

Maharashtra State Board Of Technical Education, Mumbai

Learning and Assessment Scheme for Post S.S.C Diploma Courses

Programme Name	: Diploma In Architecture Assistantship / Agricultural Engineering / Architecture / Civil Engineering / Civil & Rural Engineering / Construction Technology / Interior Design & Decoration / Interior Design / Civil & Environmental Engineering																				
Programme Code	: AA / AL / AT / CE / CR / CS / IX / IZ / LE										With Effect From Academic Year					: 2023-24					
Duration Of Programme	: 6 Semester										Duration					: 16 WEEKS					
Semester	: First										Scheme					: K					

Sr No	Course Title	Abbreviation	Course Type	Course Code	IKS Hrs	Learning Scheme						Credits	Paper Duration (hrs.)	Assessment Scheme										Total Marks
						Actual Contact Hrs./Week			Self Learning (Term Work + Assignemnt)	Notional Learning Hrs /Week	Theory			Based on LL & TL				Based on Self Learning						
						CL	TL	LL			FA-TH			SA-TH	Total		FA-PR		SA-PR		SLA			
															Max	Min	Max	Min	Max	Min	Max	Min		
1	BASIC MATHEMATICS	BMS	AEC	311302	6	4	2	-	2	8	4	3	30	70	100	40	25	10	-	-	25	10	150	
2	BASIC SCIENCE	PHYSICS	BSC	DSC	311305	4	2	-	2	1	10	5	1.5	15	70*#	100	40	25	10	25@	10	25	20	250
		CHEMISTRY					2	-	2	1				15				25	10	25@	10	25		
3	CIVIL ENGINEERING WORKSHOP	CEW	SEC	311010	6	-	-	4	-	4	2		-	-	-	-	50	20	50@	20	-	-	100	
4	COMMUNICATION SKILLS (ENGLISH)	ENG	AEC	311303	0	3	-	2	1	6	3	3	30	70	100	40	25	10	-	-	25	10	150	
5	ENGINEERING GRAPHICS (Civil, Electrical, Mechanical and allied branches)	EGR	DSC	311006	2	2	-	4	-	6	3		-	-	-	-	50	20	50@	20	-	-	100	
6	FUNDAMENTALS OF ICT	ICT	SEC	311001	0	1	-	2	1	4	2		-	-	-	-	25	10	25@	10	25	10	75	
7	YOGA AND MEDITATION	YAM	VEC	311003	1	-	-	1	1	2	1		-	-	-	-	25	10	-	-	25	10	50	
Total					19	14	2	17	7	40	20		90	210	300		250		175		150		875	

Abbreviations : CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment, SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends : @ Internal Assessment, # External Assessment, *# On Line Examination, @\$ Internal Online Examination

- Note :**
1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
 2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
 3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
 4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
 5. 1 credit is equivalent to 30 Notional hrs.
 6. * Self learning hours shall not be reflected in the Time Table.

Course Category : Discipline Specific Course Core (DSC) : 2, Discipline Specific Elective (DSE) : 0, Value Education Course (VEC) : 1, Intern./Apprenti./Project./Community (INP) : 0, Ability Enhancement Course (AEC) : 2, Skill Enhancement Course (SEC) : 2, Generic Elective (GE) : 0

Programme Name/s : Architecture Assistantship/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data Analytics/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Textile Technology/ Electronics & Computer Engg./ Textile Manufactures

Programme:

Code AA/AE/AI/AL/AN/AO/AT/BD/CE/CH/CM/CO/CR/CS/CW/DC/DE/DS/EE/EJ/EP/ET/EX/FC/HA/IC/IE/IF/IH/IL

Semester : First

Course Title : BASIC MATHEMATICS

Course Code : 311302

I. RATIONALE

Basic Mathematics plays a crucial role in diploma programmes as it fosters the development of critical thinking skills, enhances quantitative literacy, prepares students for higher education, promotes problem-solving abilities, cultivates logical and abstract thinking and fosters mathematical literacy. By engaging with Mathematics, students acquire logical reasoning, problem-solving techniques and analytical thinking, which are valuable for lifelong learning and professional growth. Calculus is a branch of Mathematics that calculates how matter, particles and heavenly bodies actually move. Derivatives are useful to find maxima and minima of the function, velocity and acceleration are also useful for many engineering optimization problems. Statistics can be defined as a type of mathematical analysis which involves the method of collecting and analyzing data and then summing up the data into a numerical form for a given set of factual data or real-world observations. It equips individuals with the ability to interpret numerical information, make informed decisions and navigate real-world situations. Moreover, Mathematics provides a foundation for further studies in various disciplines and prepares students to tackle complex challenges. By exploring abstract concepts and logical structures, students develop their ability to reason, make connections, and approach problems with clarity and precision. Furthermore, studying Mathematics helps students appreciate the historical and cultural significance of Mathematics and its applications in diverse fields, thereby fostering mathematical literacy and a deeper understanding of the world. Hence the course provides the insight to analyze engineering problems scientifically using logarithms, matrices, trigonometry, straight line, differential calculus and statistics. By incorporating these topics, students comprehend to approach engineering problems from a mathematical perspective, enabling them to devise efficient and effective solutions and this leads to preparing Diploma graduates well-rounded, adaptable and capable of making significant contributions to the branch-specific problems.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply the concept of Mathematics to solve industry-based technology problems.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Apply the concepts of algebra to solve engineering (discipline) related problems.
- CO2 - Utilize trigonometry to solve branch specific engineering problems.
- CO3 - Solve area specific engineering problems under given conditions of straight lines.
- CO4 - Apply differential calculus to solve discipline specific problems.
- CO5 - Use techniques and methods of statistics to crack discipline specific problems.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory			Based on LL & TSL				Based on SL			
				CL	TL	LL					Total	Practical		SLA							
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min				
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min												
311302	BASIC MATHEMATICS	BMS	AEC	4	2	-	2	8	4	3	30	70	100	40	25	10	-	-	25	10	150

IKS Content : 6 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Solve the given simple problem based on laws of logarithm. TLO 1.2 Solve given system of linear equations using matrix inversion method. TLO 1.3 Obtain the proper and improper partial fraction for the given simple rational function. TLO 1.4 Solve simultaneous equations by using concept given in Ancient Indian Mathematics.	Unit - I Algebra 1.1 Logarithm: Concept and laws of logarithm. 1.2 Matrices: Matrices, algebra of matrices, transpose, value of determinant of matrix of order 3x3, adjoint and inverse of matrices. 1.3 Matrices: Solution of simultaneous equations by matrix inversion method. 1.4 Partial Fractions: Types of partial fraction based on nature of factors and related Problems. 1.5 Algebra in Indian Knowledge System: Solution of simultaneous equations (Indian Mathematics)..	Improved Lecture Tutorial Assignment Demonstration Simulation
2	TLO 2.1 Apply the concept of Compound angle, allied angle and multiple angles to solve the given simple engineering problem(s). TLO 2.2 Apply the concept of Sub- multiple angle to solve the given simple engineering related problem(s). TLO 2.3 Apply concept of factorization and de-factorization formulae to solve the given simple engineering problem(s). TLO 2.4 Investigate given simple problems by utilizing inverse trigonometric ratios. TLO 2.5 Use concept given in Ancient Indian Mathematics for trigonometry to solve given problems.	Unit - II Trigonometry 2.1 Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), submultiples angles. (without proof) 2.2 Factorization and De factorization formulae. (without proof). 2.3 Inverse Trigonometric Ratios and related problems. 2.4 Principle values and relation between trigonometric and inverse trigonometric ratios. 2.5 Trigonometry in Indian Knowledge System: The Evolution of Sine Function in India. 2.6 Indian Trigonometry: Basic Indian Trigonometry- Introduction and Terminology (From Ancient Beginnings to Nilakantha). 2.7 Trigonometry in Indian Knowledge System: Pythagorean triples in Sulabasutras.	Improved Lecture Tutorial Assignment Demonstration Simulation Flipped Classroom approach

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	<p>TLO 3.1 Calculate angle between given two straight lines.</p> <p>TLO 3.2 Formulate equation of straight lines related to given engineering problems.</p> <p>TLO 3.3 Identify perpendicular distance from the given point to the line.</p> <p>TLO 3.4 Calculate perpendicular distance between the given two parallel lines.</p> <p>TLO 3.5 Use geometry given in Sulabasutras to solve the given problems.</p>	<p>Unit - III Straight Line</p> <p>3.1 Straight line and slope of straight line: Angle between two lines, Condition of parallel and perpendicular lines.</p> <p>3.2 Various forms of straight lines: Slope point form, two-point form, Double intercept form, General form.</p> <p>3.3 Perpendicular distance from a point on the line.</p> <p>3.4 Perpendicular distance between two parallel lines.</p> <p>3.5 Geometry in Sulabasutras in Indian Knowledge System (construction of square, circling the square). (Indian Mathematics).</p>	<p>Improved Lecture</p> <p>Tutorial</p> <p>Assignment</p> <p>Demonstration</p> <p>Simulation</p>
4	<p>TLO 4.1 Solve the given simple problems based on functions.</p> <p>TLO 4.2 Solve the given simple problems based on rules of differentiation.</p> <p>TLO 4.3 Obtain the derivatives of composite, implicit, parametric, inverse, logarithmic, exponential functions.</p> <p>TLO 4.4 Apply the concept of differentiation to find given equation of tangent and normal.</p> <p>TLO 4.5 Apply the concept of differentiation to calculate maxima, minima and radius of curvature for given function.</p> <p>TLO 4.6 Familiar with concept of calculus given in Indian Mathematics.</p>	<p>Unit - IV Differential Calculus</p> <p>4.1 Functions and Limits: Concept of function and simple examples.</p> <p>4.2 Functions and Limits: Concept of limits without examples.</p> <p>4.3 Derivatives: Rules of derivatives such as sum, Product, Quotient of functions.</p> <p>4.4 Derivatives: Derivative of composite functions (chain Rule), implicit and parametric functions.</p> <p>4.5 Derivatives: Derivatives of inverse, logarithmic and exponential functions.</p> <p>4.6 Applications of derivative: Second order derivative without examples, Equation of tangent and normal, Maxima and minima, Radius of curvature.</p> <p>4.7 Calculus in Indian Knowledge System: The Discovery of Calculus by Indian Astronomers. (Indian Mathematics).</p>	<p>Improved Lecture</p> <p>Tutorial</p> <p>Assignment</p> <p>Demonstration</p> <p>Simulation</p>
5	<p>TLO 5.1 Obtain the range and coefficient of range of the given grouped and ungrouped data.</p> <p>TLO 5.2 Calculate mean and standard deviation of ungrouped and grouped data related to the given simple engineering problem(s).</p> <p>TLO 5.3 Determine the variance and coefficient of variance of given grouped and ungrouped data.</p> <p>TLO 5.4 Justify the consistency of given simple sets of data.</p>	<p>Unit - V Statistics</p> <p>5.1 Range, coefficient of range of discrete and grouped data.</p> <p>5.2 Mean deviation and standard deviation from mean of grouped and ungrouped data.</p> <p>5.3 Variance and coefficient of variance.</p> <p>5.4 Comparison of two sets of observation.</p>	<p>Improved Lecture</p> <p>Tutorial</p> <p>Assignment</p> <p>Demonstration</p> <p>Simulation</p> <p>Flipped Classroom approach</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Solve simple problems of Logarithms based on given applications.	1	Solve simple problems of Logarithms based on given applications.	2	CO1
LLO 2.1 Solve elementary problems on Algebra of matrices for branch specific engineering related applications.	2	Solve elementary problems on Algebra of matrices for branch specific engineering related applications.	2	CO1
LLO 3.1 Apply the concept of matrix to solve engineering problems.	3	Solve solution of Simultaneous Equation using inversion method.	2	CO1
LLO 4.1 Apply the concept of matrix to solve engineering problems.	4	Apply Matrix Inversion method to determine currents through various branches of given electrical networks.	2	CO1
LLO 5.1 Apply the concept of matrix to solve engineering problems.	5	Determine inverse of a non-singular matrix by using open source software.	2	CO1
LLO 6.1 Apply the concept of partial fraction to solve engineering problems.	6	Resolve into partial fraction using linear non-repeated, repeated, and irreducible quadratic factors.	2	CO1
LLO 7.1 Solve problems on Compound, Allied, multiple and sub multiple angles for related shapes.	7	Solve problems on Compound, Allied, multiple and sub multiple angles for related shapes.	2	CO2

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 8.1 Utilize the concept of trigonometry to solve engineering problems.	8	Practice problems on factorization and de factorization.	2	CO2
LLO 9.1 Utilize the concept of trigonometry to solve engineering problems.	9	Solve problems on inverse trigonometric ratios based on applications.	2	CO2
LLO 10.1 Solve branch specific engineering problems under given conditions of straight lines.	10	Practice problems on equation of straight lines using different forms.	2	CO3
LLO 11.1 Solve branch specific engineering problems under given conditions of straight lines.	11	Solve problems on perpendicular distance, distance between two parallel lines and angle between two lines.	2	CO3
LLO 12.1 Solve branch specific engineering problems under given conditions of straight lines.	12	Use given form of straight line to calculate the speed, distance and time of moving object.	2	CO3
LLO 13.1 Apply the concept of derivative to solve engineering problems.	13	Solve problems to find derivatives of implicit function and parametric function.	2	CO4
LLO 14.1 Apply the concept of derivative to solve engineering problems.	14	Solve problems to find derivative of logarithmic and exponential functions for engineering applications.	2	CO4
LLO 15.1 Apply the concept of equation of tangent and normal to solve engineering problems.	15	Solve problems based on finding equation of tangent and normal for engineering applications.	2	CO4
LLO 16.1 Apply the concept of maxima, minima and radius of curvature to solve engineering problems.	16	Solve problems based on finding maxima, minima of function and radius of curvature at a given point for engineering applications.	2	CO4
LLO 17.1 Apply the concept of equation of tangent and normal to solve engineering problems.	17	Use the concept of tangent and normal to solve the given problem of Engineering Drawing.	2	CO4
LLO 18.1 Apply the concept of Maxima and Minima to solve engineering problems.	18	Use the concept of Maxima and Minima to obtain optimum value for given engineering problem.	2	CO4
LLO 19.1 Apply the concept of radius of curvature to solve engineering problems.	19	Use the concept of radius of curvature to solve given branch specific engineering problem.	2	CO4
LLO 20.1 Utilize the concept of derivative to solve engineering problems.	20	Use the concept of derivative to find the slope of a bending curve for given engineering problem.	2	CO4
LLO 21.1 Use concept of range and mean deviation to crack branch specific problems.	21	Solve problems on finding range, coefficient of range and mean deviation for given applications.	2	CO5
LLO 22.1 Use concept of standard deviation and coefficient of variance to crack branch specific problems.	22	Solve problems on standard deviation, coefficient of variation and comparison of two sets.	2	CO5
LLO 23.1 Use concept of standard deviation to crack branch specific problems.	23	Calculate the Standard Deviation for Concrete with the given data for given engineering applications.	2	CO5
Note : Note: 1. Take any 15 tutorials out of 23 and ensured that all the units are covered. 2. Take tutorial in the batch size of 20 to 30 students. 3. Give students at least 10 problems to solve in each tutorial.				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Micro project

- Create a function that takes a matrix as input and returns its inverse matrix if it exists. Also Implement a program that finds the inverse of a square matrix.
- Collect the Data of Marks obtained by your class in mid sem test. Compute the variance and coefficient of variance of the data and interpret the result using the free open source software ORANGE.
- Prepare models using matrices to solve simple problems based on cryptography.
- Collect Model on quality control analysis, energy efficiency assessment, environmental monitoring, and process optimization, for these models, analyze data and calculate variance and standard deviation, make a presentation including short videos.
- Prepare the model using the concept of tangent and normal bending of roads in case of sliding of a vehicle, express geometrically the same through any open source software.
- Prepare the model using the concept of radius of curvature to bending of railway tracks, express geometrically the same through any open source software.
- A window in the form of a rectangle surmounted by a semicircular opening. The total perimeter of the window to admit maximum light through the whole opening, prepare a model using concept of Maxima and Minima for the above problem and verify the result.
- Visualize trigonometric waveforms and create animations utilizing sine or cosine functions and make a presentation.

- Develop a program of trigonometric function calculator that computes sine, cosine, and tangent values.
- Collect applications of the radius of curvature on lens design and optics, mirror and reflective surface properties, road and highway design, structural behavior, roller coaster track design, and composite material manufacturing and make a video of 5-minutes duration.
- Prepare models using trigonometry based on at least 10 engineering problems.
- Apply trigonometric principles to calculate angles, distances, forces, and dimensions relevant to the chosen area and make a poster presentation.
- Prepare charts using determinant to find area of regular shapes.
- Design a puzzle based on matrices. Create a grid of numbers and operations.
- Develop a math game based on operations of matrices.
- Use matrices as a tool for music composition. Assign different musical elements (e.g., notes, chords, rhythms) to matrix elements, and experiment with combining and transforming the matrices to create unique musical compositions. You can use musical notation open software or even traditional instruments to bring your compositions to life.
- Attempt any 10-12 Micro Projects, out of the given list.

Assignment

- Collect examples based on real world applications of logarithm and prepare a pdf file.
- Solve the simultaneous system of equation in two variables by Matrix Inversion Method. Write down a Mathematical programming using any open source software to verify the result.
- Collect an examples on coding theory using applications of matrices and prepare a pdf file.
- Represent the Graph of Trigonometric function, Logarithmic function on Geogebra and interpret the nature of graph and Make a pdf file.
- Measure height of trees in surrounding locations using trigonometry and prepare presentation.
- Find the derivative of $y = x^{\sin x}$ and visualize the graph of the function and its derivative using any open source software geometrically.
- Find height of room or distance between two pillars by using concept of straight line.
- Collect at least 10 examples based on real world applications of standard deviation/variance.
- Collect at least 10 examples based on real world uses of applications of derivative.
- Attempt any 5-7 Assignment, out of the given list.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Open-source software like SageMaths, MATHS3D, GeoGebra, Graph, DPLOT, and Graphing Calculator (Graph Eq 2.13), ORANGE can be used for Algebra, Calculus, Trigonometry, and Statistics respectively.	All

IX. SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Algebra	CO1	12	2	6	6	14
2	II	Trigonometry	CO2	16	2	6	6	14
3	III	Straight Line	CO3	6	2	2	4	8
4	IV	Differential Calculus	CO4	16	2	8	10	20
5	V	Statistics	CO5	10	2	6	6	14
Grand Total				60	10	28	32	70

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Tests
- Rubrics for COs Assignment
- Midterm Exam
- Self-learning
- Term Work
- Seminar/Presentation

Summative Assessment (Assessment of Learning)

- End Term Exam
- Micro-project
- Tutorial Performance

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	-	1	-	1	1			
CO2	3	1	-	-	1	1	1			
CO3	3	-	-	-	-	-	-			
CO4	3	1	1	1	-	1	-			
CO5	3	2	1	1	1	1	1			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher
1	Grewal B. S.	Higher Engineering Mathematics	Khanna publication New Delhi , 2013 ISBN: 8174091955
2	Dutta. D	A text book of Engineering Mathematics	New age publication New Delhi, 2006 ISBN: 978-81-224-1689-3
3	Kreyszig, Ervin	Advance Engineering Mathematics	Wiley publication New Delhi 2016 ISBN: 978-81-265-5423-2
4	Das H.K.	Advance Engineering Mathematics	S Chand publication New Delhi 2008 ISBN: 9788121903455
5	Marvin L. Bittinger David J. Ellenbogen Scott A. Sargent	Calculus and Its Applications	Addison-Wesley 10th Edition ISBN-13: 978-0-321-69433-1
6	C. S. Seshadri	Studies in the History of Indian Mathematics	Hindustan Book Agency, New Delhi 110016. ISBN 978-93-80250-06-9
7	George Gheverghese Joseph	Indian Mathematics Engaging with the World from Ancient to Modern Times	World Scientific Publishing Europe Ltd. 57 ISBN 978-17-86340-61-0
8	Deepak Singh	Mathematics-I	Khanna Book Publishing Co. (P) Ltd. ISBN: 978-93-91505-42-4
9	Garima Singh	Mathematics-II	Khanna Book Publishing Co. (P) Ltd. ISBN: 978-93-91505-52-3
10	Gareth James, Daniela Witten, Trevor Hastie Robert and Tibshirani	An Introduction to Statistical Learning with Applications in R	Springer New York Heidelberg Dordrecht London ISBN 978-1-4614-7137-0 ISBN 978-1-4614-7138-7 (eBook)
11	Gunakar Muley	Sansar Ke Mahan Ganitagya	First Edition, Rajkamal Prakashan, ISBN-10. 8126703571, ISBN-13. 978-8126703579.
12	T.S. Bhanumurthy	A Modern introduction to Ancient Indian Mathematics	New Age International Private Limited, 1 January 2008 ISBN- 10. 812242600X, ISBN- 13. 978-8122426007
13	M.P. Trivedi and P.Y. Trivedi	Consider Dimension and Replace Pi	Notion Press; 1st edition (2018), ISBN-978-1644291795

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	http://nptel.ac.in/courses/106102064/1	Online Learning Initiatives by IITs and IISc
2	www.scilab.org/ -SCI Lab	Signal processing, statistical analysis, image enhancement.
3	www.mathworks.com/product/matlab/ -MATLAB	Applications of concepts of Mathematics to coding.

Sr.No	Link / Portal	Description
4	Spreadsheet Applications	Use of Microsoft Excel, Apple Numbers, Google Sheets.
5	https://ocw.mit.edu/	MIT Course ware
6	https://www.khanacademy.org/math?gclid=CNqHuabCys4CFdOJaddHoPig	Concept of Mathematics through video lectures and notes
7	http://ocw.abu.edu.ng/courses/mathematics/	List of Mathematical Courses.
8	https://libguides.furman.edu/oer/subject/mathematics	Open Education Resources (OER) in Mathematics.
9	https://phet.colorado.edu/en/simulations/filter?subjects=math&type=html,prototype	Phet Simulation for Mathematics.
10	https://libguides.cmich.edu/OER/mathematics	Mathematics with OER.

Programme Name/s : Architecture Assistantship/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data Analytics/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Textile Technology/ Electronics & Computer Engg./ Textile Manufactures

Programme:

Code AA/AE/AI/AL/AN/AO/AT/BD/CE/CH/CM/CO/CR/CS/CW/DC/DE/DS/EE/EJ/EP/ET/EX/FC/HA/IC/IE/IF/IH/IL

Semester : First

Course Title : BASIC SCIENCE

Course Code : 311305

I. RATIONALE

Diploma engineers have to deal with various materials and machines. This course is designed with fundamental information to help the diploma engineering students to apply the basic concepts and principles of physics and chemistry to solve broad-based engineering problems. The basic concepts and principles of sciences related to heat, electricity, magnetism, optics, semiconductors, engineering materials will help in understanding the technology courses where emphasis is on the applications of these in various technology domain applications

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

This course is to be taught and implemented with the aim to develop in the student, the course outcomes (COs) leading to the attainment of following industry identified outcome expected from this course: Apply principles of physics and chemistry to solve broad based relevant engineering problems.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Use basic instruments to measure the physical quantities in various engineering situations.
- CO2 - Apply the basic principles of electromagnetics to solve given engineering problems.
- CO3 - Apply basic principles of thermometry and fibre optics to solve engineering problems.
- CO4 - Predict the structure, properties and behaviour of molecules and compounds based on the types of che
- CO5 - Apply the concepts of electrochemistry and corrosion preventive measures in industry.
- CO6 - Use the appropriate engineering material and catalyst appropriately.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										
				Actual Contact Hrs./Week			SLH	NLH	Paper Duration		Theory			Based on LL & TSL				Based on SL		Total Marks	
				CL	TL	LL					FA-TH	SA-TH	Total	Practical		SLA					
							Max	Min						Max	Min	Max	Min	Max	Min		
311305	BASIC SCIENCE	BSC	DSC	4	-	4	2	10	5	1.5	30	70*#	100	40	50	20	50@	20	50	20	250

IKS Content : 4 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Explain physical quantities and its types with examples.</p> <p>TLO 1.2 Differentiate between scalar and vector quantities with examples.</p> <p>TLO 1.3 Apply dimensional analysis to check correctness of equation and conversion of units in different systems .</p> <p>TLO 1.4 Estimate the errors in the measurement for the give problem.</p> <p>TLO 1.5 Explain the working of ancient astronomical instruments to measure distance , time and hour angle .</p> <p>TLO 1.6 Explain the procedure of measuring the dimension of a given object by using vernier calipers and screw gauge .</p>	<p>Unit - I Units and Measurements</p> <p>1.1 Unit, physical quantities: fundamental and derived quantities and their units Systems of units: CGS, MKS and SI .</p> <p>1.2 Scalar and Vector Physical Quantities.</p> <p>1.3 Dimensions, dimensional formula ,Applications of dimensional analysis; correctness of physical equations ,conversion factor for interconversion of units in different systems of units.</p> <p>1.4 Errors, types of errors: instrumental, systematic and random error, estimation of errors: absolute, relative and percentage error, significant figures.</p> <p>1.5 Ancient astronomical instruments:Chakra, Dhanuryatra , Yasti and Phalaka yantra .</p> <p>1.6 Applications of Vernier calipers , Screw gauge .</p>	<p>Chalk and board Improved lecture, Tutorial Assignment Demonstration</p>
2	<p>TLO 2.1 Explain electric field, potential and potential difference.</p> <p>TLO 2.2 Explain magnetic intensity and flux with their units.</p> <p>TLO 2.3 Apply laws of series and parallel combination to the given electrical circuits.Explain the heating effect of electric current.</p> <p>TLO 2.4 Distinguish between conductors, semiconductors and insulators on the basis of energy bands.</p> <p>TLO 2.5 Explain the I-V characteristics and applications of p-n junction diode.</p>	<p>Unit - II Electricity, Magnetism and Semiconductors</p> <p>2.1 Concept of charge, Coulomb's inverse square law, Electric field, Electric field intensity, potential and potential difference.</p> <p>2.2 Magnetic field and magnetic field intensity and its units, magnetic lines of force, magnetic flux .</p> <p>2.3 Electric current, Ohm's law, specific resistance, laws of series and parallel combination of resistance, conversion of galvanometer into ammeter and voltmeter, Heating effect of electric current .</p> <p>2.4 Conductors, Insulators and Semiconductors, Energy bands, intrinsic and extrinsic semiconductors, minority and majority charge carriers.</p> <p>2.5 p-n junction diode, Depletion layer I-V characteristics of p-n junction, static and dynamic resistance, applications of p-n junction diode ,: Half wave rectifier.</p>	<p>Chalk and board Improved lecture, Tutorial Assignment Demonstration Educational Games</p>

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	<p>TLO 3.1 Convert temperature in different temperature scales.</p> <p>TLO 3.2 Compare different modes of heat transfer with examples.</p> <p>TLO 3.3 Inter-relate the characteristics of the three gas laws.</p> <p>TLO 3.4 Inter-relate the characteristics of the three gas laws.</p> <p>TLO 3.5 Explain total internal reflection in optical fiber.</p> <p>TLO 3.6 Differentiate between types optical fiber with applications.</p>	<p>Unit - III Thermometry and Fiber Optics</p> <p>3.1 Heat, temperature, temperature scale: Degree Celsius, degree Kelvin, degree Fahrenheit.</p> <p>3.2 Modes of heat transfer: Conduction , Convection and Radiation , Applications in daily life .</p> <p>3.3 Boyle's law, Charle's law, Gay Lussac's law, perfect gas statements equations and simple numerical.</p> <p>3.4 Law of thermal conductivity ,Newton's law of cooling.</p> <p>3.5 Law of refraction, total internal reflection.</p> <p>3.6 Optical fiber: Principle, construction and working Types of Optical fibers;Single mode step index, Multimode step index, Multimode graded index Applications of optical fibers.</p>	<p>Chalk and board Improved lecture, Tutorial Assignment Demonstration Flip classroom Educational Games</p>
4	<p>TLO 4.1 Explain the properties of given material based on the bond formation.</p> <p>TLO 4.2 Describe the molecular structure of given solid, liquid and gases.</p> <p>TLO 4.3 Describe the crystal structure of the given solids.</p> <p>TLO 4.4 Explain Properties of metallic solid.</p>	<p>Unit - IV Chemical bonding</p> <p>4.1 Indian Chemistry:-Philosophy of atom by Acharya Kanad.</p> <p>4.2 Electronic theory of valency: Assumptions , Chemical bonds: Types and characteristics of electrovalent bond, covalent bond, coordinate bond, hydrogen bond, metallic bond and Intermolecular forces of attraction.</p> <p>4.3 Molecular arrangement in solid, liquid and gases.</p> <p>4.4 Structure of solids: crystalline and amorphous solids ,Properties of metallic solid, Unit cell: simple cubic, body center cubic (BCC) , face centre cubic (FCC), hexagonal close pack crystals.</p>	<p>Simulation, Model Display, Demonstration Chalk and board , PPT, ect</p>
5	<p>TLO 5.1 Describe mechanism of electrolysis of CuSO₄ solution by using cu and pt rods</p> <p>TLO 5.2 Solve numerical based on Faraday's first and second law of electrolysis.</p> <p>TLO 5.3 Distinguish between primary and secondary cell</p> <p>TLO 5.4 Describe the phenomenon of the given type of corrosion and its prevention.</p> <p>TLO 5.5 Identify the different factors affecting rate of corrosion for the given type of material.</p> <p>TLO 5.6 Select the protective measures to prevent the corrosion in the given corrosive medium.</p>	<p>Unit - V Electro chemistry and Metal Corrosion, its prevent ion</p> <p>5.1 Electrolyte- Types of electrolyte, ionization and dissociation ,Cathode, Anode, Electrode potential: oxidation and reduction, Mechanism of electrolysis :Electrolysis, Electrochemical series for cations and anions. Mechanism of electrolysis of CuSO₄ solution</p> <p>5.2 Faraday's laws of electrolysis: Faraday's first and second law, relation between electrochemical equivalent and chemical equivalent, Numerical. Applications of electrolysis: Electro-refining of copper and Electroplating.</p> <p>5.3 Difference between primary and secondary cell.</p> <p>5.4 Corrosion: Definition and Types of corrosion Dry corrosion: Mechanism, Types of oxide film, Wet corrosion :Mechanism hydrogen evolution in acidic medium, oxygen absorption in neutral or alkaline medium ,Galvanic cell action by Daniel cell.</p> <p>5.5 Factors affecting the rate of corrosion.</p> <p>5.6 Corrosion control: Modification of environment, Use of protective coatings, coating of less active metal like Tin (Tinning), coating of more active metal like Zinc (Galvanizing), Anodic and cathodic protection, Choice of material-using pure metal and using metal alloy</p>	<p>Simulation, Demonstration, Flipped Classroom, Collaborative Learning, Case Study, On-site/Industrial Visit ,chalk and board etc.</p>

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
6	<p>TLO 6.1 Identify the ingredients of the given paints.</p> <p>TLO 6.2 List out salient properties of the given paint and varnish.</p> <p>TLO 6.3 Describe the properties of insulating materials for the given application.</p> <p>TLO 6.4 Differentiate the given types of structural polymers.</p> <p>TLO 6.5 Describe the polymerization process of the given polymer.</p> <p>TLO 6.6 Explain the properties and uses of the given polymer, elastomer and adhesive.</p> <p>TLO 6.7 Describe the application of relevant adhesives required for the given material.</p> <p>TLO 6.8 Suggest the lubricant for various types of machines in industry.</p> <p>TLO 6.9 Select the relevant catalyst for given application.</p>	<p>Unit - VI Engineering Materials and Catalysis</p> <p>6.1 Paints: Purposes of applying paint, Characteristics of paints, Ingredients of paints, Function and examples of each ingredient.</p> <p>6.2 Varnish: Types, Difference between paint and varnishes.</p> <p>6.3 Insulators: Characteristics, Classification, Properties and Application of Glass wool Thermocol.</p> <p>6.4 Polymer and Monomer : Classification on the basis of Molecular structure, on the basis of monomers (homo polymer and copolymer), on the basis of Thermal behavior (Thermoplastics and Thermosetting).</p> <p>6.5 Types Polymerization Reaction, Addition Polymerization, Condensation Polymerization, Synthesis, properties and application of Polyethylene, Polyvinyl chloride, Teflon, Polystyrene, Phenol formaldehyde, Epoxy Resin.</p> <p>6.6 Adhesives: Characteristics, Classification and their uses</p> <p>6.7 Lubricants: Classification, properties and Applications.</p> <p>6.8 Catalysis: Types of catalysis homocatalysis, heterocatalysis .</p> <p>6.9 Catalyst: Types of Catalyst Positive, Negative and Auto-catalyst, Catalytic Promoter and Catalytic inhibitor, Industrial application of catalyst.</p>	<p>Simulation, Demonstration, On-site Visit, Chalk and Board, etc.</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Use Vernier caliper to : Measure dimensions of given objects. Measure the dimensions of objects of known dimensions. LLO 1.2 Estimate the errors in measurement.	1	Measurements of dimensions of given object by Vernier caliper.	2	CO1
LLO 2.1 Use Micrometer Screw gauge to: Measure dimensions of given objects. Measure the dimensions of objects of known dimensions. LLO 2.2 Estimate the errors in measurement.	2	Measurements of dimensions of given objects by micrometer screw gauge.	2	CO1
LLO 3.1 Apply Ohm's law to solve circuit problems.	3	Determination of resistance by Ohm's law.	2	CO2
LLO 4.1 Determine the specific resistance of given wire.	4	Determination of specific resistance of given wire.	2	CO2
LLO 5.1 Verify law of series connection of resistors.	5	Determination of equivalent resistance in series connection of resistors.	2	CO2
LLO 6.1 Verify law of parallel connection of resistors.	6	Determination of equivalent resistance in parallel connection of resistors.	2	CO2
LLO 7.1 Use magnetic compass to draw the magnetic lines of forces of magnet of different shapes and determine neutral points.	7	Determination of neutral points by magnetic compass.	2	CO2
LLO 8.1 Use P-N junction diode to draw forward bias and reverse bias I-V characteristics LLO 8.2 Find out static and dynamic resistance of given P N junction diode	8	Determination of static and dynamic resistance of given P N junction diode.	2	CO2
LLO 9.1 Determine forbidden energy band gap in semiconductors	9	Determination of forbidden energy band gap in semiconductors.	2	CO2
LLO 10.1 Use Joule's calorimeter to determine Joule's mechanical equivalent of heat	10	Determination of Joule's mechanical equivalent of heat by Joule's law.	2	CO3
LLO 11.1 Determine the pressure-volume relation using Boyle's law	11	Determination of pressure-volume relation using Boyle's law.	2	CO3
LLO 12.1 Use Newton's law of cooling to determine the rate of heat loss due to convection phenomena	12	Determination of the rate of heat loss due to convection by Newton's law of cooling.	2	CO3

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 13.1 Use Searle's thermal conductivity apparatus to find coefficient of thermal conductivity of given material (Virtual Lab)	13	Determination of Coefficient of thermal conductivity.	2	CO3
LLO 14.1 Determine the refractive index of glass slab using TIR phenomenon.	14	Determination of the refractive index of glass slab.	2	CO3
LLO 15.1 Determine the Numerical Aperture (NA) of a given step index optical fibre	15	Determination of the Numerical Aperture (NA) of a given step index optical fiber.	2	CO3
LLO 16.1 Identify cation in given ionic solutions by performing selective test	16	Identification of cation in given ionic solutions.	2	CO4
LLO 17.1 Identify anion in given ionic solutions by performing selective test	17	Identification of anion in given ionic solutions.	2	CO4
LLO 18.1 Identify states of matter of materials by using simulation. by Applying heating and cooling Techniques. LLO 18.2 Relate temperature-pressure diagram	18	Identification of states of matter.	2	CO4
LLO 19.1 Determine the electrode potential of copper metal. by setting Electrochemical Cell LLO 19.2 Measure electrode potential of Cu Using Voltmeter. LLO 19.3 Measure the cell potential for various conditions.	19	Determination of electrode potential of copper.	2	CO5
LLO 20.1 Determine the electrode potential of Iron metal. by setting Electrochemical Cell LLO 20.2 Measure electrode potential of Fe Using Voltmeter LLO 20.3 Measure the cell potential for various conditions.	20	Determination of electrode potential of Iron metal.	2	CO5
LLO 21.1 Determine the voltage generated from chemical reaction using Daniel Cell. LLO 21.2 Set up Daniel Cell. Prepare Electrolyte Solution LLO 21.3 Measure voltage accurately	21	Determination of the voltage generated from chemical reaction using Daniel Cell.	2	CO5
LLO 22.1 Prepare Electrolyte Solution of CuSO ₄ of known concentration LLO 22.2 Set up electrolysis apparatus LLO 22.3 Control various parameters of electrolysis. LLO 22.4 Determine electrochemical equivalent of Cu metal using Faraday's first law.	22	Determination of electrochemical equivalent of Cu metal using Faraday's first law.	2	CO5
LLO 23.1 Prepare Electrolyte Solution of the given metal of known concentration LLO 23.2 Set up electrolysis apparatus LLO 23.3 Control various parameters of electrolysis LLO 23.4 Analyze the data obtained from the experiment. LLO 23.5 Verify Faraday second law	23	Determination of equivalent weight of metal using Faraday's second law.	2	CO5
LLO 24.1 Prepare corrosive solutions LLO 24.2 Determine the extent of corrosion.	24	Preparation of corrosive medium for Aluminium at different temperature.	2	CO5
LLO 25.1 Prepare corrosive solutions. LLO 25.2 Determine the extent of corrosion LLO 25.3 Compare the corrosion behaviour of Aluminum at different temperatures.	25	Determination of rate of corrosion at different temperatures for Aluminium.	2	CO5
LLO 26.1 Determine the effect of temperature on viscosity for given lubricating oil using Redwood viscometer-	26	Determination of effect of temperature on viscosity for given lubricating oil using Redwood viscometer-I.	2	CO6
LLO 27.1 Determine the steam emulsification number of given lubricating oil. LLO 27.2 Measure the steam flow duration	27	Determination of the steam emulsification number of given lubricating oil.	2	CO6
LLO 28.1 Calculate the flash and fire point of given lubricating oils using Cleveland open cup apparatus	28	Determination of flash and fire point of given lubricating oils using Cleveland open cup apparatus.	2	CO6
LLO 29.1 Determine the flash point of given lubricating oil using Abel's closed cup apparatus.	29	Determination of flash point of given lubricating oil using Abel's closed cup apparatus.	2	CO6

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 30.1 Determine thinner content in oil paint. using electric oven	30	Determination of thinner content in oil paint.	2	CO6
<p>Note :</p> <p>i. A suggestive list of practical LLOs is given in the table, more such practical LLOs can be added to attain the COs and competency. A judicious mix of minimum 12 or more for physics and minimum 12 or more for chemistry practical LLOs need to be performed, so that the student reaches the 'Precision Level' of Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry. ii. Hence, the 'Process' and 'Product' related skills associated with each LLOs of the laboratory work are to be assessed according to a suggested sample of Performance Indicators (Weightage in %) as follows: 1) Preparation of experimental set up 20% 2) Setting and operation 20% 3) Safety measures 10% 4) Observations and Recording 10% 5) Interpretation of result and Conclusion 20% 6) Answer to sample questions 10% 7) Submission of report in time 10%.</p>				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Micro project

- Series and parallel resistances: Prepare models for combination of series and parallel resistances
- Magnetic flux: Prepare models to demonstrate magnetic lines of forces of different types
- Vernier Calipers: Prepare prototype vernier caliper of desired least count using card sheet
- Conductivity: Collect different materials such as metal, plastics, glass etc. and prepare models to
- Gas laws: Prepare models to demonstrate Boyle's laws, Charles's Law and Gay Lussac's law using household
- Carbon resistors: Determine the resistance and tolerance of carbon resistors using color codes and
- Thermal conductivity: Take different metallic plates of various metals and calculate rate of flow of
- Temperature sensor : Use Temperature sensor IC LM 35 to measure temperature of given body in various
- Mobile applications : Use mobile applications for measurements of different physical quantities For
- Optical Fiber and TIR: Prepare model to demonstrate total internal reflection and the propagation of
- Convert given galvanometer into ammeter of desired range.
- Convert given galvanometer into voltmeter of desired range
- LDR: Use Light dependent resistor for measuring the intensity of light.
- Types of bonds: Prepare chart and models displaying different types of bonds with examples.
- Prepare a chart for showing different types of bonds or molecules.
- Crystal Structure: Prepare Models of SC, FCC, HCP, BCC
- Ionization: Prepare chart displaying ionization phenomenon.
- Corrosion-Prepare Chart displaying images of observed corrosion processes in the surrounding.
- Adhesives: Prepare chart or model to demonstrate the applications of various adhesives.
- Polymer: Collect the samples of different polymers and list their uses.
- Collect information based on market survey of different Polymer and compare the following points. i) Structure ii) Properties.
- Collect information by library survey regarding engineering material used in various industries.

Assignment

- Convert the units of a given physical quantity from one system of units to another.
- Measure room temperature of hot baths / bodies by using mercury thermometer and convert it into different
- Prepare a chart to summarize units and measurements
- Enlist information like band gap, material used, dimension etc about different semiconductor device
- Give details about the explanation of concept like electrostatics, magnetic domain, current elect
- Demonstrate the variation of angle of refraction with respect to refractive index using online tool
- Use a digital vernier caliper and micrometer screw gauge for measurements. (lab- based).
- Applications of optical fibers in civil, mechanical , electrical engineering etc.
- Applications of semiconductors in civil, mechanical , electrical engineering etc.
- Explain covalent bond, ionic bond, coordinate bond, hydrogen bond, intermolecular forces
- Draw Crystal structures of SC, BCC, FCC, HCP.
- Distinguish between paints and varnishes.
- Solve numerical based on Faraday's first and second law of electrolysis.
- Enlist various Adhesives with properties and applications.
- Compare between Thermoplastics and Thermosetting.
- State properties and applications thermocol and glass wool.
- Differentiate the given types of structural polymers and list out their applications.
- Demonstrate Mechanism of wet corrosion by waterline corrosion.
- Prepare chart showing mechanism of electrolysis of CuSO₄ solution by using Cu and Pt electrodes.
- Write properties and applications of solid, semisolid and liquid lubricant.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

<https://truexams.com/msbte-diploma/>

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Vernier Calipers: Range : 0-150mm , Resolution: 0.1mm	1
2	Micrometer screw gauge : Range : 0-25mm, Resolution: 0.01mm, Accuracy ± 0.02 mm or better	2
3	Digital multimeter : 3 1/2 digit display, 9999 counts, digital multimeter measures: Vac, Vdc (1000V max) , DC A, AC A(10 amp max), Resistance (0 - 100 MOhm	3,4,5,6
4	Resistance Box: 4 decade ranges from 1 ohm to 1K,accuracy 0.1 % - 1 %	3,4,5,6
5	Battery eliminator : 0- 12 V ,2A	3,4,5,6,8,9,10,12
6	Boyle's apparatus: U tube manometer , barometer	11
7	Joule's calorimeter : well insulated "mechanical equivalent of heat apparatus" in wooden box, , digital / analog thermometer,	10,12
8	Electronic balance, with the scale range of 0.001g to 500gm pan size 100 mm; response time 3-5 sec.: power requirement 90-250 V, 10 watt	19,20,21,22,23,24,25,30
9	Electric oven inner size 18"x18"x18"; temperature range 100 to 2500 C. with the capacity of 40 lt.	30
10	Ammeter 0-2 amp voltmeter-0-5v DC	19,20,21,22,23
11	Redwood viscometer-I	26
12	Cleveland open cup apparatus	28
13	Abel's close cup apparatus	29

IX. SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Units and Measurements	CO1	7	2	3	4	9
2	II	Electricity, Magnetism and Semiconductors	CO2	13	3	5	6	14
3	III	Thermometry and Fiber Optics	CO3	10	2	4	6	12
4	IV	Chemical bonding	CO4	6	2	3	4	9
5	V	Electro chemistry and Metal Corrosion, its prevent ion	CO5	12	3	4	5	12
6	VI	Engineering Materials and Catalysis	CO6	12	3	5	6	14
Grand Total				60	15	24	31	70

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Two unit tests of 30 marks (Physics 15 marks,Chemistry-15 marks) and average of two unit tests.
- For laboratory learning 50 marks (Physics 25 marks,Chemistry-25 marks).

Summative Assessment (Assessment of Learning)

- End semester assessment of 50 marks for laboratory learning (Physics 25 marks,Chemistry-25 marks).
- End semester assessment of 70 marks through online MCQ examination.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1		2	1	1	1			
CO2	3	1	1	2	1	1	1			
CO3	3	1	1	2	1	1	1			
CO4	3	2			2		1			
CO5	3	2	1	1	2		1			

CO6	3	2		2	1	1		
Legends :- High:03, Medium:02,Low:01, No Mapping: - *PSOs are to be formulated at institute level								

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher
1	Narlikar J. V. ;Joshi , A. W.; Mathur , Anuradha ; et al	Physics Textbook Part I - Class XI	National Council of Education Research and Training, New Delhi, 2010, ISBN : 8174505083
2	Narlikar, J.V.;Joshi , A. W.; Mathur , Anuradha ; et al	Physics Textbook Part II - Class XI	National Council of Education Research and Training, New Delhi, 2015, ISBN : 8174505660
3	Narlikar J.V.;Joshi , A. W.; Ghatak A.K. et al	Physics Textbook Part I - Class XII	National Council of Education Research and Training, New Delhi, 2013, ISBN : 8174506314
4	Narlikar, J.V.;Joshi , A. W.; Ghatak A.K. et al	Physics Textbook Part II - Class XII	National Council of Education Research and Training, New Delhi, 2013, ISBN : 8174506713
5	Haliday, David; Resnik, Robert and Walker, Jearl	Fundamentals of Physics	John Wiley & sons, Hoboken, USA, 2014 ISBN : 812650823X
6	Jain and Jain	Engineering Chemistry	National Council of Education Research and Training, New Delhi, 2010, ISBN : 8174505083
7	Dara S. S.	Engineering Chemistry	National Council of Education Research and Training, New Delhi, 2015, ISBN : 8174505660
8	Bagotsky V.S.	Fundamental of electrochemistry	National Council of Education Research and Training, New Delhi, 2013, ISBN : 8174506314
9	Jain and Jain	Engineering Chemistry	National Council of Education Research and Training, New Delhi, 2013, ISBN : 8174506713
10	Aryabhata.	The Surya Siddhanta	Baptist Mission press ,Calcutta
11	Steeramula Rajeswara Sarma	The Archaic And The Exotic : Studies In The History Of Indian Astronomical Instruments	Published by Manohar Book Service, 2008 ISBN 10: 8173045712 / ISBN 13: 9788173045714
12	Anju Rawlley,Devdatta V. Saraf	Applied Chemistry with Lab Manual	Khanna Book Publishing Co. (P) Ltd. New Delhi, 2021, ISBN- 978-93-91505-44-8
13	Dr. Hussain Jeevakhan	Applied Physics - II	Khanna Book Publishing, (2021), ISBN: 978-93-91505-57-8

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	www.sciencejoywagon.com/physicszone	Electricity, Magnetism and Semiconductors , basic of fiber optics
2	https://phet.colorado.edu	Electricity, Magnetism and Semiconductors , Thermometry and basic of fiber optics
3	www.physicsclassroom.com	concepts of basic physics
4	http://nptel.ac.in/course.php?disciplineId=104	concepts of basic physics
5	http://hperphysics.phy-astr.gsu.edu/hbase/hph.html	concepts of basic physics
6	https://www.youtube.com/results?search_query=amruta+university+physics+expts	concepts of basic physics
7	k. https://www.youtube.com/results?search_query=physics+class+11+chapter+1	concepts of basic physics
8	l. https://www.youtube.com/watch?v=zRGh9_a1J7s	concepts of basic physics
9	https://iksindia.org	IKS physics
10	www.chem1.com	Chemistry instruction and education
11	ww.onlinelibrary.wiley.com	Materials and corrosion
12	www.rsc.org	Catalysis
13	www.chemcollective.org	Virtual Labs, simulation

Sr.No	Link / Portal	Description
14	https://www.ancient-origins.net/history-famous-people/indian-sage-acharya-kanad-001399	IKS Philosophy of atom by Acharya Kanad.
15	https://phet.colorado.edu/en/simulations/filter?subjects=chemistry&type=html,prototype	Identify states of matter of materials by using simulation.

	: Architecture Assistantship/ Agricultural Engineering/ Architecture/ Civil Engineering/
Programme Name/s	Civil & Rural Engineering/ Construction Technology/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering
Programme Code	: AA/AL/AT/CE/CR/CS/IX/IZ/LE
Semester	: First
Course Title	: CIVIL ENGINEERING WORKSHOP
Course Code	: 311010

I. RATIONALE

General Civil Engineering Practices is a basic engineering course. The course of Civil Engineering Workshop practices would facilitate the opportunity to appreciate the basic construction activities that a Diploma holder is expected to perform. Supervision of construction activities like brick masonry, woodwork, concreting, welding etc. and quality control and maintenances of safety to self, coworkers and the constructed components of the building. The knowledge of basics of civil Engineering operations like Line out, Excavation, masonry, mixing, concreting, plumbing and finishing works is essential for technician to perform his/her duties in industries. Therefore, an opportunity is created through this course to develop basic skills with the safety aspects required for the same, Students should be able to supervise construction activities and use quality control techniques and maintain tools and equipment's with safety to self, co-workers and the constructed components of the building Working in field develops the attitude of team working and safety awareness, this course provides the unique experience of field work.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences: Perform the basic civil engineering operations using relevant tools and identifying appropriate materials, tools and equipment required for each construction activity. The course will develop awareness, knowledge & skills of various Civil Engineering practice with safety precautions and quality control at the construction site.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Use the relevant type of firefighting equipment in the given situation.
- CO2 - Undertake the various construction activities at site.
- CO3 - Perform the masonry work for the given situation.
- CO4 - Carry out the specified Plumbing work in the given situation
- CO5 - Prepare the simple job using relevant sheet metal tools.
- CO6 - Use the relevant tools for the specified carpentry work.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme				Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH			NLH	Theory			Based on LL & TSL				Based on SL		
				CL	TL	LL					Total	Practical		SLA						
							FA-TH			SA-TH		Max	Min	FA-PR	SA-PR	Max	Min	Max	Min	
311010	CIVIL ENGINEERING WORKSHOP	CEW	SEC	-	-	4	-	4	2	-	-	-	-	50	20	50@	20	-	-	100

IKS Content : 6 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain the safety practices & precautions while operating firefighting equipment. TLO 1.2 Explain the procedure for using the given type of fire extinguisher. TLO 1.3 Justify the given type of firefighting equipment for the given situation. TLO 1.4 Prepare a list of equipment used for safety in workshop operations. TLO 1.5 Maintain the good housekeeping in the working area TLO 1.6 Prepare a layout of workshop	Unit - I Safety Practices & Precautions 1.1 1.1 Safety Practices, Causes of accidents, General safety rules, Safety signs and symbols, Safety Precaution. 1.2 1.2 First Aid box and its constituent materials. 1.3 1.3 Fire, Causes of Fire, Basic ways of extinguishing the fire Classification of fire, Firefighting equipment, fire extinguishers (Class A, B, C, D).(As per NBC 2016). 1.4 1.4 Workshop Layout: Issue and return system of tools, equipment and consumables.	Demonstrate Show first aid box Hands on practice Video Demonstrations
2	TLO 2.1 Explain the basic activities to be undertaken for the construction of the given component of civil structure. TLO 2.2 Lay the foundation layout on site using relevant techniques. TLO 2.3 Explain the safety precautions to be undertaken at the given construction site.	Unit - II Construction Activities 2.1 Construction activities such as layout, excavation, brick masonry, concreting, plumbing, electrification, Interdependency of various activities. 2.2 Causes of accidents, Safety Practices and Precaution.	Demonstrate the various construction activity. Hands-on practice Field Visit Videos

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	<p>TLO 3.1 Carry out the given type of masonry work using relevant tools.</p> <p>TLO 3.2 Explain the relevant method for doing plaster of required thickness.</p> <p>TLO 3.3 Explain the relevant method of doing pointing work for rubble masonry</p> <p>TLO 3.4 Explain the need of the formwork in construction.</p> <p>TLO 3.5 Construct the false ceiling using relevant tools in the given situation.</p> <p>TLO 3.6 Fix the aluminum partition using the relevant specified material.</p> <p>TLO 3.7 Justify the need of plastering in construction.</p> <p>TLO 3.8 Undertake the flooring operation using the given type of flooring material.</p> <p>TLO 3.9 Explain the procedure for Painting a level surface of the given wall.</p> <p>TLO 3.10 Explain the relevant steps involved in Painting of steel frames/wooden structure using given type of paint.</p>	<p>Unit - III Masonary & Finishing works</p> <p>3.1 Brick and stone Masonry work, Types of bonds and joints (vertical and horizontal)</p> <p>3.2 String (Line dori), plumb bob, right angle and water level tube.</p> <p>3.3 Plastering (Internal & External) work.</p> <p>3.4 Pointing work</p> <p>3.5 Types of Formwork with safety measures.</p> <p>3.6 False ceiling, Plaster of Paris (POP) work.</p> <p>3.7 Aluminum glass works, cladding.</p> <p>3.8 Different types of flooring and its application</p> <p>3.9 Dado with its importance</p> <p>3.10 Whitewash and painting: -Tools required, brush, roller and spray-painting preparation of surface for timber and steel members for painting.</p>	<p>Demonstrate</p> <p>Hands on practice</p> <p>Tool handling.</p> <p>Simulation Videos.</p> <p>Field visit</p>
4	<p>TLO 4.1 Undertake the plumbing operation for the given situation.</p> <p>TLO 4.2 Select the relevant tools to perform the given plumbing work.</p> <p>TLO 4.3 Use the concerned tools to lay the pipe line of required specification using relevant fittings</p> <p>TLO 4.4 Draw the flow chart describing the laying operations of water supply pipe line from overhead tank to the given flat/house.</p>	<p>Unit - IV Plumbing Fixtures</p> <p>4.1 Different types of pipes, Joints, Taps. Fixtures and accessories used in plumbing.</p> <p>4.2 Components (pipes, valves bends.) used in water supply/sanitary/ sewerage lines.</p> <p>4.3 Pipe fittings- bends, elbows, tees, cross, coupler, socket, reducer, cap, plug, nipple and their Specifications</p> <p>4.4 Various Operation in plumbing shops- pipe bending machine their specifications and maintenance. Basic process cutting, threading etc.</p>	<p>Demonstrate</p> <p>Hands on practice.</p> <p>Simulation Videos.</p> <p>Field visit.</p>
5	<p>TLO 5.1 Identify the tools used in sheet metal work, available in the workshop.</p> <p>TLO 5.2 Perform the required operation on sheet metal using relevant tools in given situation.</p> <p>TLO 5.3 Perform bending operations on the given piece of sheet metal</p> <p>TLO 5.4 Maintain the equipment and machineries used in sheet metal works.</p>	<p>Unit - V Sheet Metal</p> <p>5.1 Sheet metal hand tools snip, shears sheet gauge, straight edge, L square, scriber, divider, trammel, punches, pliers, stakes, groovers, limit set and their Specifications</p> <p>5.2 Operation of machineries in sheet metal shops- sheet cutting and bending machine their specifications and maintenance.</p> <p>5.3 Basic process- marking, bending, folding, edging, seaming, staking, riveting.</p>	<p>Demonstrate</p> <p>Hands on practice.</p> <p>Simulation Videos.</p>

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
6	TLO 6.1 Select the relevant type of wood in the given situation TLO 6.2 Carry out the relevant operations on the given piece of wood using the carpentry tools. TLO 6.3 Maintain carpentry tools in good condition. TLO 6.4 Use the relevant type of material for preparing the furniture of given specification.	Unit - VI Carpentry Work 6.1 Types of engineered woods such as plywood, block board, hardboard, laminated boards, Veneer, fiber Boards and their applications. 6.2 Wood working hand tools carpentry vice, marking and measuring tools, saws, claw hammer, mallet, chisels, plans, squares, and their specifications 6.3 Operation of wood working machineries - Wood turning lathe, circular saw, their specifications and maintenance. 6.4 Basic process- marking, sawing, planning, chiseling, turning, grooving, boring. 6.5 Components of wood work- different types of Hinges, tower bolts, brackets etc.	Demonstrate Hands on practice. Simulation Videos.

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Safety Practices & Precautions	1	Operate the fire extinguisher available in laboratory (Any two types)	2	CO1
LLO 2.1 Safety Practices & Precautions	2	Perform mock drill for extinguishing fire. (Group of 10 students preferably)	4	CO1
LLO 3.1 Construction activities	3	Prepare the report of site visit of a construction project with reference to substructure construction activities along with the equipment used.	4	CO2
LLO 4.1 Construction activities	4	Perform the lineout activity on the site for the given type of foundation work.	4	CO2
LLO 5.1 Construction activities	5	Prepare a report on the observation carried on the site regarding the safety precautions followed during construction activities.	4	CO2
LLO 6.1 Study the different Agricultural Equipment's and their applications.	6	Prepare a report on different equipment involved in agricultural activities	2	CO6
LLO 7.1 Construction activities	7	Prepare a report on vernacular construction techniques used in old constructions.	2	CO2
LLO 8.1 Construction activities	8	Prepare the schematic diagram of the given structure by measuring its dimensions using measuring tape	2	CO2
LLO 9.1 Construction activities	9	Conduct the survey of the construction material through internet with reference to their properties, cost and utilities.	2	CO2
LLO 10.1 Masonary & Finishing works	10	Prepare the report of site visit of a construction project with reference to superstructure construction activities along with the equipment used.	6	CO3
LLO 11.1 Masonary & Finishing works	11	Construct a corner brick wall using the relevant type of bond by ensuring wall is in straight line, plumb and at right angle. (Group of 10 students).	6	CO3
LLO 12.1 Masonary & Finishing works	12	Transfer the marked level at the required location by using water tube level for a given construction activity.	4	CO3
LLO 13.1 Masonary & Finishing works	13	Conduct the various field test on the given sample of cement to check its quality.	4	CO3

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 14.1 Masonary & Finishing works	14	Conduct the various field test on the given sample of brick to check its quality.	2	CO3
LLO 15.1 Plumbing Fixtures	15	Prepare the pipe line of required length using the given type of fittings.	2	CO4
LLO 16.1 Plumbing Fixtures	16	Connect the two pipes of given diameters in the form of T- joint by using relevant pipe fitting.	4	CO4
LLO 17.1 Sheet Metal	17	Prepare the given shape of sheet metal utility job (tray, dustbin, letter box, fire bucket etc.) using following operations 1. Cutting And Bending 2. Edging 3. End Curling 4. Lancing 5. Welding 6. Riveting	4	CO5
LLO 18.1 Carpentry Work	18	Perform the sawing operation on the given sample of wood to convert rough surface to smooth and levelled surface.	4	CO6
LLO 19.1 Carpentry Work	19	Draw the labelled diagram of truss reflecting the tongue and groove joints with brief note on it.	2	CO6
LLO 20.1 Carpentry Work	20	Compile the information in a report format, regarding latest construction equipment used in a construction project through internet surfing.	2	CO6
LLO 21.1 Carpentry Work	21	Prepare the architectural model of the given structure using relevant types of materials.	4	CO6
LLO 22.1 Carpentry Work	22	Prepare the model of farm pond of the given capacity by using relevant materials.	4	CO6
LLO 23.1 Carpentry Work	23	Prepare a report on various ancient tools/modern tools.(Any Five each)	2	CO2 CO3 CO4 CO5 CO6
LLO 24.1 Study and collect the information about various heritage structures	24	Prepare a report on the site visit of a Heritage structures/ Ancient structure available in the immediate vicinity (Any Two)	4	CO2 CO3 CO4 CO5 CO6

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Assignment

- a. Undertake a market survey of local dealers for procurement of civil engineering materials, plumbing materials and finishing items. b. Organize a visit to Construction sites of different types such as simple residential buildings, malls, multistoried buildings. Observe the course/topic based practices on the field. c Course library internet based mini-projects. d. Develop Power point presentation or animation for activities seen during field visit.. e. Concerned faculty member may add the assignments.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Fire buckets of standard size.	1
2	Fire extinguisher (Type A,B,C and ABC)	2
3	Measuring Tape (15meter ,30meter)	8
4	Ordinary Portland Cement (43,53 grade)	13
5	Raw material such as bricks of standard size 230 mm x 115 mm x 75 mm,	11,14
6	Trowels (Brick, Buttering, Pointing), triangular, ranging in size up to about 11 inches (279.40 mm) long and from 101.6 mm to 203.2 mm wide i.e. (4 to 8 inches wide).	11,14
7	Portable Hammer, Spade, Pans (ghamela), Thread, lime	11,14
8	Square, mason's level, and straightedge 28.57 mm to 38. 10 mm and the middle 4 portion of the top edge from 152.40 mm to 254 mm wide	11
9	Levels and mason's line, brushes	11
10	String Level/Water tube, Plumb bob. Right Angle	12
11	The mason's level to establish "plumb" and "level" lines.	12
12	Plumbing materials such as pipes and accessories for different sizes and materials. pipe wrench	15,16,17
13	Components of wood work- different types of Hinges, tower bolts, brackets etc.	19,20
14	Sheet metal hand tools- snip, shears sheet gauge, straight edge, L square, scribe, divider, trammel, punches, pliers, stakes, groovers, limit set	17

IX. SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Termwork

Summative Assessment (Assessment of Learning)

- Practical

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	1	1	0	2	2	0	3			
CO2	2	2	1	3	2	3	3			
CO3	2	3	1	3	1	2	2			
CO4	2	3	1	3	1	2	2			
CO5	0	2	0	3	0	0	2			
CO6	2	2	2	3	1	1	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher
1	PWD	PWD- Standard Data Book for Building Work	PWD, Government of Maharashtra. Mumbai.
2	CPWD	CPWD Specifications (Vol.-1 and IT)	CPWD, Govt. of India, New Delhi.
3	PWD	District Schedule of rates, (DSR)	PWD, Government of Maharashtra, Mumbai.
4	Mantri Sandeep	A To Z Of Practical Building Construction & its Management	Satya Prakashan, New Delhi: 2015; ISBN 9788176842051

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	http://www.asnu.com.au	Experts in residential house painting, carpentry repairs and renovations.
2	www.mahapwd.com/	Official Portal for Public works Department for Maharashtra State
3	cpwd.gov.in/	Official Portal for Public works Department for Government of India
4	https://wrd.maharashtra.gov.in/	Official Portal for Water Resource Department for Government of Maharashtra
5	https://theconstructor.org/building/types-bonds-brick-masonry-flemish-english-wall/11616/	Different types of brick bonds
6	https://dailycivil.com/types-of-joints-in-plumbing/	Different types of plumbing materials and joints

: Architecture Assistantship/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Bi; Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Science & Engineering/ Fashion & Clothing Te Dress Designing & Garment Manufacturing/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Programme Electronics & Tele-communication Engg./ Electrical Power System/ Electronics & Communication Engg./ Electr Name/s Food Technology/ Computer Hardware & Maintenance/ Hotel Management & Catering Technology/ Instrument Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Textile Technology/ Electronics & Computer Engg./ Travel and Tourism/ Textile Manufactures

Programme:

Code AA/AE/AI/AL/AN/AO/AT/BD/CE/CH/CM/CO/CR/CS/CW/DC/DD/DE/DS/EE/EJ/EP/ET/EX/FC/HA/HM/IC/IE

Semester : First

Course Title : YOGA AND MEDITATION

Course Code : 311003

I. RATIONALE

Diploma Graduate needs a sound body and mind to face the challenging situations in career as employee or as an entrepreneur. Yoga and Meditation brings about the holistic development of an individual and equips with necessary balance to handle the challenges. The age of polytechnic student is appropriate to get introduced to yoga practice as this will help them in studies as well as his professional life. Moreover, Yoga inculcates discipline in all walks of the life of student. Pranayama practice regulates breathing practices of the student to improve stamina, resilience. Meditation empowers a student to focus and keep calm to get peace of mind. World Health Organization (WHO) has also emphasized the role of yoga and meditation as stress prevention measure. National Education Policy -2020 highlights importance of yoga and meditation amongst students of all ages. Therefore, this course for Diploma students is designed for the overall wellbeing of the student and aims to empower students to adopt and practice "Yoga" in daily life .

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Practice basic Yoga and Pranayama in daily life

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Practice basic Yoga and Pranayama in daily life to maintain physical and mental fitness.
- CO2 - Practice meditation regularly for improving concentration and better handling of stress and anxiety.
- CO3 - Follow healthy diet and hygienic practices for maintaining good health.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme										
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory			Based on LL & TSL				Based on SL		Total Marks
				CL	TL	LL					Total	Practical		SLA						
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min	Max	Min	
311003	YOGA AND MEDITATION	YAM	VEC	-	-	1	1	2	1	-	-	-	-	25	10	-	-	25	10	50

IKS Content : 1 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
-------	--	---	--------------------------------

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Practice warming up for Yoga.	1	Introduction :- Presentations on Introduction to Yoga and its History. Lab Exp: 1. Perform warming up exercises to prepare the body from head to toe for Yoga.	5	CO1
LLO 2.1 Practice Surya Namaskar	2	Lab Exp: 2. Perform all the postures of Surya Namaskar one by one in a very slow pace, after warm up. Lab Exp 3. Perform multiple Surya Namaskar (Starting with three and gradually increasing it to twelve) in one go. Experiment 2 to 4 must be followed by shavasana for self relaxation.	7	CO1 CO2
LLO 3.1 Practice basic Asanas	3	Lab Exp: 4 Perform Sarvangasana, Halasana, Kandharasana (setubandhasana) Lab Exp: 5 Perform Bhujangasana, Naukasana, Mandukasana Lab Exp: 6 Perform Paschimottasana, Baddhakonasana, Bharadwajasana. Lab Exp: 7 Perform Veera Bhadrasana, Vrukshasana, Trikonasana. Follow up experiment 5 to 7 with shavasana for self relaxation	8	CO2
LLO 4.1 Practice basic pranayama	4	Lab Exp: 8 Perform Bhastrika, Anulom Vilom Pranayam Kriya Lab Exp: 9 Practice Kapalbhathi Pranayam Kriya Lab Exp: 10 Practice Bhramary Pranayam.	5	CO3
LLO 5.1 Practice meditation	5	Lab Exp: 11 Perform sitting in Dhyana Mudra and meditating. Start with five minute and slowly increasing to higher durations. (Trainer will explain the benefits of Meditation before practice)	5	CO3

Note :

Note:

1. Start and end of each session can be with appropriate Yoga prayers and chanting of Omkar.
2. Trainers can add similar asanas in practical sessions.
3. Students are to be instructed to practice the experiment performed at least twice a week as part of self learning practices.
4. Live demonstration by the trainer needs to be carried out during practical hours. Yogic Videos can be used as well .

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Maintain a diary indicating date wise practice done by the student with a photograph of self in yogic posture.

Assignment

- Prepare Diet and nutrition chart for self

Self Learning

- Practice at least thrice a week.
- Read books on different methods to maintain health, wellness and to enhance mood
- Watch videos on Yoga Practices.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Yoga and Meditation kits : Yoga Mats, Yoga Rollers, Yoga Blocks, Aero Yoga Clothing Blankets, Cloth Straps, Bolsters, Wheels	All

IX. SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Lab performance, Self-learning and Terms work

Summative Assessment (Assessment of Learning)

- Actual Practical Performance

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	-	-	-	-	3	-	-			
CO2	-	-	-	-	3	-	-			
CO3	-	-	-	-	3	-	-			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher
1	Swami Vivekananda	Patanjalis Yoga Sutras	Fingerprint Publishing (2023) Prakash Books India Pvt Ltd, New Delhi ISBN-13?: ? 978-9354407017
2	Luisa Ray, Angus Sutherland	Yoga for Every Body: A beginner's guide to the practice of yoga postures, breathing exercises and me	Vital Life Books (2022) ISBN-13?: ? 978-1739737009
3	Swami Saradananda	Mudras for Modern Living: 49 inspiring cards to boost your health, enhance your yoga and deepen your	Watkins Publishing (2019) ISBN-13?: ? 978-1786782786

Sr.No	Author	Title	Publisher
4	Martha Davis, Elizabeth Robbins, Matthew McKay, Eshelman MSW	The Relaxation and Stress Reduction Workbook	A New Harbinger Self-Help Workbook (2019)
5	Ann Swanson	Science of Yoga: Understand the Anatomy and Physiology to Perfect Your Practice	ISBN-13?: ? 978-1465479358

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://onlinecourses.swayam2.ac.in/aic19_ed28/preview - introduction to Yoga and Applications of Yog	Yoga and Applications of Yoga
2	https://onlinecourses.swayam2.ac.in/aic23_ge09/preview	Yoga for Creativity
3	https://onlinecourses.swayam2.ac.in/aic23_ge05/preview	Yoga for concentration
4	https://onlinecourses.swayam2.ac.in/aic23_ge06/preview	yoga for memory development
5	https://onlinecourses.nptel.ac.in/noc21_hs29/preview	Psychology of Stress, Health and Well-being
6	https://onlinecourses.swayam2.ac.in/nce19_sc04/preview	Food Nutrition for Healthy Living - Course – Swayam
7	https://www.classcentral.com/course/swayam-fitness-management-	Fitness Management from Swayam

Programme Name/s : Architecture Assistantship/ Automobile Engineering./ Agricultural Engineering/ Architecture/
 Civil Engineering/ Chemical Engineering/ Civil & Rural Engineering/ Construction Technology/
 Fashion & Clothing Technology/ Electrical Engineering/ Electrical Power System/ Food Technology/
 Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/
 Mechatronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Textile Technology/ Textile Manufactures

Programme Code : AA/AE/AL/AT/CE/CH/CR/CS/DC/EE/EP/FC/IX/IZ/LE/ME/MK/PG/PN/PO/TC/TX

Semester : First

Course Title : ENGINEERING GRAPHICS (Civil, Electrical, Mechanical and allied branches)

Course Code : 311006

I. RATIONALE

Engineering graphics is the language of engineers. The concepts of graphical language are used in expressing the ideas, conveying the instructions, which are used in carrying out the jobs on the sites, shop floor etc. This course is useful in developing drafting and sketching skills in the student. It covers the knowledge & application of drawing instruments & also familiarizes the learner about Bureau of Indian Standards related to engineering drawing. The curriculum aims at developing the ability to draw and read various engineering curves, projections and dimensioning styles. The subject mainly focuses on use of drawing instruments, developing imagination and translating ideas into sketches. The course also helps to develop the idea of visualizing the actual object or part on the basis of drawings and blue prints. This preliminary course aims at building a foundation for the further courses related to engineering drawing and other allied courses in coming semesters

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Prepare engineering drawing manually using prevailing drawing instruments.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Draw geometrical figures and engineering curves.
- CO2 - Apply principles of orthographic projections for drawing given pictorial views.
- CO3 - Draw isometric views of given component or from orthographic projections.
- CO4 - Use various drawing codes, conventions and symbols as per IS SP-46 in engineering drawing.
- CO5 - Draw free hand sketches of given engineering elements.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme				Credits	Assessment Scheme												
				Actual Contact Hrs./Week			SL		H	NL	Paper Duration	Theory			Based on LL & TSL				Based on SL		Total Marks
				CL	TL	LL						Total	Practical		SLA						
													FA-TH	SA-TH	FA-PR	SA-PR	SLA				
								Max	Max	Max	Min	Max	Min	Max	Min	Max	Min				

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	TLO 3.1 Explain methods of Orthographic Projections. TLO 3.2 Draw orthographic views of simple 2D entities containing lines, circles and arcs only. TLO 3.3 Draw the orthographic views from given pictorial views. TLO 3.4 Use of IS code IS SP-46 for dimensioning technique.	Unit - III Orthographic Projections 3.1 Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications.(No question to be asked in examination) 3.2 Introduction to orthographic projection, First angle and Third angle method, their symbols. Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (use First Angle Pr	Model Demonstration Video Demonstrations
4	TLO 4.1 Prepare isometric scale. TLO 4.2 Draw isometric views of simple 2D entities containing lines, circles and arcs only. TLO 4.3 Interpret the given orthographic views. TLO 4.4 Draw Isometric views from given orthographic views	Unit - IV Isometric Projections 4.1 Introduction to Isometric projection. 4.2 Isometric scale and Natural Scale. 4.3 Isometric view and isometric projection. 4.4 Illustrative problems related to simple objects having plain, slanting, cylindrical surfaces and slots on slanting surfaces. 4.5 Conversion of orthographic views into isometric View/projection. (For branches other than mechanical Engineering, the teacher should select branch specific elements)	Model Demonstration Video Demonstrations
5	TLO 5.1 Sketch proportionate freehand sketches of given machine elements. TLO 5.2 Select proper fasteners and locking arrangement.	Unit - V Free Hand Sketches of Engineering Elements 5.1 5.1 Free hand sketches of machine elements: Thread profiles, nuts, bolts, studs, set screws, washers, Locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching)	Model Demonstration

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Use of drawing instruments	1	Draw horizontal, vertical, 30 degree, 45 degree, 60 & 75 degrees lines using Tee and Set squares/ drafter. (Sketch Book).	2	CO1
LLO 2.1 Use of IS code related to dimensioning standard	2	Draw different types of lines, dimensioning styles (Sketch Book)	2	CO1
LLO 3.1 Practice of drawing as per given sketch	3	Draw one figure showing dimensioning techniques, two problems on redraw the figures and one problem on loci of points - slider crank mechanism. (Sketch Book)	2	CO1
LLO 4.1 Use IS Standard for drawing different figures	4	Draw one figure showing dimensioning techniques, two problems on redraw the figures and one problem on loci of points - slider crank mechanism. (01 Sheet)	4	CO1
LLO 5.1 Identify different Engineering curves	5	Draw any four Engineering Curves (Sketchbook)	2	CO1
LLO 6.1 Identify different Engineering curves	6	Draw any four Engineering Curves – (01 Sheet)	4	CO1

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 7.1 Apply method of projection for drawing simple orthographic views	7	Draw two problems on orthographic projections using first angle method of projection having plain surfaces, slanting surfaces and slots etc.- (Sketchbook)	2	CO2 CO4
LLO 8.1 Apply method of projection for drawing simple orthographic views	8	Draw two problems on orthographic projections using first angle method of projection having plain surfaces, slanting surfaces and slots etc.- (01 Sheet)	4	CO2 CO4
LLO 9.1 Apply method of projection for drawing complex orthographic views	9	Draw two problems on orthographic projections using first angle method of projection having cylindrical surfaces, ribs etc. (Sketchbook)	2	CO2 CO4
LLO 10.1 Apply method of projection for drawing complex orthographic views	10	Draw two problems on orthographic projections using first angle method of projection having cylindrical surfaces, ribs etc.- (01 Sheet)	4	CO2 CO4
LLO 11.1 Draw simple isometric projections	11	Draw two problems on Isometric view of simple objects having plain and slanting surfaces by using natural scale. (Sketchbook)	2	CO3 CO4
LLO 12.1 Apply different scales for drawing isometric projections.	12	Draw two problems on Isometric view of simple objects having plain and slanting surfaces by using natural scale. (01 sheet)	4	CO3 CO4
LLO 13.1 Draw simple isometric projections	13	Draw two problems on Isometric Projection of objects having cylindrical surfaces and slots on slanting surfaces by using isometric scale.(Sketchbook)	2	CO3 CO4
LLO 14.1 Apply different scales for drawing isometric projections	14	Draw two problems on Isometric Projection of objects having cylindrical surfaces and slots on slanting surfaces by using isometric scale. (01 sheet)	4	CO3 CO4
LLO 15.1 Draw Orthographic views of a given object.	15	Problem Based Learning: Given the orthographic views of at least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views (sketch book).	2	CO2 CO4
LLO 16.1 Draw standard discipline oriented components using free hand .	16	Draw freehand Sketches of 12 different standard components (Sketch book)	2	CO5
LLO 17.1 Draw standard discipline oriented components using free hand .	17	Draw freehand Sketches of 12 different standard components (1 Sheet)	2	CO5
LLO 18.1 Collect information of an ancient Indian culture related to engineering graphics	18	Correlate ancient Indian sculptures, Indian temples, Monuments, etc. with Engineering Graphics	2	CO1 CO2 CO3 CO4 CO5

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

-

- not Applicable

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Drawing Table with Drawing Board of Full Imperial/ A1 size.	All
2	Models of objects for orthographic / isometric projections	7,8,9,10,11,12,13,14,15

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
3	Models/ Charts of objects mentioned in unit no. 5	16,17
4	Set of various industrial drawings being used by industries.	All
5	Set of drawings sheets mentioned in section 6.0 could be developed by experienced teachers and made used available on the MSBTE portal to be used as reference/standards.	All
6	Drawing equipment and instruments for class room teaching-large size: a. T-square or drafter (Drafting Machine). b. Set squares (450 and 300-600) c. Protector. d. Drawing instrument box (containing set of compasses and dividers). Drawing sheets, Drawing pencils, Eraser, Drawing pins / clips	All

IX. SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Basic Elements of Drawing	CO1	3	0	0	6	6
2	II	Engineering curves & Loci of Points.	CO1	6	0	0	6	6
3	III	Orthographic Projections	CO2,CO4	7	0	0	14	14
4	IV	Isometric Projections	CO3,CO4	8	0	0	14	14
5	V	Free Hand Sketches of Engineering Elements	CO4,CO5	6	0	0	10	10
Grand Total				30	0	0	50	50

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Term work

Summative Assessment (Assessment of Learning)

- Practical

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	-	-	2	-	2	-			
CO2	3	-	-	2	-	2	-			
CO3	3	-	-	2	-	2	-			
CO4	3	-	-	2	-	2	-			
CO5	3	-	-	2	-	2	-			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher
1	Bureau of Indian Standards.	Engineering Drawing Practice for Schools and Colleges IS: SP-46	Third Reprint, October 1998 ISBN No. 81-7061-091-2
2	Bhatt, N.D.	Engineering Drawing	Charotar Publishing House, 2010 ISBN No. 978-93-80358-17-8
3	Bhatt, N.D.; Panchal, V. M	Machine Drawing	Charotar Publishing House, 2010 ISBN No. 978-93-80358-11-6
4	Jolhe, D.A.	Engineering Drawing	Tata McGraw Hill Edu. New Delhi, 2010, ISBN No. 978-0-07-064837-1
5	Dhawan, R. K.	Engineering Drawing	S. Chand and Company New Delhi, ISBN No. 81-219-1431-0
6	Pradhan, S.K Jain, K.K	Engineering Graphics	Khanna Book Publishing CO(P) LTD, New Delhi, ISBN No. 978-93-91505-50-9

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.youtube.com/watch?v=dmt6_n7Sgcg	Free Hand Sketches
2	https://www.youtube.com/watch?v=_MQScnLXL0M	Orthographic Projection
3	https://www.youtube.com/watch?v=3WXPanCq9LI	Basics of Projection
4	https://www.youtube.com/watch?v=fvjk7PlxAuo	Introduction to Engineering Graphics
5	https://www.youtube.com/watch?v=8j7l1OWhMIE	Isometric Projection

: Architecture Assistantship/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data Analytics/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./

Programme Name/s Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Hotel Management & Catering Technology/ Instrumentation & Control/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Textile Technology/ Electronics & Computer Engg./ Travel and Tourism/ Textile Manufactures

Programme:

Code AA/AE/AI/AL/AN/AO/AT/BD/CE/CH/CM/CO/CR/CS/CW/DC/DE/DS/EE/EJ/EP/ET/EX/FC/HA/HM/IC/IE/IF/

Semester : First

Course Title : FUNDAMENTALS OF ICT

Course Code : 311001

I. RATIONALE

In any typical business setup in order to carry out routine tasks related to create business documents, perform data analysis and its graphical representations and making electronic slide show presentations, the student need to learn various software as office automation tools like word processing applications, spreadsheets and presentation tools. They also need to use these tools for making their project reports and presentations. The objective of this course is to develop the basic competency in students for using these office automation tools to accomplish the job. This course also presents an overview of emerging technologies so that students of different discipline can appraise the applications of these technologies in their respective domain.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcome through various teaching learning experiences: 1) Use computers for Internet services, Electronics Documentation, Data Analysis and Slide Presentation. 2) Appraise Application of ICT based Emerging Technologies.in different domain.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Use computer system and its peripherals for given purpose
- CO2 - Prepare Business document using Word Processing Tool
- CO3 - Analyze Data and represent it graphically using Spreadsheet
- CO4 - Prepare professional Slide Show presentations
- CO5 - Use different types of Web Browsers and Apps
- CO6 - Explain concept and applications of Emerging Technologies

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme										
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory			Based on LL & TSL				Based on SL		Total Marks
				CL	TL	LL					FA-TH	SA-TH	Total	Practical		SLA				
							Max	Min						Max	Min	Max	Min	Max	Min	
311001	FUNDAMENTALS OF ICT	ICT	SEC	1	-	2	1	4	2	-	-	-	-	25	10	25@	10	25	10	75

IKS Content : 0 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain the functions of components in the block diagram of computer system. TLO 1.2 Classify the given type of software TLO 1.3 Explain characteristics of the given type of network TLO 1.4 Describe application of the given type of network connecting device TLO 1.5 Describe procedure to manage a file /folder in the given way.	Unit - I Introduction to Computer System 1.1 Basics of Computer System: Overview of Hardware and Software: block diagram of Computer System, Input/Output unit CPU, Control Unit, Arithmetic logic Unit (ALU), Memory Unit 1.2 Internal components: processor, motherboards, random access memory (RAM), read-only memory (ROM), video cards, sound cards and internal hard disk drives) 1.3 External Devices: Types of input/output devices, types of monitors, keyboards, mouse, printers: Dot matrix, Inkjet and LaserJet, plotter and scanner, external storage devices CD/DVD, Hard disk and pen drive 1.4 Application Software: word processing, spreadsheet, database management systems, control software, measuring software, photo-editing software, video-editing software, graphics manipulation software System Software compilers, linkers, device drivers, oper 1.5 Network environments: network interface cards, hubs, switches, routers and modems, concept of LAN, MAN, WAN, WLAN, Wi-Fi and Bluetooth 1.6 Working with Operating Systems: Create and manage file and folders, Copy a file, renaming and deleting of files and folders, Searching files and folders, application installation, creating shortcut of application on the desktop.	Hands-on Demonstration Presentations

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
2	<p>TLO 2.1 Write steps to create the given text document.</p> <p>TLO 2.2 Explain the given feature for document editing.</p> <p>TLO 2.3 Explain the given page setup features of a document.</p> <p>TLO 2.4 Write the given table formatting feature.</p> <p>TLO 2.5 Write the steps to set the given type of document layout</p>	<p>Unit - II Word Processing</p> <p>2.1 Word Processing: Overview of Word processor Basics of Font type, size, colour, Effects like Bold, italic, underline, Subscript and superscript, Case changing options, Previewing a document, Saving a document, Closing a document and exiting application.</p> <p>2.2 Editing a Document: Navigate through a document, Scroll through text, Insert and delete text, Select text, Undo and redo commands, Use drag and drop to move text, Copy, cut and paste, Use the clipboard, Clear formatting, Format and align text, Formatting</p> <p>2.3 Changing the Layout of a Document: Adjust page margins, Change page orientation, Create headers and footers, Set and change indentations, Insert and clear tabs</p> <p>2.4 Inserting Elements to Word Documents: Insert and delete a page break, Insert page numbers, Insert the date and time, Insert special characters (symbols), Insert a picture from a file, Resize and reposition a picture</p> <p>2.5 Working with Tables: Insert a table, Convert a table to text, Navigate and select text in a table, Resize table cells, Align text in a table, Format a table, Insert and delete columns and rows, Borders and shading, Repeat table headings on subsequent page</p> <p>2.6 Working with Columned Layouts and Section Breaks: a Columns, Section breaks, Creating columns, Newsletter style columns, Changing part of a document layout or formatting, Remove section break, Add columns to remainder of a document, Column widths, Adjust</p>	Hands-on Demonstration Presentations
3	<p>TLO 3.1 Write steps to create the given spreadsheet.</p> <p>TLO 3.2 Explain the given formatting feature of a worksheet.</p> <p>TLO 3.3 Write steps to insert formula and functions in the given worksheet.</p> <p>TLO 3.4 Write steps to create charts for the given data set.</p> <p>TLO 3.5 Explain steps to perform data filter, sort and validation operations on the given data set.</p> <p>TLO 3.6 Write steps to setup and print a spreadsheet.</p>	<p>Unit - III Spreadsheets</p> <p>3.1 Working with Spreadsheets: Overview of workbook and worksheet, Create Worksheet Entering sample data, Save, Copy Worksheet, Delete Worksheet, Close and open Workbook.</p> <p>3.2 Editing Worksheet: Insert and select data, adjust row height and column width, delete, move data, insert rows and columns, Copy and Paste, Find and Replace, Spell Check, Zoom In-Out, Special Symbols, Insert Comments, Add Text Box, Undo Changes, - Freeze</p> <p>3.3 Formatting Cells and sheet: Setting Cell Type, Setting Fonts, Text options, Rotate Cells, Setting Colors, Text Alignments, Merge and Wrap, apply Borders and Shades, Sheet Options, Adjust Margins, Page Orientation, Header and Footer, Insert Page Breaks, S</p> <p>3.4 Working with Formula: Creating Formulas, Copying Formulas, Common spreadsheet Functions such as sum, average, min, max, date, In, And, or, mathematical functions such as sqrt, power, applying conditions using IF.</p> <p>3.5 Working with Charts: Introduction to charts, overview of different types of charts, Bar, Pie, Line charts, creating and editing charts. Using chart options: chart title, axis title, legend, data labels, Axes, grid lines, moving chart in a separate sheet.</p> <p>3.6 Advanced Operations: Conditional Formatting, Data Filtering, Data Sorting, Using Ranges, Data Validation, Adding Graphics, Printing Worksheets, print area, margins, header, footer and other page setup options.</p>	Hands-on Demonstration Presentations
4	<p>TLO 4.1 Write the steps to create the given slide presentation.</p> <p>TLO 4.2 Write the steps to insert multiple media in the given presentation.</p> <p>TLO 4.3 Explain the method of including animation, transition effects in slide show.</p> <p>TLO 4.4 Write steps to apply table features in the given presentation</p> <p>TLO 4.5 Write steps to manage charts in the given presentation</p>	<p>Unit - IV Presentation Tool</p> <p>4.1 Creating a Presentation: Outline of an effective presentation, Identify the elements of the User Interface, Starting a New Presentation Files, Creating a Basic Presentation, Working with textboxes, Apply Character Formats, Format Paragraphs, View a Prese</p> <p>4.2 Inserting Media elements: Adding and Modifying Graphical Objects to a Presentation - Insert Images into a Presentation, insert audio clips, video/animation, Add Shapes, Add Visual Styles to Text in a Presentation, Edit Graphical Objects on a Slide, Format</p> <p>4.3 Working with Tables: Insert a Table in a Slide, Format Tables, and Import Tables from Other Office Applications.</p> <p>4.4 Working with Charts: Insert Charts in a Slide, Modify a Chart, Import Charts from Other Office Applications.</p>	Hands-on Demonstration Presentations

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	<p>TLO 5.1 Explain use of the given setting option in browsers.</p> <p>TLO 5.2 Explain the given option used for effective searching in search engine</p> <p>TLO 5.3 Explain features of the given web service.</p> <p>TLO 5.4 Explain concepts and applications of emerging technologies</p> <p>TLO 5.5 Use various elementary cloud-based tools.</p>	<p>Unit - V Basics of Internet and Emerging Technologies</p> <p>5.1 World Wide Web: Introduction, Internet, Intranet, Cloud, Web Sites, web pages, URL, web servers, basic settings of web browsers-history, extension, default page, default search engine, creating and retrieving bookmarks, use search engines effectively for</p> <p>5.2 Web Services: e-Mail, Chat, Video Conferencing, e-learning, e-shopping, e-Reservation, e-Groups, Social Networking</p> <p>5.3 Emerging Technologies: IOT, AI and ML, Drone Technologies, 3D Printing.</p> <p>5.4 Tools: Docs, Drive, forms, quiz, Translate and other Apps</p>	Hands-on Demonstration Presentations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Identify various Input/output devices, connections and peripherals of computer system LLO 1.2 Work with Computer System, Input/output devices, and peripherals for manages files and folders for data storage.	1	a) Work with Computer System, Input/output devices, and peripherals. b) Work with files and folders	2	CO1
LLO 2.1 Create and manage word document. LLO 2.2 Apply formatting features on text at line, paragraph and page level.	2	Work with document files: a) Create, edit and save document in Word Processing. b) Text, lines and paragraph level formatting	2	CO2
LLO 3.1 Insert and edit images, shapes in a document file	3	Work with Images and Shapes in Word Processing.	2	CO2
LLO 4.1 Insert table and apply various table formatting features on it.	4	Work with tables in Word Processing.	2	CO2
LLO 5.1 Apply page layout features in word processing. LLO 5.2 Print a document by applying various print options LLO 5.3 Use mail merge in word processing	5	Working with layout and printing a) Document page layout, Themes, and printing. b) Use of mail merge with options.	2	CO2
LLO 6.1 Enter and format data in a worksheet. LLO 6.2 Insert and delete cells, rows and columns LLO 6.3 Apply alignment feature on cell	6	Create, open and edit Worksheet.	2	CO3
LLO 7.1 Create formula and "IF" condition on cell data LLO 7.2 Apply various functions and named ranges in worksheet.	7	Formulas and functions in Worksheet.	2	CO3
LLO 8.1 Implement data Sorting, Filtering and Data validation features in a worksheet.	8	Sort, Filter and validate data in Spreadsheet.	2	CO3
LLO 9.1 Create charts using various chart options in spreadsheet.	9	Charts for Visual Presentation in Spreadsheet.	2	CO3
LLO 10.1 Print the worksheet by applying various print options for worksheet	10	Worksheet Printing.	2	CO3
LLO 11.1 Apply design themes to the given presentation LLO 11.2 Insert pictures text/images/shapes in slide LLO 11.3 Use pictures text/images/shapes editing options.	11	Make Slide Show Presentation.	2	CO4
LLO 12.1 Add tables and charts in the slides. LLO 12.2 Run slide presentation in different modes LLO 12.3 Print slide presentation as handouts/notes	12	Use Tables and Charts in Slide	2	CO4
LLO 13.1 Apply animation effects to the text and slides LLO 13.2 Add/set audio and video files in the presentation.	13	a) Insert Animation effects to Text and Slides. b) Insert Audio and Video files in presentation	2	CO4

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 14.1 Configure internet connection on a computer system LLO 14.2 Use different web services on internet	14	a) Internet connection configuration b) Use Internet and Web Services.	1	CO5
LLO 15.1 Configure different browser settings LLO 15.2 Use browsers for the given purpose	15	Working with Browsers.	1	CO5
LLO 16.1 Create web forms for survey using different options.	16	Prepare Web Forms for Survey.	1	CO5
LLO 17.1 Create web forms for Quiz using different options	17	Prepare Web Forms for Quiz	1	CO5

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Self Learning

- Following are some suggestive self-learning topics: 1) Use ChatGPT/any other AI tool to explore information. 2) Use Calendar to Schedule and edit activities. 3) Use Translate app to translate the given content from one language to another. 4) Use cloud based storage drive to store and share your files.

Assignment

- Prepare journal of practical performed in the laboratory.

Micro project

- The microproject has to be industry application based, internet-based, workshop-based, laboratory-based or field-based as suggested by Teacher. 1) Perform a survey on various input and output devices available in market and make its report. 2) Prepare Time Table, Prepare Notes on Technical Topics, Reports, Biodata with covering letter (Subject teacher shall assign a document to be prepared by each students) 3) Prepare slides with all Presentation features such as: classroom presentation, presentation about department, presentation of Technical Topics. (Subject teacher shall assign a presentation to be prepared by each student). 4) Student Marksheet, Prepare Pay bills, tax statement, student's assessment record using spreadsheet. (Teacher shall assign a spreadsheet to be prepared by each student). 5) Carry-out Survey on different web browsers. 6) Generate resume for different job profile, survey report of any industry using ChatGPT/any other AI tool.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	a) Computer System with all necessary Peripherals and Internet connectivity. b) Any Office Software c) Any Browser (Any General Purpose Computer available in the Institute)	All

IX. SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction to Computer System	CO1	2	0	0	0	0
2	II	Word Processing	CO2	3	0	0	0	0
3	III	Spreadsheets	CO3	3	0	0	0	0
4	IV	Presentation Tool	CO4	4	0	0	0	0
5	V	Basics of Internet and Emerging Technologies	CO5,CO6	3	0	0	0	0
Grand Total				15	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Lab performance, Assignment, Self-learning and Seminar/Presentation

Summative Assessment (Assessment of Learning)

- Lab. Performance, viva voce

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	1	-	-	-	-	-	1			
CO2	-	-	-	3	-	-	1			
CO3	-	2	1	3	-	-	1			
CO4	-	-	-	3	-	-	1			
CO5	1	-	-	3	-	-	3			
CO6	1	-	-	3	-	-	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher
1	Goel, Anita	Computer Fundamentals	Pearson Education, New Delhi, 2014, ISBN-13: 978-8131733097
2	Miller, Michael	Computer Basics Absolute Beginner's Guide, Windows 10	QUE Publishing; 8th edition August 2015, ISBN: 978-0789754516
3	Alvaro, Felix	Linux: Easy Linux for Beginners	CreatevSpace Independent Publishing Platform-2016, ISBN-13: 978-1533683731
4	Johnson, Steve	Microsoft Office 2010: On Demand	Pearson Education, New Delhi India, 2010. ISBN :9788131770641
5	Schwartz, Steve	Microsoft Office 2010 for Windows: Visual Quick Start	Pearson Education, New Delhi India, 2012, ISBN : 9788131766613
6	Leete, Gurdy, Finkelstein Ellen, Mary Leete	OpenOffice.org for Dummies	Wiley Publishing, New Delhi, 2003 ISBN : 978-0764542220

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.microsoft.com/en-in/learning/office-training.aspx	Office
2	http://www.tutorialsforopenoffice.org/	Open Office
3	https://s3-ap-southeast-1.amazonaws.com/r4ltue295xy0d/Special_Edition_Using_StarOffice_6_0.pdf	Open Office
4	https://ashishmodi.weebly.com/uploads/1/8/9/7/18970467/computer_fundamental.pdf	Computer Fundamental
5	http://www.tutorialsforopenoffice.org/	Open Office
6	https://www.tutorialspoint.com/computer_fundamentals/index.htm	Computer Fundamental
7	https://www.tutorialspoint.com/word/	Word Processing
8	https://www.javatpoint.com/ms-word-tutorial	Word Processing
9	https://support.microsoft.com/en-au/office/word-for-windows-training-7bcd85e6-2e3d-4c3c-a2a5-5ed8847	Word Processing
10	https://www.javatpoint.com/excel-tutorial	Spreadsheet
11	https://support.microsoft.com/en-au/office/excel-video-training-9bc05390-e94c-46af-a5b3-d7c22f6990bb	Spreadsheet
12	https://www.javatpoint.com/powerpoint-tutorial	Powerpoint Presentation
13	https://support.microsoft.com/en-au/office/powerpoint-for-windows-training-40e8c930-cb0b-40d8-82c4-b	Powerpoint Presentation

Sr.No	Link / Portal	Description
14	https://www.geeksforgeeks.org/ms-dos-operating-system/	Operating System
15	https://www.javatpoint.com/windows	Windows Operating System
16	https://www.javatpoint.com/what-is-linux	Linux Operating System
17	https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT	IoT
18	https://www.geeksforgeeks.org/introduction-to-internet-of-things-iot-set-1/	IoT
19	https://www.javatpoint.com/machine-learning	AI & Machine Learning
20	https://www.skillrary.com/blogs/read/introduction-to-drone-technology	Drone Technology
21	https://www.cnet.com/tech/computing/what-is-3d-printing/	3D Printing
22	https://support.google.com/a/users/answer/9389764?hl=en	Apps

: Architecture Assistantship/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data Analytics/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical Power System/ Electronics & Communication Engg./ Electronic Technology/ Food Technology/ Computer Hardware & Maintenance/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Textile Technology/ Electronics & Computer Engg./ Travel and Tourism/ Textile Manufactures

Programme:

Code AA/AE/AI/AL/AN/AO/AT/BD/CE/CH/CM/CO/CR/CS/CW/DC/DD/DE/DS/EE/EJ/EP/ET/EX/FC/HA/IC/IE/IF/II

Semester : First

Course Title : COMMUNICATION SKILLS (ENGLISH)

Course Code : 311303

I. RATIONALE

The most commonly used medium to express oneself is language. English being a global language is used in all spheres of human life i.e. personal, professional and social. English Language proficiency focuses on strong reading, writing, speaking and listening skills. It will include grammar, vocabulary, comprehension and describing skills to enhance overall language proficiency. English for professional purposes aim to equip the students with necessary language skills required for Public Speaking, presentation and negotiation. English for academic purposes will include academic writing skills and critical thinking considering the need of students to communicate in engineering domain.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to achieve the following industry identified outcome through various learning experiences: "Communicate in written and oral form of English effectively at workplace".

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Construct grammatically correct sentences in English.
- CO2 - Comprehend passages correctly.
- CO3 - Compose paragraphs and dialogues on given situations
- CO4 - Use contextual words in English appropriately
- CO5 - Deliver effective presentations in English using appropriate body language

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory				Based on LL & TSL				Based on SL					
				CL	TL	LL			FA-TH			SA-TH	Total	Practical		SLA						
							Max	Min						Max	Min	Max	Min	Max	Min			
311303	COMMUNICATION SKILLS (ENGLISH)	ENG	AEC	3	-	2	1	6	3	3	30	70	100	40	25	10	-	-	25	10	150	

IKS Content : 0 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Use transcription to pronounce words correctly. TLO 1.2 Use prefix and suffix for flexibility and precision in language TLO 1.3 Employ synonyms and antonyms to express similarity and contrast between words. TLO 1.4 Use Homophones to expand their vocabulary TLO 1.5 Make use of the collocations correctly	Unit - I Vocabulary 1.1 Phonetics :Vowels(12) Consonants (24) Diphthongs (8) 1.2 Prefix & Suffix : . Definition & Examples , List of common prefixes and suffixes 1.3 Synonyms & Antonyms : Vocabulary expansion , Context & Usage 1.4 Homophones : Identifying Homophones , Meaning & Context , Vocabulary Expansion 1.5 Collocations : Definition & identification , Types of collocations	Language Lab Drill Classroom learning Reference Books NPTEL
2	TLO 2.1 Formulate paragraphs with synchronized sentence structure on the given situation / topic TLO 2.2 Develop dialogues to practice language skill in a structured and meaningful way.	Unit - II Paragraph and Dialogue Writing 2.1 Types of paragraphs: Technical , Descriptive , Narrative 2.2 Dialogue Writing: i Greetings ii. Development iii. Closing Sentence	Classroom learning Skit Language Lab YouTube videos
3	TLO 3.1 Respond to the given questions of the specified passage. TLO 3.2 Formulate sentences using new words TLO 3.3 Use correct syntax to construct meaningful sentences for the given situation. TLO 3.4 Respond to the questions on the given seen & unseen passages.	Unit - III Comprehension (Seen and Unseen Passages) 3.1 1 Passages from MSBTE workbook 1.Say No to Plastic bags 2.Interview of Dr. APJ Abdul Kalam 3.Maximum Achievements 4.Be Remarkable 5.Arunima Sinha: A Biography 6.Roses of Gratitude 3.2 Importance of Comprehension 3.3 Unseen Passages 3.4 Interpretation of passages in written and Spoken form	Classroom learning interactive session Discussion
4	TLO 4.1 Describe technical objects with specifications TLO 4.2 Explain the given picture in grammatically correct language. TLO 4.3 Diary Entry on situations TLO 4.4 Translate from English to Marathi/Hindi- vice versa	Unit - IV Communicative Language 4.1 Technical objects : i. Heading ii. Description of technical objects 4.2 Picture Description : i. Situational picture ii. Describe in your own words 4.3 Diary Entry : i. Date ii. Content iii. Name of the writer 4.4 Translation of paragraph from English to Marathi/Hindi-Vice versa (Question not to be asked on Translation in Theory Examination)	Language Lab Pictures on situations Classroom learning

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 Cultivate/Develop habit of being presentable TLO 5.2 Formulate speeches for occasions TLO 5.3 Prepare power point presentation TLO 5.4 Use appropriate body language for effective communication	Unit - V Presentation Skills 5.1 Dressing & Grooming : i. Dressing for the occasion ii. Proper grooming 5.2 Speech Writing : i. Situation ii. Salutations iii. Introduction of the topic iv. Description/Body v. Conclusion 5.3 Power Point Presentation : i. Layout ii. Font size iii. Color combination 5.4 Kinesics : i. Facial expressions ii Eye contact iii Postures iv Gestures	Classroom learning Language Lab

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Use transcription in correct form LLO 1.2 Learn to differentiate vowel, diphthong and consonants	1	Write 20 words using phonetic transcription	2	CO1
LLO 2.1 Learn correct pronunciation by using headphones in language lab	2	Practice pronunciation as per IPA using language lab	2	CO1
LLO 3.1 Enhance the understanding of word formation LLO 3.2 Enrich word power LLO 3.3 Construct words with the specific meanings	3	Formulate 20 words using Prefix and Suffix	2	CO1
LLO 4.1 Use words and phrases effectively LLO 4.2 Enrich vocabulary LLO 4.3 Develop overall language skills	4	Construct sentences using 20 collocations	2	CO1
LLO 5.1 Articulate ideas clearly and effectively LLO 5.2 Improve grammar, punctuation	5	Write two paragraphs of 75 words each	2	CO3
LLO 6.1 Add depth to narratives LLO 6.2 Form grammatically correct sentences	6	Compose situational dialogues (Any Two)	2	CO3
LLO 7.1 Promote the development of effective communication skills LLO 7.2 .Improve non -verbal communication Skills LLO 7.3 Enhance interpersonal skills LLO 7.4 Build confidence	7	Enact Role Plays as per situation and context	2	CO5
LLO 8.1 Acquire the ability to convey complex ideas in clear and concise manner LLO 8.2 Expand technical vocabulary LLO 8.3 Enhance the written communication Skills	8	Describe any three technical objects using correct grammar	2	CO1 CO3
LLO 9.1 Develop skills in story telling LLO 9.2 Connect with the audience	9	Narrate anecdotes of various situations in English	2	CO5
LLO 10.1 Notice and articulate specific elements, colors, shapes, & other visual aids LLO 10.2 Express observations & interpretations clearly and concisely LLO 10.3 Enhance vocabulary	10	Describe a given picture (Any Two)	2	CO1 CO4
LLO 11.1 Express information in coherent and engaging manner LLO 11.2 Build confidence	11	Introduce oneself and others	2	CO5
LLO 12.1 Present complex information in a clear & concise manner LLO 12.2 Develop public speaking skills and presentation skills	12	Prepare a Power point presentation on a given topic	2	CO5
LLO 13.1 Improve language skills & expand vocabulary	13	Translate paragraph --English to Marathi/Hindi (vice -Versa) (Any4)	2	CO1 CO3
LLO 14.1 Reflect on thoughts, feelings, and experiences	14	Write your experience in 50 words on (Four) given situations (Diary Entry)	2	CO3 CO5
LLO 15.1 Develop language acquisition	15	Respond to the questions based on the given passages	2	CO2

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 16.1 Build confidence in public speaking LLO 16.2 Enhance the skills in planning and prioritization	16	Deliver oral presentations using correct grammar and appropriate body language	2	CO5
Note : Any 12 out of 16 practicals are compulsory				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Micro project

- Report different types of episodes/anecdotes
- Seminar preparation and presentations
- Make a Podcast episode based on Indian Freedom Fighters
- Summarize the editorial columns of English newspapers
- Summarize the content of an Eminent person's biography / autobiography
- Write a review on the following: Short stories ,Novels ,Films.
- Prepare a booklet on the contribution of eminent Indian scientists
- Prepare a podcast referring ancient literature.
- Prepare blogs, podcast, vlogs
- Prepare a questionnaire & conduct the interview of Industry Personnel, social worker, entrepreneur
- Prepare and participate in debates and extempore speeches

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Language Lab with relevant software and Computer system with all necessary components like; motherboard, random access memory (RAM), read-only memory (ROM), Graphics cards, sound cards, internal hard disk drives, DVD drive, network interface card	All
2	LCD Projector with document reader	All
3	Smart Board with networking	All

IX. SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Vocabulary	CO1	10	2	4	6	12
2	II	Paragraph and Dialogue Writing	CO2	6	2	4	6	12
3	III	Comprehension (Seen and Unseen Passages)	CO3	16	5	6	13	24
4	IV	Communicative Language	CO4	7	2	4	8	14
5	V	Presentation Skills	CO5	6	2	2	4	8
Grand Total				45	13	20	37	70

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- -

Summative Assessment (Assessment of Learning)

- -

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	1	1				2	1			
CO2	1	1				2	1			
CO3	1	1				2	1			
CO4	1	1				2	1			
CO5	1	1				2	1			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher
1	MSBTE	Spectrum, G Scheme and I- Scheme	MSBTE
2	Kumar, E. Suresh, Sreehari, P Savitri	Effective English with CD	Pearson Education
3	Gnanamurli	English Grammar at a Glance	S. Chand
4	CBSE	English Communicative (class X)	Golden
5	Dr. Anjana Tiwari	Communication Skills in English	Khanna Publishers, New Delhi

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.britishcouncil.in/english/learn-online	Website link is given to refer Unit 1
2	Vocabulary.com	Refer this website for interactive vocabulary quizzes, word lists
3	International Phonetic Association (IPA) Website	It offers audio examples and charts to help understand and transcribe sounds
4	grammarly.com/blog	For constructing effective paragraphs and improving clarity
5	www.newagegolden.com	Refer this website for speech writing, diary entry and paragraph writing

Maharashtra State Board Of Technical Education, Mumbai

Learning and Assessment Scheme for Post S.S.C Diploma Courses

Programme Name	: Diploma In Architecture and Interior Design		
Programme Code	: AD	With Effect From Academic Year	: 2024-25
Duration Of Programme	: 6 Semester	Duration	: 16 WEEKS
Semester	: Second	NCrF Entry Level	: 3.0
		Scheme	: K

Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme					Credits	Paper Duration (hrs.)	Assessment Scheme										Total Marks
						Actual Contact Hrs./Week			Self Learning (Activity/Assignment /Micro Project)	Notional Learning Hrs /Week			Theory			Based on LL & TL				Based on Self Learning			
						CL	TL	LL					FA-TH	SA-TH	Total	Practical		SLA					
																FA-PR	SA-PR	Max	Min	Max	Min		

(All Compulsory)

1	APPLIED MATHEMATICS	AMS	AEC	312301	2	3	1	-	-	4	2	3	30	70	100	40	-	-	-	-	-	-	100	
2	CONSTRUCTION MATERIALS	CMT	DSC	322328	2	4	-	5	1	10	5	3	30	70	100	40	25	10	-	-	25	10	150	
3	HISTORY OF ARCHITECTURE & CULTURE	HOA	DSC	322329	2	4	-	2	-	6	3	3	30	70	100	40	25	10	25@	10	-	-	150	
4	THEORY OF DESIGN	TOD	AEC	322330	-	3	-	2	1	6	3	3	30	70	100	40	25	10	-	-	25	10	150	
5	PROFESSIONAL COMMUNICATION	PCO	SEC	312002	-	-	-	2	-	2	1	-	-	-	-	-	25	10	25@	10	-	-	50	
6	SOCIAL AND LIFE SKILLS	SFS	VEC	312003	-	-	-	-	2	2	1	-	-	-	-	-	-	-	-	-	-	50	20	50
7	BASIC DESIGN	BAD	DSC	322010	6	2	-	6	2	10	5	-	-	-	-	50	20	50@	20	50	20	150		
Total					12	16	1	17	6		20		120	280	400	150	100	150	100	150	150	800		

Abbreviations : CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment, SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends : @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

Course Category : Discipline Specific Course Core (DSC) , Discipline Specific Elective (DSE) , Value Education Course (VEC) , Intern./Apprenti./Project./Community (INP) , Ability Enhancement Course (AEC) , Skill Enhancement Course (SEC) , Generic Elective (GE)

Programme Name/s	: Architecture Assistantship/ Architecture and Interior Design/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Software Technology/ Computer Science & Engineering/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical and Electronics Engineering/ Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Computer Hardware & Maintenance/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Manufacturing Technology/ Medical Electronics/ Metallurgical Engineering/ Production Engineering/ Computer Science/ Electronics & Computer Engg.
Programme Code	: AA/ AD/ AE/ AI/ AL/ AN/ AO/ AT/ BD/ CE/ CH/ CM/ CO/ CR/ CS/ CST/ CW/ DE/ DS/ EE/ EJ/ EK/ EP/ ET/ EX/ HA/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ MRT/ MU/ MY/ PG/ SE/ TE
Semester	: Second
Course Title	: APPLIED MATHEMATICS
Course Code	: 312301

I. RATIONALE

An Applied Mathematics course, covering integration, definite integration, differential equations, numerical methods, and probability distribution, equips engineering students with essential problem-solving tools. It enables them to model and analyze complex systems, make informed decisions and address real-world engineering challenges effectively.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Engineers applying Mathematics should proficiently solve complex real-world problems, enhancing decision-making, design and innovation with precision and efficiency.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Solve the broad-based engineering problems of integration using suitable methods.
- CO2 - Use definite integration to solve given engineering related problems.
- CO3 - Apply the concept of differential equation to find the solutions of given engineering problems.
- CO4 - Employ numerical methods to solve programme specific problems.
- CO5 - Use probability distributions to solve elementary engineering problems.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme							
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory			Based on LL & TL		Based on SL	Total Marks
				CL	TL	LL					FA-TH	SA-TH	Total	Practical			
														FA-PR	SA-PR	SLA	
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min				

APPLIED MATHEMATICS**Course Code : 312301**

312301	APPLIED MATHEMATICS	AMS	AEC	3	1	-	-	4	2	3	30	70	100	40	-	-	-	-	-	100
--------	------------------------	-----	-----	---	---	---	---	---	---	---	----	----	-----	----	---	---	---	---	---	-----

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Solve the given simple problem(s) based on rules of integration. TLO 1.2 Evaluate the given simple integral(s) using substitution method. TLO 1.3 Integrate given simple functions using the integration by parts. TLO 1.4 Solve the given simple integral by partial fractions.	Unit - I Indefinite Integration 1.1 Simple Integration: Rules of integration and integration of standard functions 1.2 Integration by substitution. 1.3 Integration by parts. 1.4 Integration by partial fractions (only linear non repeated factors at denominator of proper fraction).	Improved Lecture Demonstration Chalk-Board Presentations Video Demonstrations
2	TLO 2.1 Solve given examples based on Definite Integration. TLO 2.2 Use properties of definite integration to solve given problems.	Unit - II Definite Integration 2.1 Definite Integration: Definition, rules of definite integration with simple examples. 2.2 Properties of definite integral (without proof) and simple examples.	Video Simulation Chalk-Board Improved Lecture Presentations
3	TLO 3.1 Find the order and degree of given differential equations. TLO 3.2 Form simple differential equation for given elementary engineering problems. TLO 3.3 Solve given differential equations using the methods of Variable separable and Exact Differential Equation(Introduce the concept of partial differential equation). TLO 3.4 Solve given Linear Differential Equation.	Unit - III Differential Equation 3.1 Concept of Differential Equation. 3.2 Order, degree and formation of Differential equations 3.3 Methods of solving differential equations: Variable separable form, Exact Differential Equation, Linear Differential Equation.	Video Demonstrations Presentations Chalk-Board Improved Lecture Flipped Classroom

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	TLO 4.1 Find roots of algebraic equations by using appropriate methods. TLO 4.2 Solve the system of equations in three unknowns by iterative methods. TLO 4.3 Solve problems using Bakhshali iterative method for finding approximate square root. (IKS)	Unit - IV Numerical Methods 4.1 Solution of algebraic equations: Bisection method, Regula falsi method and Newton –Raphson method. 4.2 Solution of simultaneous equations containing three Unknowns by iterative methods: Gauss Seidal and Jacobi's method. 4.3 Bakhshali iterative method for finding approximate square root. (IKS)	Video SCILAB Spreadsheet Chalk-Board Flipped Classroom Presentations
5	TLO 5.1 Solve given problems based on repeated trials using Binomial distribution. TLO 5.2 Solve given problems when number of trials are large and probability is very small. TLO 5.3 Utilize the concept of normal distribution to solve related engineering problems.	Unit - V Probability Distribution 5.1 Binomial distribution. 5.2 Poisson's distribution. 5.3 Normal distribution.	Video ORANGE Chalk-Board Improved Lecture Presentations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Solve simple problems of Integration by substitution	1	*Integration by substitution	1	CO1
LLO 2.1 Solve integration using by parts	2	*Integration by parts	1	CO1
LLO 3.1 Solve integration by partial fractions(only linear non repeated factors at denominator of proper fraction).	3	Integration by partial fractions.	1	CO1
LLO 4.1 Solve examples on Definite Integral based on given methods.	4	Definite Integral based on given methods.	1	CO2
LLO 5.1 Solve problems on properties of definite integral.	5	*Properties of definite integral	1	CO2
LLO 6.1 Solve given problems for finding the area under the curve and volume of revolution.	6	* #Area under the curve and volume of revolution.(Only for Civil and Mechanical Engineering Group)	1	CO2
LLO 7.1 Solve examples on mean value and root mean square value.	7	* #Mean value and root mean square value. (Only for Computer, Electrical and Electronics Engineering Group)	1	CO2
LLO 8.1 Solve examples on order, degree and formation of differential equation.	8	Order, degree and formation of differential equation.	1	CO3
LLO 9.1 Solve first order first degree differential equation using variable separable method.	9	Variable separable method.	1	CO3
LLO 10.1 Solve first order first degree differential equation using exact differential equation and linear differential equation.	10	*Exact differential equation and linear differential equation.	1	CO3

APPLIED MATHEMATICS**Course Code : 312301**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 11.1 Solve engineering application problems using differential equation.	11	*Applications of differential equations.(Take programme specific problems)	1	CO3
LLO 12.1 Solve problems on Bisection method and Regula falsi method.	12	*Bisection method and Regula falsi method.	1	CO4
LLO 13.1 Solve problems on Newton-Raphson method.	13	Newton- Raphson method.	1	CO4
LLO 14.1 Solve problems on Jacobi's method and Gauss Seidal Method.	14	Jacobi's method and Gauss Seidal Method.	1	CO4
LLO 15.1 Use Bakhshali iterative methods for finding approximate value of square root. (IKS)	15	*Bakhshali iterative methods for finding approximate value of square root. (IKS)	1	CO4
LLO 16.1 Solve engineering problems using Binomial distribution.	16	*Binomial Distribution	1	CO5
LLO 17.1 Solve engineering problems using Poisson distribution.	17	*Poisson Distribution	1	CO5
LLO 18.1 Solve engineering problems using Normal distribution.	18	Normal Distribution	1	CO5
LLO 19.1 Solve problems on Laplace transform and properties of Laplace transform.	19	* # Laplace transform and properties of Laplace transform.(Only for Electrical and Electronics Engineering Group)	1	CO2
LLO 20.1 Solve problems on Inverse Laplace transform and properties of Inverse Laplace transform.	20	* # Inverse Laplace transform and properties of Inverse Laplace transform.(Only for Electrical and Electronics Engineering Group)	1	CO2
Note : Out of above suggestive LLOs -				
<ul style="list-style-type: none"> • '*' Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- NA

Assignment

- NA

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Open-source software like wolfram alpha, SageMaths, MATHS3D, GeoGebra, Graph, DPLOT, and Graphing Calculator (Graph Eq2.13), ORANGE can be used for Algebra, Calculus, Trigonometry and Statistics respectively.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Indefinite Integration	CO1	15	2	6	12	20
2	II	Definite Integration	CO2	8	2	4	6	12
3	III	Differential Equation	CO3	8	2	4	6	12
4	IV	Numerical Methods	CO4	6	2	4	8	14
5	V	Probability Distribution	CO5	8	2	4	6	12
Grand Total				45	10	22	38	70

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Tests

Summative Assessment (Assessment of Learning)

- End Term Exam

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	-	-	1	-	1			
CO2	3	1	-	-	1	-	1			
CO3	3	2	1	1	1	1	1			
CO4	2	3	2	2	1	1	1			
CO5	2	2	1	1	2	1	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Grewal B. S.	Higher Engineering Mathematics	Khanna publication New Delhi, 2013 ISBN: 8174091955
2	Dutta. D	A text book of Engineering Mathematics	New age publication New Delhi, 2006 ISBN: 978- 81-224-1689-3

APPLIED MATHEMATICS**Course Code : 312301**

Sr.No	Author	Title	Publisher with ISBN Number
3	Kreysizg, Ervin	Advance Engineering Mathematics	Wiley publication New Delhi 2016 ISBN: 978-81- 265-5423-2
4	Das H.K.	Advance Engineering Mathematics	S Chand publication New Delhi 2008 ISBN: 9788121903455
5	S. S. Sastry	Introductory Methods of Numerical Analysis	PHI Learning Private Limited, New Delhi. ISBN-978-81-203-4592-8
6	C. S. Seshadri	Studies in the History of Indian Mathematics	Hindustan Book Agency (India) P 19 Green Park Extension New Delhi. ISBN 978-93-80250-06-9
7	Marvin L. Bittinger David J. Ellenbogen Scott A. Surgent	Calculus and Its Applications	Addison-Wesley 10th Edition ISBN-13: 978-0-321-69433-1
8	Gareth James, Daniela Witten, Trevor Hastie Robert Tibshirani	An Introduction to Statistical Learning with Applications in R	Springer New York Heidelberg Dordrecht London ISBN 978-1-4614-7137-0 ISBN 978-1-4614-7138-7 (eBook)

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	http://nptel.ac.in/courses/106102064/1	Online Learning Initiatives by IITs and IISc
2	https://www.khanacademy.org/math?gclid=CNqHuabCys4CFdOJaddHoPig	Concept of Mathematics through video lectures and notes
3	https://www.wolframalpha.com/	Solving mathematical problems, performing calculations, and visualizing mathematical concepts.
4	http://www.sosmath.com/	Free resources and tutorials
5	http://mathworld.wolfram.com/	Extensive math encyclopedia with detailed explanations of mathematical concepts
6	https://www.mathsisfun.com/	Explanations and interactive lessons covering various math topics, from basic arithmetic to advanced
7	http://tutorial.math.lamar.edu/	Comprehensive set of notes and tutorials covering a wide range of mathematics topics.
8	https://www.purplemath.com/	Purplemath is a great resource for students seeking help with algebra and other foundational mathematics to improve learning.
9	https://www.brilliant.org/	Interactive learning in Mathematics
10	https://www.edx.org/	Offers a variety of courses
11	https://www.coursera.org/	Coursera offers online courses in applied mathematics from universities and institutions around the globe.
12	https://ocw.mit.edu/index.htm	The Massachusetts Institute of Technology (MIT) offers free access to course materials for a wide range of mathematical courses.

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

Programme Name/s	: Architecture Assistantship/ Architecture and Interior Design/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Software Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical and Electronics Engineering/ Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Manufacturing Technology/ Medical Electronics/ Metallurgical Engineering/ Production Engineering/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Computer Science/ Textile Technology/ Electronics & Computer Engg./ Travel and Tourism/ Textile Manufactures/
Programme Code	: AA/ AD/ AE/ AI/ AL/ AN/ AO/ AT/ BD/ CE/ CH/ CM/ CO/ CR/ CS/ CST/ CW/ DC/ DD/ DE/ DS/ EE/ EJ/ EK/ EP/ ET/ EX/ FC/ HA/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ ML/ MRT/ MU/ MY/ PG/ PN/ PO/ SC/ SE/ TC/ TE/ TR/ TX
Semester	: Second
Course Title	: PROFESSIONAL COMMUNICATION
Course Code	: 312002

I. RATIONALE

Communication is key to smooth and efficient functioning of any industry or business . Professional communication is the need of every organization to maintain ethics, quality and standards. The efficacy of business communication skills are essential for engineering professionals to instruct, guide and motivate peers/ subordinates to achieve desired goals at work place. Strong Communication skills are highly valued in the professional world and contribute to career growth and opportunities. Thus, this course has been designed to enhance the professional communication skills for effective presentation both in written and oral forms at workplace.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

1. Communicate effectively at workplace. 2. Issues can be identified and resolved by brainstorming solutions 3. Effective communication ensures strong decision making

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Communicate effectively (oral / spoken and Written) in various formal and informal situations minimizing the barriers.
- CO2 - Develop listening skills through active listening and note taking.
- CO3 - Write circulars, notices and minutes of the meeting.
- CO4 - Draft inquiry letter, complaint letter , Job application with resume / CV, Compose effective E - mails .
- CO5 - Write Industrial reports.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			FA-TH			SA-TH	Total	Practical		SLA						
														FA-PR	SA-PR	Max	Min	Max	Min			
312002	PROFESSIONAL COMMUNICATION	PCO	SEC	-	-	2	-	2	1	-	-	-	-	25	10	25@	10	-	-	50		

Total IKS Hrs for Sem. : 0 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Describe the importance of professional communication in given situations TLO 1.2 Identify the types of communication barriers in given situations and suggestive remedies TLO 1.3 Use different types of verbal and non-verbal communication for the given situation	Unit - I Professional Communication : An Overview 1.1 Definition of professional communication- Importance, relevance, Elements and process of communication 1.2 7 C's of Professional Communication (Clarity, Conciseness, correctness, Coherent, concrete, courteous and Complete) 1.3 Types –Verbal (Oral-Written),Formal, Informal (Grapevine), Vertical 1.4 Barriers to communication,Types of barriers (Linguistic, Psychological, Technological)	Language lab Role plays Chalk board Reference books Case studies
2	TLO 2.1 Identify the difference between listening and hearing TLO 2.2 Differentiate the types of listening in various situations TLO 2.3 Take notes during lectures, seminars . Make use of types of note taking and note making for different subjects / topics	Unit - II Listening & Note Taking 2.1 Difference between listening & Hearing 2.2 Types of listening a)Active listening b)Passive listening c)Selective listening 2.3 Techniques of Note taking , Types of note taking (Outline notes, Mind Mapping, Flowcharts)	Language Lab Classroom learning NPTEL Role Play

PROFESSIONAL COMMUNICATION**Course Code : 312002**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	TLO 3.1 Prepare notices / agenda for the given type of meeting / information TLO 3.2 Prepare minutes of meeting/s TLO 3.3 Draft a circular for a particular information/ event	Unit - III Office Drafting 3.1 Format of Notice and Circular 3.2 Drafting Agenda 3.3 Preparing Minutes of meeting	white board Language Lab Reference books Classroom learning
4	TLO 4.1 Compose cover letter and CV / Resume for jobs TLO 4.2 Apply E- mail Etiquette for professional purposes TLO 4.3 Compose E- mails for different official purposes	Unit - IV Writing Skills for Professional Communication 4.1 Job Application with Resume / CV 4.2 E-Mail Etiquettes 4.3 Writing official E- Mails to communicate intended purposes 4.4 Drafting Enquiry letter and Complaint letter	Language lab Classroom learning NPTEL Reference books
5	TLO 5.1 Compose technical reports TLO 5.2 Draft accident / Investigation/ Daily reports	Unit - V Report Writing 5.1 Introduction to report writing 5.2 Accident Report 5.3 Investigation Report 5.4 Daily Report	Chalk and talk Language Lab Collaborative learning Classroom learning

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Draw communication cycle using real life examples and explain process of communication.	1	*Communication Process and Cycle	2	CO1
LLO 2.1 Undertake the Role play / Group discussion to illustrate types / barriers to communication	2	Role plays and Group Discussion	2	CO1
LLO 3.1 Listen to audios in the language lab and make notes of it.	3	*Active Listening	2	CO2
LLO 4.1 Give a presentation / Seminar using 7 C's of Communication.	4	*Presentations / Seminars	2	CO1
LLO 5.1 Explain the types of note taking with examples and make notes on any one topic related to your curriculum.	5	*Note taking and Note Making	2	CO2
LLO 6.1 Prepare agenda for meeting and draft minutes of the meeting.	6	*Agenda and Minutes of the meeting	2	CO3
LLO 7.1 Draft circulars for the given situation .	7	*Office Drafting	2	CO3
LLO 8.1 Respond to job advertisements referring newspapers, LinkedIn. Write cover letter with resume /CV.	8	*Type Job Application with Resume / CV	2	CO4
LLO 9.1 Type Four (formal) E-mails using ethics and etiquette.	9	* E- Mail writing	2	CO4
LLO 10.1 Write a detailed report on Accident/ Investigation .	10	*Technical Report writing	2	CO5
LLO 11.1 Prepare a case study related to linguistic barriers : language ,pronunciation, punctuation, technical jargon and suggest remedies for the same.	11	*Barriers to Communication	2	CO1
LLO 12.1 Draft complaint / enquiry letter for various situations	12	Complaint and Enquiry letter	2	CO4

PROFESSIONAL COMMUNICATION**Course Code : 312002**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 13.1 List psychological barriers to communication LLO 13.2 Prepare case studies on any two psychological barriers and suggest remedies to overcome the barriers	13	Psychological barriers to Communication	2	CO1
LLO 14.1 Draw flow chart and mind mapping for any topic related to the curriculum.	14	*Listening Skills	2	CO2
LLO 15.1 Face mock interview arranged by your teacher.	15	* Typed Job Application , Resume / CV/ formal dressing and Interview	2	CO4

Note : Out of above suggestive LLOs -

- '* Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Conduct an interview of any person and follow the procedure (interview questions, photo with the interviewee etc.)
- Listening and Speaking are life long learnings . Explain with appropriate examples and real life case studies.
- Collect (four to five) emails with technical jargons, barriers, make required corrections and keep a record of both the mails (original and Corrected one)
- Complete any one certification course of (Two Weeks duration) from (MOOC/ NPTEL/ Coursera/ any other source)related to Communication Skills / Personality Development.
- Prepare a report on aspects of body language
- Prepare a case study on Technological /Psychological barriers to communication

Reading for vocabulary and sentence structure

- Read any motivational book and present a review of the book

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and may be considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Smart Board with networking	All
2	Language Lab with software and internet facility	All
3	LCD Projector	All

PROFESSIONAL COMMUNICATION**Course Code : 312002**

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
4	Printer	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE**X. ASSESSMENT METHODOLOGIES/TOOLS****Formative assessment (Assessment for Learning)**

- Term Work, Micro Project

Summative Assessment (Assessment of Learning)

- Practical Exam of 25 marks using language lab

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	1	1	1		1	3	1			
CO2	1	1				3	1			
CO3	1					3	1			
CO4		1				3	1			
CO5		1	1			3	1			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	M Ashraf Rizvi	Effective Communication Skills	Tata McGraw-Hill Publication-ISBN 0070599521, 9780070599529
2	Sanjay Kumar and Pushp Lata	Communication Skills	Oxford University Press ISBN 9780199457069
3	MSBTE Textbook	Communication Skills	MSBTE
4	Robert King	Effective communication Skills	Audio Book -ISBN 978181667009742
5	N P Sudharshana , C Savitha	English for Technical Communication	Cambridge-ISBN 978-13-16640-08-1
6	C. Murlikrishna , Sunita Mishra	Communication Skills for Engineers	Pearson - ISBN 978-81-317-3384-4
7	Meenakshi Raman, Sangeeta Sharma	Technical Communication, Principles and Practice	Oxford University Press -ISBN 978-13-16640-08-1
8	K. K. Sinha	Business Communication	Galgotiya Publishing company, New Delhi -ISBN 9789356227064

PROFESSIONAL COMMUNICATION**Course Code : 312002**

Sr.No	Author	Title	Publisher with ISBN Number
9	Rajendra Pal, J.S. Korlahalli	Essentials of Business Communication	Sultan Chand & Sons, New Delhi ISBN 9788180547294

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.britishcouncil.in	conversations
2	https://www.coursera.org	certification courses
3	https://www.udemy.com	Communication skills training courses
4	http://www.makeuseof.com	Dale Carnegie's free resources

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 01/10/2024

Semester - 2, K Scheme

Programme Name/s	: Architecture Assistantship/ Architecture and Interior Design/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Software Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical and Electronics Engineering/ Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Hotel Management & Catering Technology/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Manufacturing Technology/ Medical Electronics/ Metallurgical Engineering/ Production Engineering/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Computer Science/ Textile Technology/ Electronics & Computer Engg./ Travel and Tourism/ Textile Manufactures
Programme Code	: AA/ AD/ AE/ AI/ AL/ AN/ AO/ AT/ BD/ CE/ CH/ CM/ CO/ CR/ CS/ CST/ CW/ DC/ DD/ DE/ DS/ EE/ EJ/ EK/ EP/ ET/ EX/ FC/ HA/ HM/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ ML/ MRT/ MU/ MY/ PG/ PN/ PO/ SC/ SE/ TC/ TE/ TR/ TX
Semester	: Second
Course Title	: SOCIAL AND LIFE SKILLS
Course Code	: 312003

I. RATIONALE

Rationale : Life skills can be defined as abilities that enable humans to deal effectively with the demands and challenges of life. Social skills are a subset of life skills that are needed for successful, healthy relationships to easily adapt when moving from one social situation to the next. They help regulate our emotions effectively and develop enduring, supportive relationships, we're happier and healthier. This is why developing life skills and eventually social skills is key not only to being successful in life, it's key for our health and well-being. Thus, Teaching of Social and life skills provide students with essentials of knowing , understanding attitudes, values, morals ,social skills and better equip them to handle stress and build their self efficacy, self esteem and self confidence.

Note : The course offers five different alternatives(modules) for achieving above outcomes . Students must complete any one module from the following given options.

- a. MODULE-I : Unnat Maharashtra Abhiyan (UMA)
- b. MODULE-II : National Service Scheme (NSS)
- c. MODULE-III : Unniversal Human Values
- d. MODULE-IV: Value Education (Unnati Foundation)
- e. MODULE-V : Financial Literacy (NABARD)

The institute can choose to offer any one MODULE to the groups of the students by taking into consideration the resources required and resources available in the institute . Different group of students maybe offered different MODULE based on their choices .

SOCIAL AND LIFE SKILLS**Course Code : 312003****II. INDUSTRY / EMPLOYER EXPECTED OUTCOME**

Demonstrate critical social and life skills ethics, resilience, positive attitude , integrity and self-confidence at workplace and society at large.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Enhance the ability to be fully self-aware and take challenges by overcoming all fears and insecurities and grow fully.
- CO2 - Increase self-knowledge and awareness of emotional skills and emotional intelligence at the place of study/work.
- CO3 - Provide the opportunity to realizing self-potential through practical experience while working individually or in group.
- CO4 - Develop interpersonal skills and adopt good leadership behaviour for self-empowerment and empowerment of others.
- CO5 - Set appropriate life goals with managing stress and time effectively.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					Total	Practical		SLA							
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min	Max	Min		
312003	SOCIAL AND LIFE SKILLS	SFS	VEC	-	-	-	2	2	1	-	-	-	-	-	-	-	-	-	50	20	50

Total IKS Hrs for Sem. : Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
-------	--	---	--------------------------------

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Explain developmental needs and connection of various stakeholders</p> <p>TLO 1.2 Enlist the local problems</p> <p>TLO 1.3 Design a methodology for fieldwork</p> <p>TLO 1.4 Select the attributes of engineering and social system for measurement, quantification, and documentation</p> <p>TLO 1.5 Measure & quantify the quantities / systems parameters</p> <p>TLO 1.6 Write a report using information collected tStudy the data collected from fieldwork and conclude the observations</p>	<p>MODULE I : Activities Under Unnat Maharashtra Abhiyan (UMA)</p> <p>1.1 Introduction to Societal Needs and respective stakeholders : Regional societal issues that need engineering intervention</p> <p>1.2 Multidisciplinary approach-linkages of academia, society and technology</p> <p>1.3 Stakeholders' involvement</p> <p>1.4 Introduction to Important secondary data sets available such as census, district economic surveys, cropping pattern, rainfall data, road network data etc</p> <p>1.5 Problem Outline and stakeholders : Importance of activity and connection with Mapping of system components and stakeholders (engineering / societal)</p> <p>1.6 Key attributes of measurement</p> <p>1.7 Various instruments used for data collection - survey templates, simple measuring equipments</p> <p>1.8 Format for measurement of identified attributes/ survey form and piloting of the same</p> <p>1.9 Fieldwork : Measurement and quantifications of local systems such as agriculture produce, rainfall, Road network, production in local industries, Produce /service which moves from A to B</p> <p>1.10 Analysis and Report writing Report writing containing-</p> <ol style="list-style-type: none"> 1. Introduction of the topic 2. Data collected in various formats such as table, pie chart, bar graph etc 3. Observations of field visits and data collected. 	<p>i) Group discussion ii) Role play iii) Case study iv) Seminar and presentation</p> <p><u>Implementation guidelines suggested</u></p> <p>The course will be implemented in eight sessions and fieldwork:</p> <ol style="list-style-type: none"> a) Session I - Introduction to development paradigm, fieldwork and case study as pedagogy b) Session II - VII - Society, stakeholders and value creation, measurements, rudimentary analysis and reporting c) Session VIII - Final closure session feedback and assessment d) Field work - <ol style="list-style-type: none"> 1. Pilot Visit - Pilot of survey instrument 2. Survey Visit 1 - Data gathering / Information Collection 3. Survey Visit 2 - Data gathering 4. Summary Visit - Closure after analysis <p>Methodology: Considering the nature of the course designed, following points shall be considered while implementing the course.</p> <ol style="list-style-type: none"> i) Regroup in the batches of 5-6 students for conducting the fieldwork from the bigger group. ii) Assign a few batches of the students for this course to all the faculty members. iii) A group of course teachers will visit local governance bodies such as Municipal Corporations, Village Panchayats, Zilla Parishads, Panchayat Samitis to assess the small technological / engineering needs in their area

SOCIAL AND LIFE SKILLS

Course Code : 312003

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
			of work. iv) The group of course teachers will carry out initial field visits to evaluate the various possibilities of field visits / various scenarios where in students can conduct field work to measure / quantify the parameters / attributes.
2	<p>TLO 2.1 Adopt a Village or Slum for providing needed services to the community</p> <p>TLO 2.2 Carry out Survey to identify the problems of village community</p> <p>TLO 2.3 Undertake Special camping about developmental programs</p> <p>TLO 2.4 Establish the liaisons between government and other developmental agencies for the implementations of various development schemes of Government</p>	<p>MODULE II : National Service Scheme (NSS)</p> <p>2.1 Contacting Village/Area Leaders</p> <p>2.2 Primary socio economic survey of few villages in the vicinity of the institute.</p> <p>2.3 Selection of the village for adoption - conduct of activities</p> <p>2.4 Comprehensive Socio Economic Survey of the Village/Area</p> <p>2.5 Identification of Problem(s)</p> <p>2.6 Dissemination of information about the latest developments in agriculture, watershed management, wastelands development, non-conventional energy, low cost housing, sanitation, nutrition and personal hygiene, schemes for skill development, income generation, government schemes, legal aid, consumer protection and allied fields.</p> <p>2.7 A liaison between government and other development agencies for the implementation of various development schemes in the selected village / slum.</p>	<p>(i) The teachers should visit the village / slum before adopting it for NSS activities.</p> <p>(ii) The selected area should be compact.</p> <p>(iii) The community people should be receptive to the ideas of improving their living standard. They should also be ready to coordinate and involve in the projects undertaken by the NSS for their upliftment.</p> <p>(iv) The areas where political conflicts are likely to arise should be avoided by the NSS units.</p> <p>(v) The area should be easily accessible to the NSS volunteers to undertake frequent visits to slums.</p>
3	<p>TLO 3.1 Demonstrate Love and Compassion (Prem and Karuna) in the society</p> <p>TLO 3.2 Follow the path of Truth (Satya)</p> <p>TLO 3.3 Practice Non-Violence (Ahimsa)</p> <p>TLO 3.4 Follow the Righteousness (Dharma)</p> <p>TLO 3.5 Attain Peace (Shanti) in Life</p> <p>TLO 3.6 Provide Service (Seva) to the needy person/community.</p> <p>TLO 3.7 Demonstrate Renunciation (Sacrifice) Tyaga</p> <p>TLO 3.8 Practice Gender Equality and Sensitivity</p>	<p>MODULE-III : Universal Human Values</p> <p>3.1 Love and Compassion (Prem and Karuna): Introduction, Practicing Love and Compassion (Prem and Karuna)</p> <p>3.2 Truth (Satya) : Introduction, Practicing Truth (Satya)</p> <p>3.3 Non-Violence (Ahimsa) : Introduction, Practicing Non-Violence (Ahimsa)</p> <p>3.4 Righteousness (Dharma) : Introduction, Practicing Righteousness (Dharma)</p> <p>3.5 Peace (Shanti) : Introduction, Practicing Peace (Shanti)</p> <p>3.6 Service (Seva) : Introduction, Practicing Service (Seva)</p> <p>3.7 Renunciation (Sacrifice) Tyaga : Introduction, Practicing Renunciation (Sacrifice) Tyaga</p> <p>3.8 Gender Equality and Sensitivity: Introduction, Practicing Gender Equality and Sensitivity</p>	<p>i) Lectures</p> <p>ii) Demonstration</p> <p>iii) Case Study</p> <p>iv) Role Play</p> <p>v) Observations</p> <p>vi) Portfolio Writing</p> <p>vii) Simulation</p> <p>viii) Motivational talks by Practitioners</p> <p>ix) Site/Industry Visit</p>

SOCIAL AND LIFE SKILLS

Course Code : 312003

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	<p>TLO 4.1 Demonstrate Punctuality appropriately</p> <p>TLO 4.2 Practice Cleanliness, Hygiene and Orderliness for self and others</p> <p>TLO 4.3 Take Responsibility and Calculated Risks</p> <p>TLO 4.4 Demonstrate Gratitude and Appreciations</p> <p>TLO 4.5 Show Determination & Persistence about work</p> <p>TLO 4.6 Give Respect as per the social norms and practice</p> <p>TLO 4.7 Respect Team Spirit to the acceptable level</p> <p>TLO 4.8 Practice Caring & Sharing among fellow citizens/community</p> <p>TLO 4.9 Demonstrate Honesty</p> <p>TLO 4.10 Practice for Forgive and Forget</p>	<p>MODULE-IV: Value Education (Unnati Foundation)</p> <p>4.1 Punctuality, Icebreaker and Simple Greeting, Understanding & Managing Emotions, Introducing Self, The power of a Positive Attitude, Talking about one's Family, Talking about one's Family, Making a Positive Impression, Give word list for a Word based</p> <p>4.2 Cleanliness , Hygiene and Orderliness , Likes and Dislikes, Developing Confidence in Self and Others, Strengths and Weaknesses, Listening Skills , Greeting gestures, Gender Equality and Sensitivity</p> <p>4.3 Responsibility, OCSEM- Visual Comprehension and Word Based Learning, Goal Setting – Make it happen, Follow, Like & Share Unnati Social Media - Facebook / Instagram/ Twitter Introducing Others, Time Management, Talking about the daily routine, Money Management</p> <p>4.4 Gratitude and Appreciation , Asking Simple Questions & Asking for the price , Stress Management, Student Referral process ,Comprehending & Paraphrasing Information, A Plate of Rice and Dignity of Labour, Topics for Public Speaking, Placement Process , OCSEM-E- Newspaper, Critical Thinking to overcome challenges</p> <p>4.5 Determination and Persistence, Guiding and Giving Directions, Language Etiquette & Mannerism, . Unnati Philosophy , b. Unnati Branding - Follow, Like & Share Unnati Social Media - Facebook / Instagram/ Twitter, Simple instructions to follow procedures, Assertiveness, Give topics for Debate, Describing a person/Objects, Refusal Skills, Word List for Word based Learning</p> <p>4.6 Respect, Comparing , OCSEM - Public Speaking, Student referral process, Attending a phone call, Being a Good Team Player , Placement Process, At a Restaurant, Workplace ethics</p> <p>4.7 Team Spirit, Inviting someone, OCSEM - Picture Reading & Word, a. Unnati Philosophy & b. Unnati Branding - Follow, Like & Share Unnati Social Media - Facebook / Instagram/ Twitter, Apologizing, Apologizing, Dealing effectively with Criticism, Introduce</p>	<p>i) Video Demonstrations</p> <p>ii) Flipped Classroom</p> <p>iii) Case Study</p> <p>iv) Role Play</p> <p>v) Collaborative learning</p> <p>vi) Cooperative Learning</p> <p>vii) Chalk-Board</p>

SOCIAL AND LIFE SKILLS**Course Code : 312003**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
		Importance of Self Learning and upskilling 4.8 Caring and Sharing , Handling Customer queries, Flexibility & Adaptability, Student referral process, Writing a Resume, OCSEM-Public Speaking, Placement Process, Meditation/ Affirmation & OCSEM-Debate, Introduce Certif-ID, how to create Certif-ID Project , 4.9 Honesty, Email etiquette & Official Email communication, Alcohol & Substance use & abuse, Describing a known place , Leadership Skills, Describing an event, OSCEM-Picture Reading & Visual Comprehension 4.10 Forgive and Forget, Facing and Interview, OSCEM-Public Speaking , Attending a telephonic/Video interview & Mock Interview , Affirmation , Pat-a-Back & Closure (Valediction , Unnati Branding, Student Testimonials), Meditation/ Affirmation & Sponsor connect (Speak to UNXT HO)	
5	TLO 5.1 Develop Literacy About Savings and Investments in the community TLO 5.2 Attain Literacy About Financial Planning TLO 5.3 Demonstrate skills about Financial Transactions TLO 5.4 Use Literacy skills About Income, expenditure and budgeting TLO 5.5 Use measures about Inflation in the market. TLO 5.6 Use Literacy/Knowledge About Loans TLO 5.7 Explain the Importance of Insurance TLO 5.8 Follow Dos and Donts about finances	MODULE-V : Financial Literacy 5.1 Introduction - Life Goals and financial goals 5.2 Savings and Investments - Three pillars of investments, Popular asset classes, Government schemes, Mutual Funds, Securities markets (Shares and bonds), Gold, Real Estate, Do's and Don'ts of investments 5.3 Retirement planning 5.4 Cashless transactions 5.5 Income, expenditure and budgeting – Concepts and Importance 5.6 Inflation- Concept, effect on financial planning of an individual 5.7 Loans – Types, Management of loans, Tax benefits 5.8 Insurance – Types, Advantages, selection 5.9 Dos and Donts in Financial planning and Transactions	i) Online/Offline Mode of Instructions ii) Video Demonstrations iii) Presentations iv) Case Study v) Chalk-Board vi) Collaborative learning

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES : NOT APPLICABLE.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Suggestive list of activities during Regular as well as Special Camping (NSS Activities)

- Following list is only an illustrative list of the type of activities that can be undertaken. Under the programme it would be open to each NSS Unit to undertake one of these programmes or any other activity which may seem

desirable to them according to local needs. The NSS Unit should aim at the integrated development of the area selected for its operation which could be a village or a slum. It has also to be ensured that at least a part of the programme does involve manual work.

(a) Environment Enrichment and Conservation:

The activities under this sub-theme would inter-alia, include:

- (i) plantation of trees, their preservation and upkeep
- (ii) Construction & maintenance of village streets, drains
- (iii) Cleaning of village ponds and wells;
- (iv) Popularization and construction of Gobar Gas Plants, use of non-conventional energy;
- (v) Disposal of garbage & composting;
- (vi) Prevention of soil erosion and work for soil conservation,
- (vii) Watershed management and wasteland development
- (viii) Preservation and upkeep of monuments, and creation of consciousness about the preservation of cultural heritage among the community.

(b) Health, Family Welfare and Nutrition Programme:

- (i) Programme of mass immunization;
- (ii) Working with people in nutrition programmes with the help of Home Science and medical college students;
- (iii) Provision of safe and clean drinking water;
- (iv) Integrated child development programmes;
- (v) Health education, AIDS Awareness and preliminary health care.
- (vi) Population education and family welfare programme;
- (vii) Lifestyle education centres and counselling centres.

- © Programmes aimed at creating an awareness for improvement of the status of women: (i) programmes of educating people and making them aware of women's rights both constitutional and legal;
- (ii) creating consciousness among women that they too contributed to economic and social well-being of the community;
- (iii) creating awareness among women that there is no occupation or vocation which is not open to them provided they acquire the requisite skills; and
- (iv) imparting training to women in sewing, embroidery, knitting and other skills wherever possible.

(d) Social Service Programmes:

- (i) work in hospitals, for example, serving as ward visitors to cheer the patients, help the patients, arranging occupational or hobby activities for long term patients; guidance service for out-door-patients including guiding visitors about hospital's procedures, letter writing and reading for the patients admitted in the hospital; follow up of patients discharged from the hospital by making home visits and places of work, assistance in running dispensaries etc.
- (ii) work with the organisations of child welfare;
- (iii) work in institutions meant for physically and mentally handicapped;
- (iv) organising blood donation, eye pledge programmes;
- (v) work in Cheshire homes, orphanages, homes for the aged etc.;
- (vi) work in welfare organisations of women;
- (vii) prevention of slums through social education and community action;

(e) Production Oriented Programmes:

- (i) working with people and explaining and teaching improved agricultural practices;
- (ii) rodent control land pest control practices;
- (iii) weed control;
- (iv) soil-testing, soil health care and soil conservation;
- (v) assistance in repair of agriculture machinery;
- (vi) work for the promotion and strengthening of cooperative societies in villages;
- (vii) assistance and guidance in poultry farming, animal husbandry, care of animal health etc.;
- (viii) popularisation of small savings and assistance in procuring bank loans

(f) Relief & Rehabilitation work during Natural Calamities:

- (i) assisting the authorities in distribution of rations, medicine, clothes etc.;
- (ii) assisting the health authorities in inoculation and immunisation, supply of medicine etc.;
- (iii) working with the local people in reconstruction of their huts, cleaning of wells, building roads etc.;
- (iv) assisting and working with local authorities in relief and rescue operation;
- (v) collection of clothes and other materials, and sending the same to the affected areas;

(g) Education and Recreations: Activities in this field could include:

- (i) adult education (short-duration programmes);
- (ii) pre-school education programmes;
- (iii) programmes of continuing education of school drop outs, remedial coaching of students from weaker sections;
- (iv) work in crèches;
- (v) participatory cultural and recreation programmes for the community including the use of mass media for instruction and recreation, programmes of community singing, dancing etc.;
- (vi) organisation of youth clubs, rural land indigenous sports in collaboration with Nehru Yuva Kendras;
- (vii) programmes including discussions on eradications of social evils like communalism, castism, regionalism, untouchability, drug abuse etc.;
- (viii) non- formal education for rural youth and
- (ix) legal literacy, consumer awareness.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Simple engineering measurement devices GPS data collection tools GIS open source softwares- Google Earth and QGIS MS office suite	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Formative assessment (Assessment for Learning) Report and presentation of fieldwork activities, Self-Learning (Assignment)

Summative Assessment (Assessment of Learning)

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1					03	03	03			
CO2					02	02	03			
CO3	01	01	01		03	03	03			
CO4		01	01	01	03	03	03			
CO5		02		01	03	03	03			

Legends :- High:03, Medium:02,Low:01, No Mapping: -

*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	IRAP, Hyderabad, CTARA, IIT Bombay and UNICEF, Mumbai	Compendium of Training Materials for the Capacity Building of the Faculty and Students of Engineering Colleges on 'IMPROVING THE PERFORMANCE OF RURAL WATER SUPPLY AND SANITATION SECTOR IN MAHARASHTRA' Districts Economic survey reports	UNICEF
2	Prepared by each district administration	Districts Economic survey reports	Govt. of Maharashtra
3	Local college students, UMA staffs	Sample Case Studies on UMA website	IITB-UMA team
4	Central Public Health and Environmental Engineering Organisation	Manual on Water Supply and Treatment	Ministry of Urban Development, New Delhi
5	Specifications And Standards Committee	Indian Standards (IS) Codes and Indian Roads Congress (IRC) Codes	Bureau of Indian Standards and The Indian Road Congress
6	RBI	https://www.rbi.org.in/FinancialEducation/content/GUIDE310113_F.pdf	RBI
7	RBI	https://www.rbi.org.in/FinancialEducation/content/Financing%20needs%20of%20Micro%20and%20small%20Enterprises%20-%20A%20guide.pdf	RBI
8	RBI	https://www.rbi.org.in/FinancialEducation/content/I%20Can%20Do_RBI.pdf	RBI

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://gr.maharashtra.gov.in/Site/Upload/Government%20Resolutions/English/201601131501523808.pdf	Government Resolution of Government of Maharashtra regarding Unnat Maharashtra Abhiyan
2	https://gr.maharashtra.gov.in/Site/Upload/Government%20Resolutions/English/201606151454073708.pdf	Government Resolution of Government of Maharashtra regarding Unnat Maharashtra Abhiyan Guidelines
3	https://censusindia.gov.in/census.website/	A Website of Census of India
4	https://gsda.maharashtra.gov.in/english/	A Website of Groundwater Survey and Development Agency, GoM
5	https://mrsac.gov.in/MRSAC/map/map	A Website where district-wise maps showcasing different attributes developed by Maharashtra Remote Sensing Applications Centre.
6	https://ejalshakti.gov.in/jjmreport/JJMIndia.aspx	A Website of Jal Jivan Mission, Government of India
7	https://cpcb.nic.in/	A Website of Central Pollution Control Board, Government of India
8	http://www.mahapwd.com/#	A Website of Public Works Department, GoM
9	http://tutorial.communitygis.net/	A Website for GIS data sets developed by Unnat Maharashtra Abhiyan
10	https://youtu.be/G71maumVZ1A?si=TzDTxKUpLYaRos7U	A video record of lecture by Prof. Milind Sohoni, IIT Bombay, on Engineering, Development and Society
11	https://youtu.be/TUcPNwtdKyE?si=wnSWrhGc9dJTC-ac	A keynote talk by Prof. Milind Sohoni, IIT Bombay, on Interdisciplinary Engineering: The Road Ahead
12	https://youtu.be/mKJj6j_1gWg?si=ajE8s4lfB2OM63Ng	A TED talk by Prof. Milind Sohoni, IIT Bombay, on Vernacular Science: The Science of Delivery
13	https://www.ugc.gov.in/pdfnews/4371304_LifeSkill_JeevanKaushal_2023.pdf	UHV: UGC Course on life skills. Unit 4 i.e. Course 4 is to be referred
14	https://nss.gov.in/	NSS : Know about the NSS Scheme and details
15	https://www.rbi.org.in/FinancialEducation/FinancialEntrepreneur.aspx	Reference for Module V
16	https://www.rbi.org.in/FinancialEducation/content/I%20Can%20Do_RBI.pdf	Reference for Module V
17	https://www.rbi.org.in/FinancialEducation/content/Financing%20needs%20of%20Micro%20and%20small%20Enterprises%20-%20A%20guide.pdf	Reference for Module V
18	https://www.rbi.org.in/FinancialEducation/content/GUIDE310113_F.pdf	Reference for Module V

SOCIAL AND LIFE SKILLS**Course Code : 312003**

Sr.No	Link / Portal	Description
Note : <ul style="list-style-type: none">Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students		

MSBTE Approval Dt. 01/10/2024**Semester - 2, K Scheme**

BASIC DESIGN**Course Code : 322010**

Programme Name/s	: Architecture Assistantship/ Architecture and Interior Design/ Architecture/ Interior Design & Decoration/ Interior Design
Programme Code	: AA/ AD/ AT/ IX/ IZ
Semester	: Second
Course Title	: BASIC DESIGN
Course Code	: 322010

I. RATIONALE

The subject is the primary core of the total course and forms the spine of the Architectural /interior design profession that intends to equip the students with thorough knowledge about basic concepts of Architectural/interior design. The students shall also learn planning processes and develop intellectual and creative skills required for Architectural/Interior Design.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Students will be able to understand the basics of Design (Elements, Principles, Ergonomics & Colour Theory) and apply this knowledge in Architectural / interior design to achieve different usable spaces.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Use of the principles of Elements of Architecture /interior design as a basic design vocabulary.
- CO2 - Use of the Principles of Architecture /interior design as a basic design vocabulary.
- CO3 - Use of the principles of the Colour Theory and its components to achieve various compositions.
- CO4 - Apply the principles of Ergonomics to achieve design efficiency in Architecture / Interior Design.
- CO5 - Apply all of the above learnings, to achieve simple individual activity-based rooms for Architecture / Interior Design.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme									
				Actual Contact Hrs./Week			SLH	NLH	Paper Duration		Theory			Based on LL & TL				Based on SL		Total Marks
				CL	TL	LL					Total	Practical		SLA						
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min	Max	Min	
322010	BASIC DESIGN	BAD	DSC	2	-	6	2	10	5	-	-	-	-	50	20	50@	20	50	20	150

Total IKS Hrs for Sem. : 6 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Explain - Elements of Architectural/Interior Design.</p> <p>TLO 1.2 Explain - Point, Line, Plane, volume.</p> <p>TLO 1.3 Explain- Texture, Colour, Value and Space.</p> <p>TLO 1.4 Application and Interpretation of Elements Of Architectural/ Interior design.</p> <p>TLO 1.5 Explain - Elements of Architectural Design with the context of IKS & its importance.</p>	<p>Unit - I Elements of Architectural/Interior design</p> <p>1.1 Explain the term - Elements of design.</p> <p>1.2 Study of different Elements of design.</p> <p>1.3 Application of Elements of Design.</p> <p>1.4 Study of Elements of Design in the Indian context (IKS).</p>	<p>Chalk-Board Presentations</p> <p>IKS examples</p>
2	<p>TLO 2.1 Explain - Principles of Architectural/Interior Design.</p> <p>TLO 2.2 Explain - Balance, Contrast, Emphasis, Movement.</p> <p>TLO 2.3 Explain - Rhythm, Hierarchy, White Space, Unity.</p> <p>TLO 2.4 Application and Interpretation of Principles Of Architectural/ Interior design.</p> <p>TLO 2.5 Study the Principles of Architectural / Interior Design in context to IKS.</p>	<p>Unit - II Principles Of Architectural / Interior Design</p> <p>2.1 Explain the term - Principles of design.</p> <p>2.2 Study of different Principles of design.</p> <p>2.3 Application of Principles of Design.</p> <p>2.4 Study of Principles of Design - IKS context.</p>	<p>Chalk-Board Presentations</p> <p>IKS examples</p>
3	<p>TLO 3.1 Explain Colour theory.</p> <p>TLO 3.2 Explain Colour Wheel.</p> <p>TLO 3.3 Explain Warm & Cool colours.</p> <p>TLO 3.4 Explain Colour scheme.</p>	<p>Unit - III Colour Theory</p> <p>3.1 Study different components of colour theory.</p> <p>3.2 Understand the colour wheel with Primary , Secondary and Tertiary Colour Schemes.</p> <p>3.3 Apply different colour schemes in the field of Architectural / Interior Design.</p>	<p>Demonstration Presentations</p> <p>Hands-on</p>
4	<p>TLO 4.1 Explain Ergonomic and its need in Architectural / Interior Design.</p> <p>TLO 4.2 Understand different human activities to related spaces.</p> <p>TLO 4.3 Study & Apply Ergonomic for living room spaces.</p> <p>TLO 4.4 Study & Apply Ergonomic for Bed room space.</p> <p>TLO 4.5 Study & Apply Ergonomic for Kitchen spaces.</p> <p>TLO 4.6 Study & Apply Ergonomic for Toilets.</p> <p>TLO 4.7 Apply Ergonomic in Interior Design.</p> <p>TLO 4.8 Apply Ergonomic in different Public Spaces.</p> <p>TLO 4.9 Study & Application of Ergonomic in the Indian context and usage type (IKS context).</p>	<p>Unit - IV Ergonomics</p> <p>4.1 Study human body and its movements.</p> <p>4.2 Importance, Need and application of Ergonomic in the field of Architecture / Interior Design.</p> <p>4.3 Study different activities and application of Ergonomic for various residential spaces.</p> <p>4.4 Study Ergonomic applicable for different commercial and Institutional spaces.</p> <p>4.5 Study of IKS examples of Ergonomic (IKS system).</p>	<p>Demonstration Presentations</p> <p>Case Studies (with & without IKS content)</p>

BASIC DESIGN**Course Code : 322010**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 Explain design of space. TLO 5.2 Design living room space. TLO 5.3 Design kitchen/dining space. TLO 5.4 Design Bed Room space TLO 5.5 Design Toilet. TLO 5.6 Design Special space.	Unit - V Design of Single Use Space 5.1 Explain the Design Process for different spaces. 5.2 Living room design basics with furniture. 5.3 Kitchen/Dining room design basics with furniture. 5.4 Bed room design basics with furniture. 5.5 Toilet design basics with Interior.	Case Study Presentations Site/Industry Visit

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Draw different types of patterns	1	*Draw different types of patterns of point and line using various techniques (free hand, compositions etc).	2	CO1
LLO 2.1 Prepare sketches	2	*Prepare sketches incorporating volumetric and planar elements - minimum 2 each.	2	CO1
LLO 3.1 Prepare different compositions	3	*Prepare different compositions of texture & colour with the use of different media.	2	CO1
LLO 4.1 Prepare sketches	4	Prepare sketches incorporating & defining the value (as meant in colour) & space by use of different media.	2	CO1
LLO 5.1 Create a single composition	5	*Create a single composition by incorporating all the elements of design using any media.	2	CO1
LLO 6.1 Prepare sketches & models	6	*Prepare Sketches / models to demonstrate the balance & contrast using different media (Balance 1 No & Contrast 1 No minimum).	2	CO2
LLO 7.1 Prepare sketches & models	7	Prepare Sketches / models to demonstrate the Emphasis & Movement using different media (Emphasis 1 No & Movement 1 No minimum).	2	CO2
LLO 8.1 Prepare sketches & models	8	Prepare Sketches / models to demonstrate the Rhythm & Hierarchy using different media (Rhythm 1 No & Hierarchy 1 No minimum).	2	CO2
LLO 9.1 Prepare sketches & models	9	Prepare Sketches / models to demonstrate the White Space & Unity using different media (White Space 1 No & Unity 1 No minimum).	2	CO2
LLO 10.1 Prepare a composition	10	*Prepare a composition defining the Principles of Design using combination of any 4 principles of choice (Composition in form of sheet or model - 1 No minimum).	2	CO2
LLO 11.1 Prepare a colour wheel sheet	11	*Prepare a Colour Wheel to understand the theory of colours using different media.	5	CO3
LLO 12.1 Create compositions	12	Create a composition using colour scheme incorporating the concept of elements & principles of design (Sheet work Min 2).	5	CO3

BASIC DESIGN**Course Code : 322010**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 13.1 Draw the Vitruvian man	13	Draw the Anthropometric figure of Human body (Vitruvius man), male, female, child and related body movements	6	CO4
LLO 14.1 draw the anthropometric sketches	14	*Draw the anthropometric sketches / drawings explaining the different human activities in living room.	6	CO4
LLO 15.1 draw the anthropometric sketches	15	Draw the anthropometric sketches / drawings explaining the different human activities in kitchen / dining	6	CO4
LLO 16.1 Draw the anthropometric sketches	16	*Draw the anthropometric sketches / drawings explaining the different human activities in bedroom / toilet.	6	CO4
LLO 17.1 Measurement & Drawing plan	17	*Measure and draw plan, section, elevation of a single use structure (small scale space like watchman cabin, milk booth, store room etc).	6	CO5
LLO 18.1 Measurement & Drawing plan	18	*Measure and draw plan, section, elevation of existing living room with furniture.	12	CO5
LLO 19.1 Measurement & Drawing plan	19	Measure and draw plan, section, elevation of existing kitchen / dining with furniture.	12	CO5
LLO 20.1 Measurement & Drawing plan	20	*Measure and draw plan, section, elevation of existing bedroom and toilet.	12	CO5
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> • '*' Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

- Collect & Study different architectural plans of residential units (plans) & prepare a report
- Study & Prepare power point presentation on elements of Design
- Study & Prepare power point presentation on Principles of Design

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

BASIC DESIGN**Course Code : 322010**

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Furniture - Drafting tables and stools, LCD Projector and Screen. Drafting tools & Computers. Paper, Pencil, T square, Setsquare and Scale. Colours, Brush, Cutters, Scissors, Glue.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE**X. ASSESSMENT METHODOLOGIES/TOOLS****Formative assessment (Assessment for Learning)**

- Rubrics for COs, Assignments & Presentations, Self learning

Summative Assessment (Assessment of Learning)

- End term Viva Voce, Lab performance

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	1	1	1	1	3			
CO2	3	1	1	1	1	1	3			
CO3	3	2	2	1	1	1	3			
CO4	3	2	3	1	2	1	3			
CO5	2	3	3	1	2	1	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Anthony Antoniadis	Poetics in Architecture : Theory of Design	Wiley
2	Donald Watson, Michael J Crosbie, John HancockCallendar	Time Saver Standards for Architectural Design Data	McGraw Hill
3	Joseph De Chaira, Julius Panero, Martin Zainik	Time saver Standards for Interior Design and Space Planning	McGraw Hill
4	Francis D K Ching	Architecture : Form Space and Order	Wiley
5	Francis D K Ching	Interior Spcaes	Wiley
6	Yatin Pandya	Elements of Space Making	Vastu Shilpa Foundation
7	Pradnya Chauhan	Learning Basic Design	Abhivikas Niketan 978-81-955393-0-7

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.youtube.com/watch?v=B4Zv500TEPA	principles and elements of design
2	https://www.youtube.com/watch?v=51rnmBLtKvs	principles and elements of Interior design
3	https://www.youtube.com/watch?v=dU_zyDYZiew	Anthropometry and ergonomic
4	https://www.youtube.com/watch?v=YeI6Wqn4I78	Colour Theory Basics

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

HISTORY OF ARCHITECTURE & CULTURE**Course Code : 322329**

Programme Name/s : Architecture Assistantship/ Architecture and Interior Design/ Architecture/ Interior Design & Decoration/ Interior Design

Programme Code : AA/ AD/ AT/ IX/ IZ

Semester : Second

Course Title : HISTORY OF ARCHITECTURE & CULTURE

Course Code : 322329

I. RATIONALE

The objective is to understand how architecture has been influenced by society and its culture through ages. The study of history will help to understand the way buildings were constructed in context to climate, geography and traditions with its own unique style. The study will help the students to understand how political, physical, social, economical and technological affect the architecture materials and construction techniques.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Students shall undertake critical study of architecture through ages and across the world. The subject study will help to understand the built form, material and technology. The course will develop awareness, knowledge and techniques of various methods of conservation and documenting heritage sites.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Students will be able to prepare drawing of given Heritage Structure with proper documentation .
- CO2 - students will be able to co-relate impact of relevant Civilizations. and work on conservation site with all relevant course base learning.
- CO3 - students will be able to Conservation to given structure with professional Ethics. and Understand the construction technics, methodology, specification of building materials as conservation technics and practice
- CO4 - students will be able to Use relevant tools for mapping, measuring, documenting and restoring of heritage sites.
- CO5 - students will be able to design / Retrofit/ Conserve furniture for given Heritage site

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										
				Actual Contact Hrs./Week			SL	LH	NLH		Paper Duration	Theory			Based on LL & TL				Based on SL		Total Marks
				CL	TL	LL						Practical			FA-PR		SA-PR		SLA		
												FA-TH	SA-TH	Total	Max	Min	Max	Min	Max	Min	
322329	HISTORY OF ARCHITECTURE & CULTURE	HOA	DSC	4	-	2	-	6	3	3	30	70	100	40	25	10	25@	10	-	-	150

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Explain the importance history of Architecture</p> <p>TLO 1.2 Explain the examples of stone age and early shelters with case study and site visit the same</p> <p>TLO 1.3 Explain the geo physical societal early caves and shelters.</p> <p>TLO 1.4 Explain the role and importance of archeological survey of India ,Explain history of Indian and world architecture early stages</p>	<p>Unit - I Pre-Historical Architecture and Introduction to History of Architecture</p> <p>1.1 Importance of history to understand the Architecture.</p> <p>1.2 Examples of Early shelters, Stone Age, Tumuli, etc.</p> <p>1.3 Determinants of built form – geo physical, societal, technological etc. (Early caves, timber huts, stone houses etc).</p> <p>1.4 Understanding people of India and Culture</p>	<p>Video</p> <p>Demonstrations</p> <p>Case Study</p> <p>Site/Industry Visit</p> <p>Collaborative learning</p>
2	<p>TLO 2.1 Explain the civilization of Egyptian, Indus valley ,Mesopotamian , Greek, roman etc.</p> <p>TLO 2.2 explain the Materials, construction systems, system of proportioning used in heritage buildings</p> <p>TLO 2.3 sketch building plans and explain the characteristic's of architectural buildings</p> <p>TLO 2.4 Explain Greek civilization ,Greek towns, location and characteristics of typical civic spaces</p> <p>TLO 2.5 Explain Significant characteristics of Greek Architecture such as Materials, construction systems</p> <p>TLO 2.6 Explain Significant characteristics of Roman Architecture.</p>	<p>Unit - II River Valley Civilizations</p> <p>2.1 Egyptian Civilization Concept of the Royal Necropolis, locational context and architectural characteristics of public buildings.</p> <p>2.2 Mesopotamian Civilization the urban context and architecture of public buildings (Ziggurats and palaces) - one example of each.</p> <p>2.3 Indus Valley Civilization: Grid Iron System</p> <p>2.4 Greek civilization ,Greek towns, location and characteristics of typical civic spaces such as Agora, Acropolis, Theatres etc</p> <p>2.5 Significant characteristics of Greek Architecture such as Materials, construction systems, system of proportioning, Greek orders, architecture of Greek temples – Parthenon at Athens.</p> <p>2.6 Significant characteristics of Roman Architecture. Concept of monumentality, materials and construction systems, Roman orders and the Roman Basilica, Pantheon Rome</p>	<p>Case Study</p> <p>Collaborative learning</p> <p>Demonstration</p> <p>Presentations</p>

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	<p>TLO 3.1 Explain the theory and design principles of Indian temple architecture</p> <p>TLO 3.2 Explain the methodology of construction technics and material used for temple architecture.</p> <p>TLO 3.3 Study of documentation of local heritage site</p> <p>TLO 3.4 research methods of temple architecture and document as per the requirements</p>	<p>Unit - III Temple Architecture in India</p> <p>3.1 Evolution of temple and its various parts</p> <p>3.2 Dravidian style (Southern) General characteristics, planning (e.g. shore temple at Mahabalipuram, Madurai Temple. Indo Aryan Temple</p> <p>3.3 Lingaraja Temple at Bhubhaneshwar, Kandariya Mahadeo at Khajuraho, Sun Temple at Modhera .</p> <p>3.4 Mughal architecture Indian context.</p>	<p>Model</p> <p>Demonstration</p> <p>Case Study</p> <p>Collaborative learning</p>
4	<p>TLO 4.1 Explain the Early Christian Architecture</p> <p>TLO 4.2 Explain and prepare sketches of Byzantine Architecture</p> <p>TLO 4.3 Explain and prepare sketches of Gothic architecture.</p> <p>TLO 4.4 Explain the Renaissance Architecture through sketches.</p> <p>TLO 4.5 Explain the Byzantine Architecture through the Model/Sketches</p>	<p>Unit - IV Western Architecture</p> <p>4.1 Early Christian Architecture - Development of church plan (Basilica)</p> <p>4.2 Byzantine Architecture -Centralized plans and construction methods for dome of St. Sophia Church)</p> <p>4.3 Gothic Architecture -Main visual and construction vocabulary of Gothic Arch at Notre Dame Paris, and Reims Cathedral</p> <p>4.4 Renaissance Architecture -Early Renaissance Architecture. General architectural characteristics (Florence cathedral)</p> <p>4.5 Late Renaissance architecture. General characteristics and Role of Michael Anglo & Palladio (eg. St. Peter's Rome. The capital Rome & Villa Capra)</p>	<p>Case Study</p> <p>Presentations</p> <p>Video</p> <p>Demonstrations</p> <p>Collaborative learning</p>
5	<p>TLO 5.1 Explain the furniture of heritage building through edges</p> <p>TLO 5.2 explain the materials used in furniture design</p> <p>TLO 5.3 Explain and analyze the types of furniture used in the heritage building as case study</p> <p>TLO 5.4 Explain methods of joinery techniques such as parquetry, marquetry gilding, turning, pierced</p> <p>TLO 5.5 Explain occidental furniture style - Classical, Medieval, 19th Century AD ,Modern</p>	<p>Unit - V History of Furniture- timeline and Evolution</p> <p>5.1 Introduction to furniture history. Evolution of furniture over a period based on climate, social factors, life style, technical and stylistic development availability of materials and various movements in design.</p> <p>5.2 Introduction to furniture terminology based on methods of joinery techniques such as parquetry, marquetry gilding, turning, pierced and chip carving, ormolu mounts</p> <p>5.3 Study of occidental furniture style - Classical, Medieval, 19th Century AD ,Modern, Post Modern , Contemporary.</p> <p>5.4 Study of architectural elements in interiors in India from Mughal period onwards such as doors, windows, pillars, columns, staircases, fireplaces, paneling, dado, frieze, architectural decoration, study sketches and creative designs.</p> <p>5.5 Oriental Furniture and Style -Chinese and Japanese interior and furniture.</p>	<p>Video</p> <p>Demonstrations</p> <p>Case Study</p> <p>Site/Industry Visit</p> <p>Collaborative learning</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

HISTORY OF ARCHITECTURE & CULTURE**Course Code : 322329**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 '*Prepare Free hand sketches and computer generated drawings in computer lab of historical buildings, Models of historical buildings in model making lab.	1	1) '* a) computer generated drawings of historical buildings in computer lab .b) Free hand scketches .	2	CO1
LLO 2.1 '* Prepare PPT in computer lab only on the topics: the civilization of Egyptian, Indus valley, Mesopotamian , Greek, roman etc.	2	'* The civilization of Egyptian, Indus valley. Presentation by PPT	2	CO2
LLO 3.1 '* Report and measurement drawings on drawing sheets or tracing paper to the suitable scale based on study and documentation of local heritage site	3	'* Select local heritage site - a) Documentation of Site b) Report c) Measurment Drawing .	2	CO3
LLO 4.1 PPT on The Early Christian Architecture /Byzantine Architecture	4	The Early Christian Architecture /Byzantine Architecture-Presentation By PPT.	2	CO4
LLO 5.1 '* model of nay one in model lab history of furniture to explain various styles and periods	5	'* History of Furniture to explain various styles.presentation by PPT / Architectural presentation free hand .	2	CO5
LLO 6.1 sketches (in the sketch book) of the (Gothic Architecture and Renaissance Architecture etc.) various furniture pieces explaining the use of materials, construction systems, study of scale and proport	6	2 (Gothic Architecture and Renaissance Architecture etc.) various furniture pieces explaining the use of materials, construction systems, study of scale and proportion - Skecthes with presentation	2	CO4
LLO 7.1 '* Prepare PPT in computer lab on the topics: Gothic Architecture and Renaissance Architecture	7	'* Gothic Architecture and Renaissance Architecture- presentation by PPT	2	CO4
LLO 8.1 sketches (in the sketch book) in plan/section/elevation/views of the important buildings of the Gothic Architecture and Renaissance Architecture etc.)	8	Draw proportionate sketches (in the sketch book) in plan/section/elevation/views of the important buildings of the civilisations (Gothic Architecture and Renaissance Architecture etc.) explaining the use of materials, construction systems, study of cale and proportion.	2	CO4
LLO 9.1 Gothic Architecture and Renaissance Architecture	9	Prepare PPT on the topics: Gothic Architecture and Renaissance Architecture	2	CO4
LLO 10.1 '* in studio lab draw plan/section/elevation/views of the important buildings of the civilisations (Greek, roman etc.) explaining the use of materials, construction systems, study of scale and prop	10	'* a) Draw the plan/section/elevation/views of the important buildings of the civilisations (Greek, roman etc.). b) Understand the scale and prortion , materials etc. make a report .	2	CO3
LLO 11.1 '* Prepare/draw mind mapping diagram/chart in chronological order of history of architecture and its evolution	11	'* history of architecture and its evolution - Prepare/draw mind mapping diagram/chart in chronological order of	2	CO1

HISTORY OF ARCHITECTURE & CULTURE**Course Code : 322329**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 12.1 '*' In the studio lab draw sketches in plan/section/elevation/views based on study: Stonehenge to cave architecture	12	'*' : Stonehenge to cave architecture - a) draw the sketches and prpare model	2	CO2
LLO 13.1 Prepare notes/PPT based on study to explain the development of architecture in early stages history of Indian and western architecture	13	Development of architecture in early stages history of Indian and western architecture- Presentation by PPT	2	CO4
LLO 14.1 '*' PPT in computer lab based on study to explain the development of architecture in early stages INDIAN history furniture	14	'*' history of Indian furniture Architecture. presentation by PPT	2	CO3
LLO 15.1 '*' prepare a report and measurement drawings based on study and documentation of historical furniture	15	'*' Prepare a report and measurement drawings based on study and documentation of local heritage site	2	CO3
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> '*' Marked Practicals (LLOs) Are mandatory. Minimum 80% of above list of lab experiment are to be performed. Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

- 1) Undertake a Survey of local historical buildings and do analysis of the structure ,design, construction, materials , furniture used etc. 2) Draw free hand sketches and prepare documentation of historical building near the institute. 3) photography survey of historical building

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	1) drawing boards	1
2	measuring tape of 30.M	1
3	A 1 Size Drawing Sheets	1

HISTORY OF ARCHITECTURE & CULTURE**Course Code : 322329**

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
4	tracing /gateway papers	1
5	stationery material /sketch book, pencil's, eraser etc.	1
6	Camera for photograph	1
7	Suitable Stationery for preparation of model	1
8	surveying and leveling materials as required.	1
9	Material Required for Documentation	1

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Pre-Historical Architecture and Introduction to History of Architecture	CO1	15	6	6	8	20
2	II	River Valley Civilizations	CO2	10	2	4	4	10
3	III	Temple Architecture in India	CO3	15	6	6	8	20
4	IV	Western Architecture	CO4	10	2	4	4	10
5	V	History of Furniture- timeline and Evolution	CO5	10	2	4	4	10
Grand Total				60	18	24	28	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Teamwork / Individual

Summative Assessment (Assessment of Learning)

- Teamwork
- Practical

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	1	1	1	1	1	3			
CO2	3	2	2	2	1	1	3			
CO3	3	2	2	2	2	1	3			
CO4	3	2	2	2	1	1	3			
CO5	3	1	1	2	1	1	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
-------	--------	-------	----------------------------

HISTORY OF ARCHITECTURE & CULTURE**Course Code : 322329**

Sr.No	Author	Title	Publisher with ISBN Number
1	John Pile	Interior Design	Harry N, Adry Publishers
2	Ahmed Kasu	Interior Design	TWAIN Pub.Bombay
3	by Sir Banister Fletcher	History of Architecture	?Architectural Press; 20th edition (21 September 1996)
4	Percy Brown	Indian Architecture (Hindu Period)	Tobey Press
5	Joseph Gwilt	Encyclopedia of Architecture.	Longmans Green
6	Michael Raeburn	An outline of World Architecture:-	Littlehampton Book Services Ltd
7	Federick Litchfield	History of furniture's	Federick Litchfield

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://archive.org/details/illustratedhisto00litrich	Illustrated history of furniture : Litchfield, Frederick, b. 1850
2	Wikipedia https://en.wikipedia.org/wiki/History_of_architecture	History of Architecture
3	Library of Congress (.gov) https://www.loc.gov/print/resource/find_arch	Documentation of history of architecture
4	Architectural Documentation - Mesa Verde ... National Park Service (.gov) https://www.nps.gov	Architectural Documentation - Mesa Verde ...
5	Domus Web https://www.domusweb .	DOMUS: the Magazine for Architecture, Design and Art Lovers
6	MIT Press https://mitpress.mit.edu	Revisiting the classics in open access for World ...

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 01/10/2024**Semester - 2, K Scheme**

THEORY OF DESIGN**Course Code : 322330**

Programme Name/s : Architecture Assistantship/ Architecture and Interior Design/ Architecture/ Interior Design & Decoration/ Interior Design

Programme Code : AA/ AD/ AT/ IX/ IZ

Semester : Second

Course Title : THEORY OF DESIGN

Course Code : 322330

I. RATIONALE

The theory of design in architecture serves as a foundational framework that informs the creation, evaluation, and understanding of architectural works. It encompasses the principles and methodologies that guide the students in shaping spaces that are functional, aesthetically pleasing, and contextually appropriate.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply the different principles of Design to solve broad-based relevant architectural problems.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Evolve the History of Architecture and Design theory
- CO2 - Explain Architectural theories as socially useful discipline
- CO3 - Explore the different elements of architecture.
- CO4 - Evaluate the works of different Architects and their philosophies.
- CO5 - Explain different architectural styles and movements.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			FA-TH			SA-TH	Total	Practical		SLA						
														FA-PR	SA-PR	Max	Min	Max	Min			
322330	THEORY OF DESIGN	TOD	AEC	3	-	2	1	6	3	3	30	70	100	40	25	10	-	-	25	10	150	

Total IKS Hrs for Sem. : Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

THEORY OF DESIGN

Course Code : 322330

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Explain scope of History of Architecture and Contemporary Design,</p> <p>TLO 1.2 Analyse types of organised architectural spaces.</p> <p>TLO 1.3 Explain Principles of Functionality and Aesthetics.</p> <p>TLO 1.4 Apply Design Principles in Projects.</p>	<p>Unit - I History of Architecture and Design theory</p> <p>1.1 Define the historical evolution of design theories and their relevance to contemporary architectural practice.</p> <p>1.2 Define architectural space types : space and organizational pattern, space relationship, hierarchy of space, experienced through movement in space - time,</p> <p>1.3 Define design intentions based on principles of functionality to ensure that architectural designs effectively meet user needs and operational requirements, such a site, context, climatology, sensory and cultural characteristics of place.</p> <p>1.4 Apply design principles through hands-on exercises and projects to develop and refine design ideas.</p>	<p>Lecture Using Chalk-Board Presentations Case Study</p>
2	<p>TLO 2.1 Discuss Essence and composition in Architecture</p> <p>TLO 2.2 Discuss theories in Architecture</p> <p>TLO 2.3 Explain different types of Elements & principles of Design</p>	<p>Unit - II Architectural theories as socially useful discipline.</p> <p>2.1 Introduction to the core principles and fundamental ideas that define different architectural styles and movements.</p> <p>2.2 Define theories in architecture in classical era to contemporary such as golden section, golden rectangle, golden lines, classical orders, renaissance theories, ken, etc.</p> <p>2.3 Introduction to innovative and creative approaches to architectural expression by applying design elements and principles .</p>	<p>Presentations Case Study Site/Industry Visit Lecture Using Chalk-Board</p>
3	<p>TLO 3.1 Explore social relevance in Architecture.</p> <p>TLO 3.2 Explore different types of theories of design.</p> <p>TLO 3.3 Explore visual properties of design.</p> <p>TLO 3.4 Apply the visual principles in design.</p>	<p>Unit - III Elements and principles of architectural design.</p> <p>3.1 Identify and describe the properties of fundamental geometric shapes such as circles, squares, triangles, and polygons, including their symmetry, angles, and relationships.</p> <p>3.2 Identify and interpret non-geometric forms, such as organic shapes and abstract patterns, and discuss their visual characteristics and how they differ from geometric shapes.</p> <p>3.3 Examine key visual attributes such as line, color, value, texture, and space to understand how elements contribute to the overall visual impact of 2D forms.</p> <p>3.4 Apply principles of design such as proportion, scale, and rhythm to both geometric and non-geometric forms to evaluate the visual effectiveness of a design.</p>	<p>Lecture Using Chalk-Board Presentations Case Study</p>
4	<p>TLO 4.1 Explore Architectural Biography and Impact.</p> <p>TLO 4.2 Study Philosophical Frameworks.</p> <p>TLO 4.3 Compare & analyze the work of different Architects.</p>	<p>Unit - IV Architects and their Philosophies.</p> <p>4.1 Identify key architects from various historical periods and contemporary contexts & their major works, influences, and contributions to architecture.</p> <p>4.2 Understand and articulate the core philosophies and design principles of different architects.</p> <p>4.3 Compare the philosophies and design approaches of different architects to identify similarities, differences, and the evolution of architectural thought.</p>	<p>Lecture Using Chalk-Board Collaborative learning Presentations Case Study Video Demonstrations</p>

THEORY OF DESIGN**Course Code : 322330**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 Describe Prehistoric Architectural building structures . TLO 5.2 Describe classical Architectural building structures . TLO 5.3 Describe Renaissance Architectural building structures .	Unit - V Architectural Styles and movements 5.1 Identify and describe the characteristics of pre-historic architectural building structures. 5.2 Identify and describe the characteristics of building structures having the classical style of architecture. 5.3 Identify and describe the characteristics of building structures during the renaissance architecture period.	Lecture Using Chalk-Board Presentations Video Demonstrations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 *Prepare a report on history and evolution of theory of architecture design.	1	Collection of data of history and evolution of theory of architecture design,	2	CO1 CO2
LLO 2.1 Prepare a report and draw sketches of composition of architectural spaces.	2	Learning through theory of architecture design.	2	CO1 CO2
LLO 3.1 *Design an architecture design brief, program and design intention of a given project based on principles of functionality, user needs, site, context, climatology, sensory and cultural characteristic	3	Development of mind mapping diagram and a report for the design intention for a given project.	2	CO1
LLO 4.1 Design and draw schematic sketches by applying design principles for a given project,	4	Application of design principles through hands-on exercises and projects to develop and refine design ideas.	2	CO1
LLO 5.1 *Prepare report with sketches illustrating design principles and ideas of different architectural styles,	5	Preparation of report with sketches on principles and ideas that define different architectural styles and movements.	2	CO1
LLO 6.1 Prepare report with sketches illustrating theories in architecture design.	6	Preparation of report with sketches theories in architecture.	2	CO2
LLO 7.1 Explain by applying design theories for a given image, picture.	7	Application of golden section on a given image to demonstrate the golden proportion.	2	CO2
LLO 8.1 Describe through sketches of different types of architectural expressions for a given architectural style.	8	Draw and explain through sketches a given architectural style to illustrate architectural expression,	2	CO2
LLO 9.1 *Draw sketches and prepare a report based on physical case study of a given building to understand building components such as court yard, openings, roof etc. With its specific characterist	9	Explain through sketches and a report on importance of components of building and its social relevance.	2	CO3
LLO 10.1 Draw sketches of 2d compositions of space to analyse and interpret visual characteristics differentiating organic and geometric shapes.	10	Exploring Different types of theories to identify and interpret form and space.	2	CO3

THEORY OF DESIGN**Course Code : 322330**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 11.1 *Draw sketches and prepare a report based on physical case study of a given building to understand building components such as court yard, openings, roof etc. With its specific characterist	11	Various types of visual properties of different types of materials used in design a building.	2	CO3
LLO 12.1 Draw sketches of 2d compositions of space to analyse and interpret visual characteristics differentiating organic and geometric shapes.	12	Exploring Different types of theories to identify and interpret form and space.	2	CO3
LLO 13.1 Draw sketches and prepare a report based on book/online case study of a given building to understand application of building material to explore architectural form based on visual attributes such as l	13	Explain various types of visual properties of different types of materials used in design a building.	2	CO3
LLO 14.1 Draw a sketch of a elevation of a given street with sets of buildings with its components and analyse design elements such as proportion, scale, and rhythm.	14	Explain various types of visual and principles of different types of materials used in design a building.	2	CO3
LLO 15.1 *Prepare a PPT differentiating works of various architects works based on their philosophies.	15	Preparation of PPT presentation differentiating works of various architects works based on their philosophies.	2	CO4
LLO 16.1 Draft plans, sections and elevations on A2 size tracing paper of a house designed by a famous architect illustrating his design philosophy in his work.	16	Explain through drafting the drawings of a house designed by a famous architect.	2	CO4
LLO 17.1 Prepare a PPT to identify and describe the characteristics of pre-historic architectural building structures.	17	Preparation of report on Prehistoric Architectural structures.	2	CO5
LLO 18.1 *Prepare a PPT to identify and describe the characteristics of building structures having the classical style of architecture.	18	preparation of report on classical Architectural structures.	2	CO5
LLO 19.1 *Prepare a PPT to Identify and describe the characteristics of building structures during the renaissance architecture period.	19	Preparation of report on Renaissance Architectural structures.	2	CO5
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> • '*' Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Micro project

- Select a historical building or object, study its design elements, and present an analysis of its form, function, and cultural context.
- Prepare a video explaining the design philosophy of any one contemporary Architect in your local vicinity.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Projector and Screen - 4K resolution, 3500 lumens brightness, HDMI and VGA inputs.	All
2	Computer Workstations - Intel Core i7, 16GB RAM, 1TB SSD, NVIDIA GeForce RTX 3060, 27-inch 4K monitors.	All
3	Scanner - 2400 x 4800 dpi resolution, color depth 48-bit.	All
4	Display Boards - Cork or magnetic boards, 48 x 36 inches.	All
5	Drawing Table - Imperial size/A1 size	All
6	Smart Boards - 75-inch interactive display, 4K resolution, multi-touch capability.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	History of Architecture and Design theory	CO1	10	2	4	4	10
2	II	Architectural theories as socially useful discipline.	CO2	14	4	4	4	12
3	III	Elements and principles of architectural design.	CO3	22	4	6	6	16
4	IV	Architects and their Philosophies.	CO4	22	4	6	6	16
5	V	Architectural Styles and movements	CO5	22	4	6	6	16
Grand Total				90	18	26	26	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Two unit tests of 30 marks and average of two unit tests.
- For laboratory learning 25 marks.

Summative Assessment (Assessment of Learning)

- End semester assessment of 70 marks through examination.

XI. SUGGESTED COS - POS MATRIX FORM

THEORY OF DESIGN

Course Code : 322330

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	1	-	-	-	-	1			
CO2	2	1	-	1	-	-	1			
CO3	2	2	2	1	-	-	2			
CO4	2	2	2	1	-	-	2			
CO5	2	3	-	1	-	-	1			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Steen Eiler Rasmussen	Experiencing Architecture	MIT Press ISBN: 9780262680028
2	Vitruvius (Author) Rowland, Ingrid D. (Southwestern Univer (Author) Howe, Thomas Noble (Author)	Vitruvius: Ten Books on Architecture	Cambridge University Press ISBN:9780521002929
3	Marc-Antoine Laugier	An Essay on Architecture	Hennessey & Ingalls, Inc ISBN:978-0912158921
4	Don Norman	The Design of Everyday Things	Basic Books 978-0465050659
5	DK	Design: The Definitive Visual History	DK 978-1465444568
6	Nikos A Salingaros	Theory of Architecture Paperback – Import, 30 May 2007	Umbau Verlag ISBN : 978-3937954073

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.designhistorysociety.org/	Offers resources, publications, and events related to the history of design.
2	https://www.aiga.org/	Professional association for design with resources on design principles, case studies, and articles.
3	http://www.visual-arts-cork.com/	A resource for understanding visual arts, including the properties of 2D forms.
4	https://www.khanacademy.org/humanities/art-history	Offers lessons on various art movements and principles that relate to 2D visual forms.

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

Maharashtra State Board Of Technical Education, Mumbai																									
Learning and Assessment Scheme for Post S.S.C Diploma Courses																									
Programme Name		: Diploma In Architecture Assistantship / Architecture / Interior Design & Decoration / Interior Design																							
Programme Code		: AA / AT / IX / IZ										With Effect From Academic Year		: 2023-24											
Duration Of Programme		: 6 Semester										Duration		: 16 WEEKS											
Semester		: Third										NCrF Entry Level : 3.5		Scheme		: K									
Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme						Credits	Paper Duration (hrs.)	Assessment Scheme										Total Marks	
						Actual Contact Hrs./Week			Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs /Week	Theory			Based on LL & TL				Based on Self Learning							
						CL	TL	LL			FA-TH			SA-TH	Total		FA-PR		SA-PR		SLA				
															Max	Min	Max	Min	Max	Min	Max	Min			
1	BUILDING SERVICES	BSE	DSC	323301	2	3	-	3	-	6	3	3	30	70	100	40	25	10	25@	10	-	-	150		
2	THEORY OF STRUCTURE	TOS	DSC	323302	-	3	2	-	1	6	3	3	30	70	100	40	25	10	-	-	25	10	150		
3	BASIC SURVEYING (ARCHITECTURE)	BSU	SEC	323303	2	2	-	6	-	8	4	3	30	70	100	40	25	10	25@	10	-	-	150		
4	BUILDING CONSTRUCTION	BCT	DSC	323304	2	2	-	6	-	8	4	4	30	70	100	40	25	10	25@	10	-	-	150		
5	ESSENCE OF INDIAN CONSTITUTION	EIC	VEC	313002	-	1	-	-	1	2	1	-	-	-	-	-	-	-	-	-	50	20	50		
6	ARCHITECTURAL DESIGN - I	ADE	DSC	323001	1	2	-	4	2	8	4	-	-	-	-	50	20	50@	20	50	20	150			
7	COMPUTER AIDED DRAWING - I	CAD	SEC	323002	2	-	-	2	-	2	1	-	-	-	-	25	10	25@	10	-	-	50			
Total					9	13	2	21	4		20		120	280	400		175		150		125		850		
Abbreviations : CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment,SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment Legends : @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination Note : 1. FA-TH represents average of two class tests of 30 marks each conducted during the semester. 2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester. 3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work. 4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks 5. 1 credit is equivalent to 30 Notional hrs. 6. * Self learning hours shall not be reflected in the Time Table. 7. * Self learning includes micro project / assignment / other activities. Course Category : Discipline Specific Course Core (DSC) , Discipline Specific Elective (DSE) , Value Education Course (VEC) , Intern./Apprenti./Project./Community (INP) , AbilityEnhancement Course (AEC) , Skill Enhancement Course (SEC) , GenericElective (GE)																									

BUILDING CONSTRUCTION**Course Code : 323304**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Third
Course Title : BUILDING CONSTRUCTION
Course Code : 323304

I. RATIONALE

Building Construction is one of the core subjects in Architecture discipline, which deals with the construction activities related to its various components such as sub structure, super structure, building finishes including maintenance of buildings. This course essentially imparts the knowledge to learners regarding building components along with the various activities involved in it.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Perform various construction activities at site for a given building construction project.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify components of a given building structure.
- CO2 - Select suitable type of foundation for a given building structure.
- CO3 - Select suitable type of stone masonry for a given building structure.
- CO4 - Illustrate brick masonry work for a given building structure.
- CO5 - Undertake the scaffolding activity for a given building structure.
- CO6 - Identify suitable type of doors, windows, roof, wall and floor finishing items for a given building structure

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL						Practical										
												FA-TH	SA-TH	Total			FA-PR	SA-PR	SLA			
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min											
323304	BUILDING CONSTRUCTION	BCT	DSC	2	-	6	-	8	4	4	30	70	100	40	25	10	25@	10	-	-	150	

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

BUILDING CONSTRUCTION**Course Code : 323304****V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Classify the given building on the basis of the nature of construction.</p> <p>TLO 1.2 Identify various components of a given building structure.</p>	<p>Unit - I Overview of Building components</p> <p>1.1 Classification of Buildings As per National Building Code-2016. Load Bearing Structure, Framed Structure, Composite Structure.</p> <p>1.2 Building Components a. Building Components and their function. b. Substructure— Foundation, Plinth and Plinth Filling. c. Superstructure— Walls, Partition wall, cavity wall, Sill, Lintel, Doors and Windows, Floor, Mezzanine floor, Roof, Columns, beams,& Parapet.</p>	<p>Case Study Model Demonstration</p>
2	<p>TLO 2.1 Perform Layout of a given building plan.</p> <p>TLO 2.2 Demonstrate suitable safety measures required in excavation for the given type of foundation.</p> <p>TLO 2.3 Identify type of foundation suitable for the given building structure.</p> <p>TLO 2.4 Identify suitable pumping method of dewatering for given excavation pit.</p>	<p>Unit - II Construction of Substructure</p> <p>2.1 Building Layout : Site Clearance, Preparing building Layout, Layout For Load Bearing Structure and Framed Structure by Center Line And Face Line Method, Precautions.</p> <p>2.2 Earthwork: Excavation For Foundation, Timbering and Strutting, Earthwork for Embankment, Material For Plinth Filling. Tools and Plants Used for Earthwork.</p> <p>2.3 Foundation: Functions of Foundation, Types of Foundation —Shallow Foundation, Stepped Footing, Wall Footing, Column Footing, Isolated And Combined Column Footing, Raft Foundation, Grillage Foundation. Deep Foundation-Pile Foundation, classification based on materials and functions, Well foundation and Caissons. Pumping Methods of Dewatering. wells.& coffer dams.</p>	<p>Case Study Site/Industry Visit</p>

BUILDING CONSTRUCTION**Course Code : 323304**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	<p>TLO 3.1 Explain various terminologies used in stone masonry work.</p> <p>TLO 3.2 Identify the type of a given stone masonry structure.</p> <p>TLO 3.3 Explain the joints used in stone masonry with sketches.</p> <p>TLO 3.4 Identify the type of stone masonry of a given structure.</p> <p>TLO 3.5 Illustrate the process of erection and dismantling of scaffolding for a given building structure considering safety aspects.</p> <p>TLO 3.6 Identify the type of roof for a given building structure.</p>	<p>Unit - III Construction of Superstructure</p> <p>3.1 Stone Masonry: Terms used in stone masonry- facing, backing heating. through stone, corner stone, cornice. Type of stone masonry: Rubble masonry. Ashlar Masonry and their types. Joints in stone masonry and their purpose and procedure. Selection of Stone Masonry, Precautions to be observed in stone masonry construction.</p> <p>3.2 Brick masonry : terms used in brick masonry-header, stretcher, closer, quoins, course. lace. back, Yearling, b bond, joints, lap. frog line, level and plumb. Bonds in brick masonry-header bond, stretcher bond, English bond and Flemish bond. Requirements of good brick masonry, junctions in brick masonry and their purpose and procedure. Precautions to be observed in Brick Masonry Construction. Comparison between stone masonry and Brick Masonry. Tools and plants required for construction of stone masonry and brick masonry. Hollow concrete block masonry and composite masonry.</p> <p>3.3 Scaffolding: Necessity. Component parts and types of Scaffolding, platforms used for multi storied building. Scaffolding and Shoring, Purpose, Types of Scaffolding, Process of Erection and Dismantling. Purpose and Types of Shoring, Underpinning. Formwork: Definition of Form work, Requirements of Formwork, Materials used in Formwork, Types of Formwork, Removal of formwork.</p> <p>3.4 Roofing Materials- RCC, Mangalore Tiles, AC Sheets, G.I. and Painted Corrugated G.I. Sheets, Plastic and Fiber Sheets. Types of Roof: Flat roof, Pitched Roof-King Post truss, Queen Post Truss and Lean to Roof. terms used in roofs.</p>	<p>Demonstration Site/Industry Visit</p>
4	<p>TLO 4.1 Select suitable type of Doors and windows for a given building structure.</p> <p>TLO 4.2 Select suitable type of fixtures find fasteners for given type of doors and windows.</p> <p>TLO 4.3 Select suitable type of staircase for a given building structure.</p>	<p>Unit - IV Building Communication and Ventilation</p> <p>4.1 Horizontal Communication: Doors — Components of Doors, fully paneled Doors. Partly Paneled and Glazed Doors, Flush Doors, Collapsible Doors, Rolling Shutters, Revolving Doors, Glazed Doors. Sizes of Door recommended by BIS.</p> <p>4.2 Windows: Component of windows, Types of Windows-fully Paneled. Partly Paneled and G lazed. Wooden, Steel. Aluminum windows, Sliding Windows, Louvered Window, Bay window. Corner window, clear-storey window. Gable and Dormer window, Skylight. Sizes of Windows recommended by HIS. Ventilators. Cement grills.</p> <p>4.3 Fixtures and fastenings for doors and windows.</p> <p>4.4 Vertical Communication: Means of Vertical Communication- Stair Case, Ramps, Lifts. Elevators and Escalators Terms used in stair case-steps. trade, riser. nosing, soffit, waist slab, baluster, balustrade, hand rails, newel post, landing, headroom, winders. Types of staircase-on the basis of shape: Straight, dog-legged, open well, Spiral, Quarter' turn, Bifurcated, three quarter turn, and Hall turn, On the basis of Material: Stone, Brick, R.C.C., wooden and Metal.</p>	<p>Model Demonstration Case Study Site/Industry Visit</p>

BUILDING CONSTRUCTION**Course Code : 323304**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	<p>TLO 5.1 Explain the methodology involved in painting work.</p> <p>TLO 5.2 Identify the type of plaster used in a given wall surface.</p> <p>TLO 5.3 Explain the procedure of plastering work for a given wall surface.</p> <p>TLO 5.4 Identify suitable type of flooring for a given building structure.</p> <p>TLO 5.5 Explain the procedure involved in laying of floor tiles.</p> <p>TLO 5.6 Select the relevant type of paint for a given building surface.</p>	<p>Unit - V Building Finishes</p> <p>5.1 Wall Finishes: Plastering — Necessity of Plastering, Procedure of Plastering, Single Coat Plaster, Double Coat Plaster, rough finish, Neeru Finishing and POP. Special Plasters- Stucco Plaster, sponge finish, pebble finish. Plaster Board And Wall Claddings. Precaution to be taken While Plastering. Defects in Plaster. Pointing — Necessity, Types of pointing and Procedure of Pointing, Painting —Necessity, Staircase Preparation for painting, Methods of Application, Selecting Suitable Painting Material.</p> <p>5.2 .Floors finishes : Types of Floor Finishes and its suitability- Shahabad , Kota, Marble, Granite, Kadappa, Ceramic Tiles, Vitrified, Chequered Tiles, Pavement Blocks, Concrete Floors, wooden Flooring, Skirting And Dado. Process of Laying- Process of laying And Construction, Finishing and Polishing of Floors.</p>	Case Study Site/Industry Visit

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Identify various components of a given building structure.	1	Components of building structure	2	CO1
LLO 2.1 Prepare foundation drawings in a suitable scale for a given building structure.	2	*Preparation of foundation drawing in a suitable scale.	2	CO2
LLO 3.1 Prepare the foundation plan for load bearing structure using suitable scale.	3	*Preparation of Foundation plan for load bearing structure.	2	CO2
LLO 4.1 Prepare the foundation plan for framed structure using suitable scale.	4	*Preparation of foundation plan for framed structure	2	CO2
LLO 5.1 Prepare Sketches for a given stone masonry structure.	5	Preparation of sketches showing different type of stone masonry like Rubble Masonry, Ashlar Masonry & Random-Rubble masonry.	2	CO3
LLO 6.1 Prepare sketches for a brick masonry structure .	6	Preparation of sketches for brick wall showing English & Flemish bond. (IKS)	2	CO4
LLO 7.1 Lay brick masonry using English bond.	7	*Demonstration of laying brick wall showing English bond.	2	CO4
LLO 8.1 Lay brick masonry using Flemish bond.	8	*Demonstration of laying brick wall showing Flemish bond.	2	CO4
LLO 9.1 Prepare model of a form work.	9	Preparation of model of formwork using suitable material.	2	CO5
LLO 10.1 Prepare of a Model of staircase using suitable scale.	10	Preparation of model of dog legged staircase using suitable material,	2	CO6

BUILDING CONSTRUCTION**Course Code : 323304**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 11.1 Prepare model of king post explaining its components and joints.	11	Preparation of model of King post using suitable media explaining its components and joints.	2	CO6
LLO 12.1 Prepare a model of Queen post showing different components and joints.	12	Preparation of model of Queen post using suitable media showing different components and joints.	2	CO6
LLO 13.1 Prepare a model of a panelled door showing its joinery details using.	13	Preparation of model of panelled door showing its joinery details using suitable material.	2	CO6
LLO 14.1 Prepare a model of a panelled and glazed window.	14	Preparation of model of panelled and glazed window.	2	CO6
LLO 15.1 Demonstrate painting work on a given wall surface.	15	Demonstration of Painting work on a given surface of wall.	2	CO6

Note : Out of above suggestive LLOs -

- '*' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Prepare a sketchbook consisting of components of building (for Sketches which are not included in practical sketchbook).
- Prepare a summary report with reference to content In any one part of National Building Code.
- Prepare a report on Scaffolding and form work by conducting a site visit to a building construction project.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Optical Square, Ranging rod, Pegs. Arrows line dori, Lime powder, Measuring Tape, hammer of suitable size and specification as per civil engineering application	2,5
2	Plum bobs, Mason Square. Level tube. Line dori. Trowel.	3,4,7,8,9

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

BUILDING CONSTRUCTION**Course Code : 323304**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Overview of Building components	CO1	2	2	4	4	10
2	II	Construction of Substructure	CO2	8	4	6	6	16
3	III	Construction of Superstructure	CO3,CO4,CO5	12	4	6	12	22
4	IV	Building Communication and Ventilation	CO6	4	2	4	6	12
5	V	Building Finishes	CO6	4	2	4	4	10
Grand Total				30	14	24	32	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- End term Viva Voce, Lab performance

Summative Assessment (Assessment of Learning)

- End term Viva Voce, Lab performance

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	-	-	-	-	2			
CO2	3	2	-	-	1	-	2			
CO3	3	1	-	-	1	-	2			
CO4	2	-	-	2	1	-	2			
CO5	2	2	2	1	1	-	1			
CO6	3	1	1	-	-	-	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	S.P. Arora and Bindra	Building Construction	Dhanpat Rai Publication, Delhi Edition 2013.ISBN: 9788189928803
2	Francis D.K. Ching.	Building construction illustrated	Wiley India, USA, 2014,ISBN: 978-1- 118- 45834-1
3	S.C.Rangawala	Building Construction	CharotarPublication,Dist-AnandISBN-13: 978-
4	B. C. Punmia and A.K Jain	Building Construction	firewall Media, 2005 ISBN 9788170080534
5	S.K.Sma	Building Construction	S. Chand and Co. Pvt. Ltd., New Delhi (ISBN:978-8 1 -219-0479-7

BUILDING CONSTRUCTION**Course Code : 323304**

Sr.No	Author	Title	Publisher with ISBN Number
6	Sandip Mantri	A to Z Building Construction	Satya Prakashan; New Delhi (2015) ISBN-13: 978-8176849692

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.letsbuild.com/blog/substructure-superstructure	building superstructure
2	https://thegraduateengineer.com/	brick and stone masonry
3	https://www.oreilly.com/library/view/building-construction-materials	building finishes

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 02/07/2024

Semester - 3, K Scheme

ESSENCE OF INDIAN CONSTITUTION**Course Code : 313002**

Programme Name/s	: Architecture Assistantship/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical and Electronics Engineering/ Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Hotel Management & Catering Technology/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Computer Science/ Textile Technology/ Electronics & Computer Engg./ Travel and Tourism/ Textile Manufactures/
Programme Code	: AA/ AE/ AI/ AL/ AN/ AO/ AT/ BD/ CE/ CH/ CM/ CO/ CR/ CS/ CW/ DC/ DD/ DE/ DS/ EE/ EJ/ EK/ EP/ ET/ EX/ FC/ HA/ HM/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ ML/ MU/ PG/ PN/ PO/ SE/ TC/ TE/ TR/ TX
Semester	: Third
Course Title	: ESSENCE OF INDIAN CONSTITUTION
Course Code	: 313002

I. RATIONALE

This course will focus on the basic structure and operative dimensions of Indian Constitution. It will explore various aspects of the Indian political and legal system from a historical perspective highlighting the various events that led to the making of the Indian Constitution. The Constitution of India is the supreme law of India. The document lays down the framework demarcating the fundamental political code, structure, procedures, powers, and sets out fundamental rights, directive principles, and the duties of citizens. The course on constitution of India highlights key features of Indian Constitution that makes the students a responsible citizen. In this online course, we shall make an effort to understand the history of our constitution, the Constituent Assembly, the drafting of the constitution, the preamble of the constitution that defines the destination that we want to reach through our constitution, the fundamental right constitution guarantees through the great rights revolution, the relationship between fundamental rights and fundamental duties, the futurist goals of the constitution as incorporated in directive principles and the relationship between fundamental rights and directive principles.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry /employer expected outcome – Abide by the Constitution in their personal and professional life.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - List salient features and characteristics of the constitution of India.
- CO2 - Follow fundamental rights and duties as responsible citizen of the country.
- CO3 - Analyze major constitutional amendments in the constitution.
- CO4 - Follow procedure to cast vote using voter-id.

ESSENCE OF INDIAN CONSTITUTION**Course Code : 313002****IV. TEACHING-LEARNING & ASSESSMENT SCHEME**

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					FA-TH	SA-TH	Total	Practical				SLA			
														Max	Min	Max	Min	Max	Min	Max	
313002	ESSENCE OF INDIAN CONSTITUTION	EIC	VEC	1	-	-	1	2	1	-	-	-	-	-	-	-	-	-	50	20	50

Total IKS Hrs for Sem. : 0 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain the meaning of preamble of the constitution. TLO 1.2 Explain the doctrine of basic structure of the constitution. TLO 1.3 List the salient features of constitution. TLO 1.4 List the characteristics of constitution.	Unit - I Constitution and Preamble 1.1 Meaning of the constitution of India. 1.2 Historical perspectives of the Constitution of India. 1.3 Salient features and characteristics of the Constitution of India. 1.4 Preamble of the Constitution of India.	Presentations Blogs Hand-outs Modules Flipped classrooms Case studies
2	TLO 2.1 Enlist the fundamental rights. TLO 2.2 . Identify fundamental duties in general and in particular with engineering field. TLO 2.3 Identify situations where directive principles prevail over fundamental rights.	Unit - II Fundamental Rights and Directive Principles 2.1 Fundamental Rights under Part-III. 2.2 Fundamental duties and their significance under part-IV-A. 2.3 Relevance of Directive Principles of State Policy under part-IV A.	Presentations Blogs Hand-outs Modules Case Study Flipped Classroom

ESSENCE OF INDIAN CONSTITUTION**Course Code : 313002**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	TLO 3.1 Enlist the constitutional amendments. TLO 3.2 Elaborate the elements of Centre-State Relationship TLO 3.3 Analyze the purposes of various amendments.	Unit - III Governance and Amendments 3.1 3.1 Amendment procedure of the Constitution and their types - simple and special procedures. 3.2 The Principle of Federalism and its contemporary significance along with special committees that were setup. 3.3 Major Constitutional Amendment procedure - 1st, 7th, 42nd, 44th, 73rd & 74th, 76th, 86th, 52nd & 91st, 102nd	Cases of Federal disputes with relevant Supreme court powers and Judgements Presentations Blogs Hand-outs Problem based learning
4	TLO 4.1 Explain the importance of electoral rights. TLO 4.2 Write the step by step procedure for process of registration TLO 4.3 Explain the significance of Ethical electoral participation TLO 4.4 Explain the steps to motivation and facilitation for electoral participation TLO 4.5 Enlist the features of the voter's guide TLO 4.6 Explain the role of empowered voter TLO 4.7 Write the steps of voting procedure TLO 4.8 Write steps to create voter awareness TLO 4.9 Fill the online voter registration form TLO 4.10 Follow procedure to cast vote using voter-id.	Unit - IV Electoral Literacy and Voter's Education 4.1 Electoral rights , Electoral process of registration 4.2 Ethical electoral participation 4.3 Motivation and facilitation for electoral participation 4.4 Voter's guide 4.5 Prospective empowered voter 4.6 Voting procedure 4.7 Voter awareness 4.8 Voter online registration https://www.ceodelhi.gov.in/ELCdetails.aspx	Presentations Hand-outs Modules Blogs Problem based Learning

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES : NOT APPLICABLE.**VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)****Assignment**

- Outline the procedure to submit application for Voter-id
- Assignments are to be provided by the course teacher in line with the targeted COs.

A1. Prepare an essay on Constitution of India .

A2 Prepare a comparative chart of Unique features of Indian Constitution of India and Constitution of USA

- Assignments are to be provided by the course teacher in line with the targeted COs. A1. Prepare an essay on Constitution of India . A2 Prepare a comparative chart of Unique features of Indian Constitution of India and Constitution of USA A3. Self-learning topics: Parts of the constitution and a brief discussion of each part Right to education and girl enrollment in schools. GER of Girls and Boys. Right to equality. Social Democracy. Women Representation in Parliament and State Assemblies. LGBTQIA+

Micro project

ESSENCE OF INDIAN CONSTITUTION**Course Code : 313002**

- 1. Organize a workshop-cum discussions for spreading awareness regarding Fundamental Rights of the citizen of the country
- 2. Prepare elaborations where directive principle of State policy has prevailed over Fundamental rights with relevant Supreme Court Judgements.
- 3. Organize a debate on 42nd, 97th and 103rd Constitutional Amendment Acts of Constitution of India.

Seminar

- 1 Differences in the ideals of Social democracy and Political democracy.
- 2 Democracy and Women's Political Participation in India.
- 3 Khap Panchayat - an unconstitutional institution infringing upon Constitutional ethos.
- 4 Situations where directive principles prevail over fundamental rights.

Group discussions on current print articles.

-
- Art 356 and its working in Post-Independent India.
- Women's Reservation in Panchayat leading to Pati Panchayats - Problems and Solutions.
- Adoption of Article 365 in India.
- Need of Amendments in the constitution.
- Is India moving towards a Unitary State Model ?

Activity

- Arrange Mock Parliament debates.
- Prepare collage/posters on current constitutional issues.
- i. National (Art 352) & State Emergencies (Art 356) declared in India.
 - ii. Seven fundamental rights.
 - iii. Land Reforms and its effectiveness - Case study of West-Bengal and Kerala.

Cases: Suggestive cases for usage in teaching:

- A.K. Gopalan Case (1950) :SC contended that there was no violation of Fundamental Rights enshrined in Articles 13, 19, 21 and 22 under the provisions of the Preventive Detention Act, if the detention was as per the procedure established by law. Here, the SC took a narrow view of Article 21.
- Shankari Prasad Case (1951) : This case dealt with the amendability of Fundamental Rights (the First Amendment's validity was challenged). The SC contended that the Parliament's power to amend under Article 368 also includes the power to amend the Fundamental Rights guaranteed in Part III of the Constitution.
- Minerva Mills case (1980) :This case again strengthens the Basic Structure doctrine. The judgement struck down 2 changes made to the Constitution by the 42nd Amendment Act 1976, declaring them to violate the basic structure. The judgement makes it clear that the Constitution, and not the Parliament is supreme.
- Maneka Gandhi case (1978) :A main issue in this case was whether the right to go abroad is a part of the Right to Personal Liberty under Article 21. The SC held that it is included in the Right to Personal Liberty. The SC also ruled that the mere existence of an enabling law was not enough to restrain personal liberty. Such a law must also be "just, fair and reasonable."

Other cases:

1. Kesavananda Bharati Case (1973) : In this case the Hon. SC laid down a new doctrine of the 'basic structure' (or 'basic features') of the Constitution. It ruled that the constituent power of Parliament under Article 368 does not enable it to alter the 'basic structure' of the Constitution. This means that the Parliament cannot abridge or take away a Fundamental Right that forms a part of the 'basic structure' of the Constitution.
2. Mathura Rape Case(1979) : A tribal woman Mathura (aged 14 to 16 years) was raped in Police Custody. The case raised the questions on the idea of 'Modesty of Woman' and here it was was a tribal woman who succumbs to multiple patriarchy. Custodial rape was made an offence and was culpable with the detainment of 7 years or more under Section 376 of Indian Penal Code. The weight of proofing the allegations moved from the victim to the offender, once sexual intercourse is established. The publication of the victim's identity was banned and it was also held that rape trials should be conducted under the cameras.
3. Puttswamy vs Union of India (2017) : In this landmark case which was finally pronounced by a 9-judge bench of the Supreme Court on 24th August 2017, upholding the fundamental right to privacy emanating from Article 21. The

ESSENCE OF INDIAN CONSTITUTION**Course Code : 313002**

court stated that Right to Privacy is an inherent and integral part of Part III of the Constitution that guarantees fundamental rights. The conflict in this area mainly arises between an individual's right to privacy and the legitimate aim of the government to implement its policies and a balance needs to be maintained while doing the same.

4. Navtej Singh Johar & Ors. v. Union of India (2018) : Hon. SC Decriminalised all consensual sex among adults, including homosexual sex by scrapping down section 377 of the Indian penal code (IPC). The court ruled that LGBTQ community are equal citizens and underlined that there cannot be discrimination in law based on sexual orientation and gender.

5. Anuradha Bhasin Judgement (2020) : The Supreme Court of India ruled that an indefinite suspension of internet services would be illegal under Indian law and that orders for internet shutdown must satisfy the tests of necessity and proportionality. The Court reiterated that freedom of expression online enjoyed Constitutional protection, but could be restricted in the name of national security. The Court held that though the Government was empowered to impose a complete internet shutdown, any order(s) imposing such restrictions had to be made public and was subject to judicial review.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED : NOT APPLICABLE**IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Constitution and Preamble	CO1	4	0	0	0	0
2	II	Fundamental Rights and Directive Principles	CO2	4	0	0	0	0
3	III	Governance and Amendments	CO3	4	0	0	0	0
4	IV	Electoral Literacy and Voter's Education	CO4	3	0	0	0	0
Grand Total				15	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Assignment, Self-learning and Terms work Seminar/Presentation

Summative Assessment (Assessment of Learning)**XI. SUGGESTED COS - POS MATRIX FORM**

ESSENCE OF INDIAN CONSTITUTION**Course Code : 313002**

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	1	-	-	-	2	-	-			
CO2	1	-	-	-	2	-	-			
CO3	1	2	-	-	2	-	1			
CO4	-	-	-	1	-	-	-			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	P.M.Bakshi	The Constitution of India	Universal Law Publishing, New Delhi 15th edition, 2018, ISBN: 9386515105 (Check the new edition)
2	D.D.Basu	Introduction to Indian Constitution	Lexis Nexis Publisher, New Delhi, 2015, ISBN:935143446X
3	B. K. Sharma	Introduction to Constitution of India	PHI, New Delhi, 6th edition, 2011, ISBN:8120344197
4	MORE READS :	Oxford Short Introductions - The Indian Constitution by Madhav Khosla. The Indian Constitution: Cornerstone of a Nation by Granville Austin. Working a Democratic Constitution: A History by Garnville Austin Founding Mothers of the Indian Republic: Gender Politics of the Framing of the Constitution by Achyut Chetan. Our Parliament by Subhash C. Kashyap. Our Political System by Subhash C. Kashyap. Our Constitution by Subhash C. Kashyap. Indian Constitutional Law by Rumi Pal.	Extra Read
5	B.L. Fadia	The Constitution of India	Sahitya Bhawan, Agra, 2017, ISBN:8193413768

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	http://www.legislative.gov.in/constitution-of-india	Constitution overview
2	https://en.wikipedia.org/wiki/Constitution_of_India	Parts of constitution
3	https://www.india.gov.in/my-government/constitution-india	Constitution overview
4	https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/	Fundamental rights and duties
5	https://main.sci.gov.in/constitution	Directive principles
6	https://legalaffairs.gov.in/sites/default/files/chapter%203.pdf	Parts of constitution

ESSENCE OF INDIAN CONSTITUTION**Course Code : 313002**

Sr.No	Link / Portal	Description
7	https://www.concourt.am/armenian/legal_resources/world_constitutions/constit/india/india-e.htm	Parts of constitution
8	https://constitutionnet.org/vl/item/basic-structure-indian-constitution	Parts of constitution
Note : <ul style="list-style-type: none">• Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students		

MSBTE Approval Dt. 02/07/2024**Semester - 3, K Scheme**

ARCHITECTURAL DESIGN - I**Course Code : 323001**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Third
Course Title : ARCHITECTURAL DESIGN - I
Course Code : 323001

I. RATIONALE

Architectural Design is one of the key courses necessary in Architectural Education. This course enables a learner to understand the various layers that are integral part of Architectural Profession. It also enables learner to understand & attain basic skills required for architectural design course. The learner will develop the graphical skills required to express design.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

A learner shall be able to design an architectural project having an area upto 50-75 Sq. Meters

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Apply basic concepts of Architectural Design for the given project.
- CO2 - Prepare Architectural Drawings for the given project.
- CO3 - Present reports on Case Study and Site Visit undertaken during the course.
- CO4 - Prepare drawings for the given project using CAD Software.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory	Based on LL & TL				Based on SL					
				CL	TL	LL						Practical									
							FA-TH	SA-TH			Total		FA-PR		SA-PR		SLA				
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min										
323001	ARCHITECTURAL DESIGN - I	ADE	DSC	2	-	4	2	8	4	-	-	-	-	-	50	20	50@	20	50	20	150

Total IKS Hrs for Sem. : 1 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

ARCHITECTURAL DESIGN - I**Course Code : 323001**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain the principles of architectural design TLO 1.2 Explain the elements of architectural design TLO 1.3 Interpret scale relevant for the architectural design . TLO 1.4 Apply Anthropometric Data in architectural design	Unit - I Basics of Architectural Design 1.1 Principles of Design - Pattern, Contrast, Emphasis, Balance, Scale, Harmony, Rhythm Movement and Unity 1.2 Elements of Design - Line, Volume, Form Shape, Texture, Colour, Value, Space and Light 1.3 Scale for the architectural design - Different types of scale, Criteria for proper selection for scale to be adopted for a drawing 1.4 Read and interpretation of Architectural Drawings, visualization of Architectural Drawings in three dimensions along with scale and proportion. 1.5 Human Scale and proportion and their relationship with space.	Case Study Video Demonstrations Lecture Using Chalk-Board Presentations Site/Industry Visit
2	TLO 2.1 Draw plans, elevations and sections on a appropriate scale and proportion TLO 2.2 Draft scaled drawings in two dimensions for design project portfolio . TLO 2.3 Render drawings using various mediums	Unit - II Sketching , Drafting and Rendering Techniques 2.1 Free Hand drawings of various objects by using appropriate grids and graph papers . 2.2 2D Scaled drafted architectural drawings. 2.3 Mediums and Techniques required for rendering drawings 2.4 Horizontal-vertical and intersecting planes to quantify space.	Demonstration Case Study Presentations Hands-on Lecture Using Chalk-Board
3	TLO 3.1 Explain the importance and relevance of Case Study / Site Visit TLO 3.2 Perform live sketching during the Site Visit / Case Study TLO 3.3 Prepare report of Site Visit / Case Study TLO 3.4 Prepare measured drawings associated with the design project	Unit - III Case Study and Site Visit 3.1 Importance of Site Visit and Case Project in education 3.2 Live Sketching during site visit and case study associated with design project 3.3 Preparation of report of site visit and case study 3.4 Preparation of measured drawings associated with the design project	Video Demonstrations Demonstration Case Study / site visit Presentations Hands-on
4	TLO 4.1 Apply various commands for developing CAD based drawings. TLO 4.2 Make Plan, Section & Elevations with all the elements and components of the Project using CAD Software TLO 4.3 Render CAD based drawing for presentation	Unit - IV Architectural Drawings by using CAD Software. 4.1 Initial settings to start CAD based drawings. 4.2 Basic commands such as line, fillet, trim, offset, copy, paste associated with CAD Software 4.3 Use of layers in the CAD software for making drawings. 4.4 Incorporation of Texts and dimensions in CAD Drawings	Role Play Hands-on Demonstration Video Demonstrations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare Report / Presentation on Topics of Elements of Design	1	Preparation of a report, presentation or sheets based on topics of Elements of Design	4	CO1 CO2 CO3

ARCHITECTURAL DESIGN - I**Course Code : 323001**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 2.1 Draw free hand sketch of outdoor facade, landscape	2	Preparation a report, presentation or sheets based on topics of Principles of Design	4	CO1 CO2 CO3
LLO 3.1 Draft objects to various scale LLO 3.2 Draft object to a scale for given size of sheet	3	Drafting of objects to various scale Drafting of objects at a scale to decide the size of paper	3	CO1 CO2 CO4
LLO 4.1 Interpret design brief for the Arch. Design project	4	Preparing a report and preliminary sketches of Design	3	CO1
LLO 5.1 Prepare preliminary design solution for the Arch. Design project	5	Drawing conceptual preliminary design at a scale of 1:50 of Arch. Design project	3	CO1
LLO 6.1 Prepare pre-final design of the Arch. Design project	6	*Drafting of Design proposal at a scale of 1:50 of the Arch. Design project	3	CO1 CO2 CO4
LLO 7.1 Sketch Building Elements and Components LLO 7.2 Sketch Furniture Pieces LLO 7.3 Sketch various small objects	7	*Free hand sketches of various objects using grids and graph papers. Free hand sketches of furniture pieces. (IKS) Free hand sketches of small objects.	2	CO1 CO2 CO3
LLO 8.1 Render sketches using pencil & pen LLO 8.2 Render sketches using color pencil & watercolors	8	*Rendering sketches using Pencil and Pen as medium to make sketches. Rendering sketches using Color Pencils and Watercolors as medium to make sketches.	4	CO1 CO2 CO3
LLO 9.1 Draft Plans at scale 1:50 LLO 9.2 Draft Elevation at Scale at scale 1:50 LLO 9.3 Draft Sections at Scale at scale 1:50	9	*Drafting Plans at scale 1:50 Drafting Elevation at Scale at scale 1:50 Drafting Sections at Scale at scale 1:50	9	CO1 CO2 CO4
LLO 10.1 Render drafted Plan, Section and Elevation at Scale 1:50	10	Rendering drafted Plan, Section Elevation at scale 1:50	3	CO1 CO2
LLO 11.1 Write a report for the case study conducted for the Arch. Design Project.	11	Preparation of report for the case study conducted for the Arch. Design Project.	3	CO1 CO3
LLO 12.1 Write a report of site visit conducted for the Arch. Design Project	12	Preparation of report for the site visit conducted for the Arch. Design Project.	3	CO1 CO3
LLO 13.1 Prepare a Site Plan in a given scale for the Arch. Design Project using CAD	13	Preparation of site plan at scale 1: 50 for the design project using CAD	4	CO2 CO4
LLO 14.1 Prepare a Ground Floor Plan in a given scale for the Arch. Design Project using CAD	14	Preparation of ground floor plan at scale 1: 50 for the design project using CAD	4	CO2 CO4
LLO 15.1 Prepare Elevation in a given scale for the Arch. Design Project using CAD	15	Preparation of elevations at scale 1: 50 for the design project using CAD	4	CO2 CO4
LLO 16.1 Prepare Sections in a given scale for the Arch. Design Project using CAD	16	Preparation of sections at scale 1: 50 for the design project using CAD	4	CO2 CO4

Note : Out of above suggestive LLOs -

- '*I' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

ARCHITECTURAL DESIGN - I**Course Code : 323001****VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)****Assignment**

- Elements of Design - Submission in form of A2 or A3 size sheets to cover the topics of Elements of Design in Unit No.-01
- Principles of Design - Submission in form of A2 or A3 size sheets to cover the topics of Elements of Design in Unit No.-01
- Anthropometric data - Submission of a report of about 15 pages of sketches to show physical measures of a person's size, form, and functional capacities.
- Assignments on the topics related to sketching, drafting & rendering techniques

Micro project

- Site Visit / Case Study associated with the given project
- Semester End Final Architectural Design Portfolio

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Basic Drafting Tools such as Tee Square, Set Squares, Triangular Scale, Foot Ruler, Drawing Board and Measuring Tape	All
2	Soft Pencils, Pencil Colors, Artist Watercolors	All
3	Softwares for making presentation, Image processing and video editing, CAD Drawing Software and apps.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Basics of Architectural Design	CO1	12	0	0	0	0
2	II	Sketching , Drafting and Rendering Techniques	CO2	6	0	0	0	0
3	III	Case Study and Site Visit	CO3	6	0	0	0	0
4	IV	Architectural Drawings by using CAD Software.	CO4	6	0	0	0	0
Grand Total				30	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS

ARCHITECTURAL DESIGN - I**Course Code : 323001****Formative assessment (Assessment for Learning)**

- The assignments are associated with the continuous assessment of the assignments of the learner for the course work.

Summative Assessment (Assessment of Learning)

- Micro Projects assessment which is at the term end is consider as a summative

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	2	2	2	3	1	2			
CO2	2	2	1	-	-	-	2			
CO3	2	2	2	3	-	1	2			
CO4	2	1	3	1	-	-	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	V. S. Parmar	Design Fundamentals in Architecture	Somaiyya Publication Mumbai. ISBN-13-978-8170391708
2	Robert Gill	Rendering with pen & INK	Thames & Hudson, London. ISBN-10-9780500680261
3	Denise Costanzo	What Architecture Means: Connecting Ideas and Design	Taylor & Francis ISBN 9781317812142

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	a. Archdaily.com	Architectural News
2	b. www.architecture.com	RIBA aims to support British architects and introduce new people to the world of architecture.
3	c. www.architecturaldesign.com	design details

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

COMPUTER AIDED DRAWING - I**Course Code : 323002**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Third
Course Title : COMPUTER AIDED DRAWING - I
Course Code : 323002

I. RATIONALE

An essential skill of a diploma holder is to use computer-aided drawing software as a drafting tool to draw, read, and interpret architectural drawings. Through this system, students will be able to edit the existing drawings and create new 2 dimensional drawings as per requirements. This will facilitate the speed, accuracy, and repetitive use of drawings as and when needed.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

A diploma holder will be able to prepare architectural drawing for a given project using computer aided software.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Explain basics of computer aided drawing software.
- CO2 - Perform various commands of computer aided drawing software.
- CO3 - Draw objects using computer aided drawing software.
- CO4 - Create architectural drawings using computer aided drawing software.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			FA-TH			SA-TH	Total	Practical		SLA						
				Max	Max	Max	Min	Max						Min	Max	Min	Max	Min				
323002	COMPUTER AIDED DRAWING - I	CAD	SEC	-	-	2	-	2	1	-	-	-	-	-	25	10	25@	10	-	-	50	

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

COMPUTER AIDED DRAWING - I**Course Code : 323002**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain the necessity of the CAD software for preparation of architectural drawing. TLO 1.2 Use line command for creation of architectural drawings. TLO 1.3 Use CAD commands for architectural drafting. TLO 1.4 Modify architectural drawings using CAD command.	Unit - I Introduction to Computer Aided Drawing software & commands. 1.1 Concept of drawing toolbar. 1.2 Drawing & modification of command such as line, polyline & circle. 1.3 Concepts of tools & Layers. 1.4 Text & rectangle command, Use of erase command, Selection of multiple objects.	Demonstration Video Demonstrations Presentations
2	TLO 2.1 Use CAD drafting command for architectural drawing. TLO 2.2 Apply various tools & commands for architectural drawing. TLO 2.3 Apply appropriate annotations & material indications in architectural drawing.	Unit - II Use of Designed Plans for drafting 2.1 Drawing of a designed plan in computer aided drawing software. 2.2 Use of various CAD commands. 2.3 Properties of CAD tools & command. 2.4 Application of various tools & commands.	Demonstration Video Demonstrations Presentations
3	TLO 3.1 Draw architectural plans using computer aided software. TLO 3.2 Apply dimensions & lettering in architectural plans. TLO 3.3 Apply door, windows & openings in architectural plans using computer aided software's.	Unit - III Architectural 2D drawing using computer aided drawing software. 3.1 Drafting plan in computer aided drawing software. 3.2 Application of line weight, hatching in architectural drawings. 3.3 Preparation of door, window & opening schedule in computer aided software.	Presentations Video Demonstrations Presentations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Draw an introduction sheet using computer aided drawing software.	1	Introduction to computer aided drawing software.*	2	CO1 CO2
LLO 2.1 Prepare a sheet for basic commands of computer aided drawing software.	2	Introduction to commands of computer aided drawing software.*	2	CO1 CO2
LLO 3.1 Prepare a sheet of basic tools of computer aided drawing software.	3	Draw & modify tools in computer aided drawing software.*	2	CO1 CO2
LLO 4.1 Prepare a sheet of 2D objects using computer aided drawing software.	4	Basics of 2D objects using computer aided drawing software.	2	CO1 CO2
LLO 5.1 Create a 2D architectural drawing using computer aided software.	5	Basics of 2D drawing techniques.*	2	CO1 CO2
LLO 6.1 Apply the dimensions & labels in architectural drafted drawing.	6	Dimensioning & Labelling in architectural drawings.*	2	CO2 CO3
LLO 7.1 Prepare a sheet for layers & modifications of layers in architectural drawing.	7	Layers management in computer aided drawing software.*	2	CO2 CO3
LLO 8.1 Prepare a sheet for snap tool & precision setting in computer aided software.	8	Snap tool & precision in drawing techniques.*	2	CO2 CO3

COMPUTER AIDED DRAWING - I**Course Code : 323002**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 9.1 Create a sheet for common cad commands & short keys.	9	Common cad commands & short keys reference.	2	CO2 CO3
LLO 10.1 Prepare a sheet for annotations & hatching incorporating in architectural drawings.	10	Annotations & hatching using computer aided software.*	2	CO2 CO3
LLO 11.1 Draft a plan of small scale residence using computer aided drawing software.	11	Drafting of designed architectural plan.* (IKS)	2	CO3 CO4
LLO 12.1 Prepare a sheet on drawing organization techniques in computer aided software.	12	Drawing organization techniques.	2	CO3 CO4
LLO 13.1 Prepare a sheet of 1 BHK residential unit using computer aided drawing software.	13	Draft a plan for 1 BHK residential unit.*	2	CO3 CO4
LLO 14.1 Draft a sheet of residential 1 BHK unit with dimensions, labelling & text.	14	Dimensioning, Labeling & text insertion in designed residential unit.*	2	CO3 CO4
LLO 15.1 Prepare a sheet of layout & print settings in software.	15	Layout & print setting in computer aided drawing software.*	2	CO3 CO4

Note : Out of above suggestive LLOs -

- '* Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Draw a Geometric Shape - Challenge yourself to recreate a geometric shape or object using CAD software's drawing tools. - Start with simple shapes like circles, squares, or triangles, and then progress to more complex forms like polygons or irregular shapes. - Focus on precision and accuracy in your drawings.
- Term end micro project - Making Cad Drawings of the Arch. Design - 1 project at the scale of 1:50

Redraw an Existing Object

- Choose a simple object from your surroundings and redraw it using CAD software. - Focus on capturing the proportions, details, and functionality of the object accurately. - Pay attention to measurements and dimensions to ensure fidelity to the original object.

Assignment

- Create a Simple 2D Floor Plan. - Design a basic floor plan for a small room or apartment - Practice drawing walls, doors, windows, and basic furniture elements using CAD software's 2D drafting tools - Focus on accuracy and proper scaling.

COMPUTER AIDED DRAWING - I**Course Code : 323002****Note :**

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Computer with specifications such as 8GB RAM, SSD 500GB, LCD Monitor with relevant CAD software. (with the latest configuration)	All
2	Color printer preferably for the output of A-3 size paper	All
3	LCD projector or SMART Interactive display panel	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE**X. ASSESSMENT METHODOLOGIES/TOOLS****Formative assessment (Assessment for Learning)**

- The continuous internal assessment for laboratory practicles.

Summative Assessment (Assessment of Learning)

- End semester internal practical exam for laboratory learning..

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	2	1	2	1	-	3			
CO2	3	2	2	3	1	-	3			
CO3	3	2	3	3	1	-	2			
CO4	3	2	3	2	1	-	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

COMPUTER AIDED DRAWING - I**Course Code : 323002****XII. SUGGESTED LEARNING MATERIALS / BOOKS**

Sr.No	Author	Title	Publisher with ISBN Number
1	Frey, David	Auto CAD-2000	BPB Publication, New Delhi, ISBN13: 9788176560801
2	Yasmin, Nighat	Introduction to Auto CAD 2012 for Architectural Assistantship Applications	SDC Publication, 2011 ISBN 978-1-58503-642-4
3	Tickoo, Shyam	Auto CAD 2016: A Problem-Solving Approach, Basic and Intermediate	CADCIM Technologies, 22nd Edition, August 2015 ISBN 13: 9781942689003
4	Leach, James	Auto CAD 2010 Instructor	Tama Mc Graw Hill, New Delhi 2007; ISBN:9780073375410
5	Shumaker, Terence A; Madsen, David P; M; Madsen, David	Auto CAD and its Applications- Basics 2010	Good heart-Willcox Publishers, 2010; ISBN:13:978159070760
6	Bhatt, N. D.	Engineering Drawing	Charotar Publications, Anand, 2016 ISBN:978-93-80358-96
7	Singh, Ajit	Working with Auto CAD 2000	McG RAW Hill Publishing New Delhi, 2001; ISBN:978070435964

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.autodesk.in/products/autocad/included-toolsets/autocad-architecture	The Architecture toolset gives students all the tools students need to complete their projects faster and scale project pipeline.
2	https://cad-academy.com/how-to-learn-autocad/#Understanding_AutoCAD_Basics	The tool boosts architectural design and drafting productivity with time-saving features and task automation. This article provides a comprehensive guide to learn AutoCAD step-by-step.
3	https://www.youtube.com/@autocad/featured	Software unlock insights and automations in 2D design workflows. Save time as student collaborate with drawing files using the latest machine learning feature and specialized industry toolsets.
4	https://www.autodesk.in/campaigns/autocad-tutorials?wchannelid=lbxfle7xmq&wmediaid=cf2wf8zv6d	AutoCAD Knowledge webinar is hosted by the Autodesk AutoCAD Product Experts to help users learn AutoCAD and create innovative 2D designs through interactive live webinars or on-demand tutorials.

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

BUILDING SERVICES**Course Code : 323301**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Third
Course Title : BUILDING SERVICES
Course Code : 323301

I. RATIONALE

Regardless of the personal factors, aspects of human comfort include thermal environment, visual ambiance, acoustics, indoor air quality, and hygienic comfort. Building services are the systems installed in buildings to make them comfortable, functional, efficient and safe. These systems include lighting, sanitary & water supply, fire safety, HVAC (heating, ventilation and air conditioning) ICT (information and communications technology) and so on. This course is designed to develop required skills in the above mentioned areas which inturn will enhance the employability in the construction industry.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The learner will be able to undertake various activities related to the building services for given building project.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Plan kitchen & toilet blocks in various types of buildings as per UDCPR and NBC provisions.
- CO2 - Design water supply system for a given building project.
- CO3 - Design sanitary system for a given building project.
- CO4 - Design electrical wiring and lighting system for a given building project..
- CO5 - Explain the importance of BMS, HVAC, Acoustics, Firefighting systems for a given building project.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Paper Duration		Theory				Based on LL & TL				Based on SL		
				CL	TL	LL					Total	Practical		SLA							
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min	Max	Min		
323301	BUILDING SERVICES	BSE	DSC	3	-	3	-	6	3	3	30	70	100	40	25	10	25@	10	-	-	150

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

BUILDING SERVICES**Course Code : 323301****V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Justify the roles & responsibilities of an architect & interior decorator to accomplish building services</p> <p>TLO 1.2 List the relevant type of services required for the given building</p> <p>TLO 1.3 Explain planning aspects related to kitchen & toilet blocks in various types of buildings as per UDCPR .and NBC</p>	<p>Unit - I Overview of building services and classification of buildings as per National Building Code.</p> <p>1.1 Role and Responsibilities of an architect and interior designer to accomplish building services.</p> <p>1.2 Functional requirements of building and different types .of services.</p> <p>1.3 Planning of kitchen and toilet of various types of buildings-Residential, Commercial, Public, institutional etc. w.r.t. NBC and UDCPR.</p>	<p>Presentations Lecture Using Chalk-Board</p>
2	<p>TLO 2.1 Explain the importance of Indian standards, byelaws & UDCPR approval in laying the plumbing system in the given type of building project.</p> <p>TLO 2.2 Select suitable pipes & fixtures for a given type of building project.</p> <p>TLO 2.3 Describe different types of water sources.</p> <p>TLO 2.4 Explain water treatment process required for drinking purpose.</p> <p>TLO 2.5 Describe different types of water distribution system for a residential building.</p> <p>TLO 2.6 Enlist toilet fixtures & accessories required for designing a typical toilet block.</p> <p>TLO 2.7 Explain importance of Rain water harvesting systems</p>	<p>Unit - II Building Water Supply and Rainwater Harvesting Systems .</p> <p>2.1 Importance of water supply system and services, Indian standards & bylaws for water supply and distribution, approval from local authorities as per UDCPR.</p> <p>2.2 Terminology used in water supply & sanitary system, different types of pipes, fittings & fixtures</p> <p>2.3 Types of water sources, pumping & transportation of water</p> <p>2.4 Treatment of water, qualities of potable water</p> <p>2.5 Domestic water distribution system from the source of the water to the building, water supply system layouts, overhead and underground water tanks, water demand calculations, Cold and hot water distribution: mixing systems using loft tanks, geysers, boilers, mixers, diverters. Different types of taps, faucets.</p> <p>2.6 Cold and hot water distribution: mixing systems using loft tanks, geysers, boilers, mixers, diverters, different types of taps, faucets.</p> <p>2.7 Introduction to Rain water Harvesting System, various types and its advantages</p>	<p>Model Demonstration Case Study Presentations Lecture Using Chalk-Board Site/Industry Visit</p>

BUILDING SERVICES**Course Code : 323301**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	<p>TLO 3.1 Explain the importance of building and sanitation services for a given building project.</p> <p>TLO 3.2 Identify various sanitary wares required for a building project .</p> <p>TLO 3.3 Describe elements of external drainage system of a given building project.</p> <p>TLO 3.4 suggest the relevant plumbing system (drainage) for the given type of building and site condition with justification.</p> <p>TLO 3.5 Describe the process of sewage disposal for a given building project.</p> <p>TLO 3.6 Calculate capacity of a septic tank for a given building project.</p>	<p>Unit - III Building Sanitation Services.</p> <p>3.1 Principles & importance of building & sanitation services, collection and disposal of various kinds of refuse from deferent types of buildings.</p> <p>3.2 Drainage system terminology, different types , sizes of sanitary wares such as wash hand basin, kitchen sink, urinals, water closets (Indian and western) pans, flushing cisterns, bath tubs, shower cubicles, quality of pipes, connections of pipes and fittings used for drainage system.</p> <p>3.3 External drainage systems, one & two pipe system, different types of traps, Inspection chambers, manhole, disconnecting chamber, soak pit, municipal sewer.</p> <p>3.4 Disposal of sewage from various types of buildings, gradients used in laying of pipes for sewage disposal, septic tank details & capacity calculation.</p>	<p>Model Demonstration Case Study Presentations Lecture Using Chalk-Board Site/Industry Visit</p>
4	<p>TLO 4.1 Describe sources of electricity and principles of distribution system for the given building project.</p> <p>TLO 4.2 Select suitable type of cables for the given building project.</p> <p>TLO 4.3 Explain different types of wiring for a given building project.</p> <p>TLO 4.4 Describe factors affecting the lighting design of a given building project.</p>	<p>Unit - IV Electricity and Lighting.</p> <p>4.1 Sources of electricity, principles of distribution system from the source of the electricity to the building and limitations of electrification (leakage, fluctuation, safety, excess, loading, interferences).</p> <p>4.2 Importance of wiring, wiring standards, specification, sizes and their, types of cables, sheathing, shielding , cross section area , colour coding.</p> <p>4.3 Single and three phase wiring, circuit wiring and installation system, open and concealed wiring, types of switches, holders, sockets, switch boards, safety devices MCB, ELCB.</p> <p>4.4 Introduction, concept of lighting (natural and artificial), factors influencing the brightness of room, factors affecting selection of artificial lighting installation (direct, indirect, diffused, reflected, glare), transmission of light, recommended illuminances, Daylight luminance, utility factors..an</p>	<p>Video Demonstrations Case Study Presentations Lecture Using Chalk-Board Site/Industry Visit</p>
5	<p>TLO 5.1 Explain importance of natural and mechanical ventilation, HVAC , fire safety and firefighting system.</p> <p>TLO 5.2 .Explain importance of vertical transportation system, acoustics and building management systems.</p>	<p>Unit - V Advanced Building Services.</p> <p>5.1 Introduction to natural and mechanical ventilation, HVAC , fire safety and fire fighting system.</p> <p>5.2 Importance of vertical transportation system, acoustics and building management systems.</p>	<p>Video Demonstrations Case Study Presentations Lecture Using Chalk-Board Site/Industry Visit</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

BUILDING SERVICES**Course Code : 323301**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare a sketch book consisting of modern building service components.	1	Preparation of sketchbook consisting of modern building service components.	3	CO1
LLO 2.1 Collect the relevant information with reference to water supply system based on video/market survey and prepare report.	2	Collection of anthropometric data required for planning and designing of toilets and kitchens for a given building project.	3	CO1
LLO 3.1 Prepare a drawing portfolio for a site layout of water supply system of a residential building.	3	Preparation of a drawing portfolio of a water supply system to scale 1:100 on A1 size drawing sheet for a given residential building project.	3	CO2
LLO 4.1 Calculate capacity of under ground and over head water tank for a given residential building project.	4	*Calculation of capacity of overhead and underground water tank for a given residential building project.	3	CO2
LLO 5.1 Prepare drawing in plan and section for water supply and drainage of typical toilet block to scale 1:25 indicating services.	5	Preparation of drawing in plan and section for water supply and drainage system of a typical toilet block for a given residential building	6	CO2 CO3
LLO 6.1 Prepare drawing for water supply & vertical stack system (one and two pipe) and its connections in a residential building.	6	*Preparation of drawing for water supply & vertical stack system (one and two pipe) and its connections in a residential building.	3	CO2
LLO 7.1 Prepare drawing of typical house drain system for a given residential building project.	7	Preparation of a site layout plan of ground and two storied residential building indicating house drain system with invert levels of the inspection chambers for a given residential building project.	3	CO3
LLO 8.1 Prepare calculation table for invert levels of the inspection chambers for a given residential building project.	8	Preparation of a calculation of the invert levels of the inspection chambers and gradients of the pipe for a given residential building project.	3	CO3
LLO 9.1 prepare detail drawing of under ground and over head water tank for a given residential building project	9	Preparation of a drawing indicating typical details of underground and overhead water tank for a given residential building project	3	CO2
LLO 10.1 Prepare a drawing indicating typical details of septic tank and soak pit for a given residential building project	10	*Preparation of a drawing indicating typical details of septic tank and soak pit for a given residential building project	3	CO3
LLO 11.1 Prepare a drawing indicating electrical layout for a given residential building project.	11	Preparation of drawing indicating electrical layout for a given residential building project.	3	CO4
LLO 12.1 Prepare a drawing indicating lighting layout for a given residential building project.	12	Preparation of drawing indicating lighting layout for a given residential building project.	3	CO4
LLO 13.1 Prepare a drawing indicating fire fighting layout a typical office premises in a office building project.	13	*Preparation of drawing indicating firefighting layout a typical office premises in an office building project.	3	CO5

BUILDING SERVICES**Course Code : 323301**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 14.1 Prepare plan indicating relevant data related to BMS, HVAC system for a given office building project.	14	Collection of data related to BMS, HVAC system required for planning and designing of a given office building project. (IKS)	2	CO5
LLO 15.1 LLO 14.1 Prepare plan indicating relevant data related to acoustics & fire fighting system for an office building.	15	Collection of data related to acoustics & fire fighting system required for planning and designing of an office building.	1	CO5

Note : Out of above suggestive LLOs -

- '* Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

- Conduct market survey for water supply and sanitary fittings and fixtures. collect technical information brochures and submit a report.
- Visit & study the water filtration plant and various resources of water supply and prepare a report.
- Visit & study the installation of fire fighting systems in commercial buildings and prepare a report.

Micro project

- Visit any three buildings near by institute and classify them in accordance with the provisions made in National Building Code & submit a report.
- Conduct market survey for electric fittings and acoustical materials. Collect technical information brochures and submit report.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Display panel for various electrical fittings and fixtures used in residential and commercial buildings.	1,11
2	Model of various materials/samples, used in water supply and drainage system such as fixtures, fittings, pipe sections, joints and valves.	1,3,4,5
3	Model of various materials/samples, used in lighting system, acoustical materials, schematic flow chart explaining HVAC system	14,15

BUILDING SERVICES**Course Code : 323301**

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
4	Schematic flow chart explaining water filtration plant and sewage treatment plant.	7,9
5	A 1 Size Drawing Sheets /tracing /gateway papers /sketch book, pencil, eraser, drawing boards etc.	All
6	Model of a civil engineering structure depicting various components , building services	All,4,5

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Overview of building services and classification of buildings as per National Building Code.	CO1	6	2	2	6	10
2	II	Building Water Supply and Rainwater Harvesting Systems .	CO2	10	4	8	8	20
3	III	Building Sanitation Services.	CO3	10	4	7	9	20
4	IV	Electricity and Lighting.	CO4	10	4	2	4	10
5	V	Advanced Building Services.	CO5	9	2	2	6	10
Grand Total				45	16	21	33	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Some of the assignments given in the course will be formative assessment.

Summative Assessment (Assessment of Learning)

- Some of the assignments will be submitted by the learner at the term end and will be summative assessment

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	1	2	1	2	-	2			
CO2	3	2	3	2	2	-	2			
CO3	3	2	3	2	2	-	2			
CO4	3	2	3	2	2	-	2			
CO5	3	-	-	-	-	-	1			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
-------	--------	-------	----------------------------

BUILDING SERVICES**Course Code : 323301**

Sr.No	Author	Title	Publisher with ISBN Number
1	Deolalikar . S.G.	Plumbing Design and Practice	Mc-Grew Hill New Delhi 2004 ISBN 9780074620694
2	Bag.S.P.	Fire Services in India : History, Detection, Protection, Management	Mittal Publications New Delhi 1995 ISBN 8170995981
3	Anil Kumar Das	Principle of fire safety engineering : understanding Fire and fire protection	PHI learning pvt. Ltd. New Delhi 20014 ISB : 9788120350380
4	BIS	National Building Code Part : 1,4,8,9	Bureau of Indian Standards – New Delhi
5	BIS	IS 12183 (part I) 1987 Code of Practice for Plumbing in multi storied buildings	Bureau of Indian Standards – New Delhi
6	BIS	2008 Uniform Plumbing Code – INDIA (UPC-I)	Bureau of Indian Standards – New Delhi

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.pas.org.in/Portal/document/ResourcesFiles/pdfs/Module_1%20Basics%20of%20water%20supply%20system.pdf	Basics of water supply systems training module for local water supply and management
2	https://en.wikipedia.org/wiki/Building_services_engineering	MEP engineer with experience in the installation of equipment in Buildings Construction, Building Maintenance, Management, integration of electrical, mechanical, fire, hydraulic, security and communications building services, who manages and delivers the integrated detailed design of multiple disciplines so as to ensure that the building is delivered in a "least cost technically acceptable" manner, with emphasis on both the construction costs and the operational costs.

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 02/07/2024

Semester - 3, K Scheme

THEORY OF STRUCTURE**Course Code : 323302**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Third
Course Title : THEORY OF STRUCTURE
Course Code : 323302

I. RATIONALE

In our day-to-day professional activities, we encounter various structures designed for diverse purposes and functions. The analysis of stresses during the design phase is a crucial and prerequisite step. A precise analysis can be done only comprehensive understanding of the types and effects of forces acting on the structure. This course is design to offer an in-depth exploration of fundamental concepts within the laws of mechanics and their practical application to various structural problems.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Use principles of Theory of Structure to solve broad-based structural related problems.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Determine unknown forces of different system by applying the basics of mechanics.
- CO2 - Check the stability of various force system.
- CO3 - Find Center of Gravity and Moment of Inertia of various components in system.
- CO4 - Determine the forces in truss and frame member.
- CO5 - Draw S.F.D. & B.M.D. of a given beam section
- CO6 - Identify the column and loading on column.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Paper Duration		Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					Total	Practical		SLA							
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min	Max	Min		
323302	THEORY OF STRUCTURE	TOS	DSC	3	2	-	1	6	3	3	30	70	100	40	25	10	-	-	25	10	150

Total IKS Hrs for Sem. : 0 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

THEORY OF STRUCTURE**Course Code : 323302****V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Use the relevant units of various quantities in a given situations.</p> <p>TLO 1.2 Explain effect of a force on the given object</p> <p>TLO 1.3 Calculate the resultant of the given force system analytically.</p> <p>TLO 1.4 Find the resultant of the given force system using law of triangle and law of parallelogram</p>	<p>Unit - I Mechanics and Forces</p> <p>1.1 Significance and relevance: Mechanics, Applied Mechanics, Statics, Dynamics.</p> <p>1.2 Force: Unit, Representation of vector and by Bow's Notation, characteristics and effect of a force, principle of transmissibility of force, force system and its classification</p> <p>1.3 Resolution of a force- orthogonal and nonorthogonal component of a force, moment of a force, Varignon's theorem,</p> <p>1.4 Composition of forces- Resultant, Analytical Method of Determination of resultant of concurrent, non-concurrent and parallel coplanar system, law of triangle, law of parallelogram and polygon of forces.</p>	Lecture Using Chalk-Board Demonstration Presentations
2	<p>TLO 2.1 Draw the free body diagram for the given system.</p> <p>TLO 2.2 Determine unknown force in the given situation using Lami's theorem.</p> <p>TLO 2.3 Identify the types of beam required for the given situation.</p> <p>TLO 2.4 Determine the reactions in the given type of beam Analytically</p>	<p>Unit - II Equilibrium of Force System</p> <p>2.1 Equilibrium and Equilibrant, free body and free body diagram, analytical and graphical condition of equilibrium</p> <p>2.2 Equilibrium of force systems by analytically</p> <p>2.3 Lami's Theorem</p> <p>2.4 Types of beam, support (simple, hinged, roller and fixed) and loads acting on beam (vertical point load and UD load)</p> <p>2.5 Beam reaction for simply supported beam with or without overhang, cantilever- subject to combination of point load and UD load</p>	Lecture Using Chalk-Board Video Demonstrations Presentations
3	<p>TLO 3.1 Explain the concept of C.G and M.I.</p> <p>TLO 3.2 Explain Parallel Axis Theorem and Radius of Gyration of the given system.</p>	<p>Unit - III Centre of Gravity and Moment of Inertia</p> <p>3.1 Concept of C.G and M.I.</p> <p>3.2 Formula only of C.G and M.I for rectangular, Triangular, Circular and Semi Circular Shapes.</p> <p>3.3 Parallel Axis Theorem and Radius of Gyration, Formula for Radius of Gyration of a Rectangular Shape</p>	Lecture Using Chalk-Board Model Demonstration Presentations
4	<p>TLO 4.1 Describe the concept of truss and frame.</p> <p>TLO 4.2 Explain the concept of different geometry of truss.</p> <p>TLO 4.3 Identify the concept of frames and truss.</p> <p>TLO 4.4 Determine the forces in a member of given frames and truss.</p>	<p>Unit - IV Frame and Truss</p> <p>4.1 Introduction to plane lattice construction, application of frames and truss with building construction terminology of Rafters, Purlins.</p> <p>4.2 Different geometry of trusses up to 15 m. span.</p> <p>4.3 Perfect frames, imperfect frames, redundant and deficient frames</p> <p>4.4 Assumptions in the solution of frames: effect of horizontal and vertical forces on frames</p>	Lecture Using Chalk-Board Video Demonstrations Collaborative learning

THEORY OF STRUCTURE**Course Code : 323302**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 Explain basic terminology of a SFD and BMD. TLO 5.2 Explain the concept of Point of Zero Shear, S.F max and B.M max and their relationship TLO 5.3 Draw of S.F.D. and B.M.D. of a given beam.	Unit - V Shear Force and Bending Moment 5.1 Definitions of Shear Force and Shear Force diagram, Bending Moment and Bending Moment diagram 5.2 Point of Zero Shear, S.F max and B.M max, relationship between S.F.D and B.M.D 5.3 S.F.D and B.M.D of Simple Supported Beam with full U.D.L, Simple Supported Beam with Central Point Load, Simple Supported Beam with Eccentric point Load.	Lecture Using Chalk-Board Presentations
6	TLO 6.1 Identify the column based on loading condition. TLO 6.2 Explain middle third rule and core or kernel of rectangular section TLO 6.3 Explain Euler's theory, assumption and end condition of column, Rankine's Theory	Unit - VI Analysis of Column 6.1 Compression Members Subjected to eccentricity of loading about one and both axis, Middle third Rule for eccentricity about one axis 6.2 Concept of Core or Kernel of a column for eccentricity about both axes. Applying the Middle Third Rule to Brick Pier Foundation. 6.3 Euler's Theory, Assumptions, Euler's Formula and its Limitations leading to Rankine's Theory. Long and Short Columns for different Materials: Various End Conditions and their Effective Lengths.	Lecture Using Chalk-Board Presentations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Calculate resultant of the given force system analytically	1	* Resolution of a force	2	CO1
LLO 2.1 Find resultant of the given force system using law of triangle and law of parallelogram	2	Composition of forces	2	CO1
LLO 3.1 Draw free body diagram for the given beam system.	3	* Free body and free body diagram, analytical and graphical condition of equilibrium	2	CO2
LLO 4.1 Determine unknown force in the given condition using Lami's theorem	4	Equilibrium of force systems by analytically	2	CO2
LLO 5.1 Identify the types of beam.	5	Types of beam, support	2	CO2
LLO 6.1 Determine reactions in the given type of beam analytically	6	Beam reaction for different types of loading	2	CO2
LLO 7.1 Explain of C.G and M.I.	7	* Formula only of C.G and M.I for different types of section	2	CO3
LLO 8.1 Explain Parallel Axis Theorem and Radius of Gyration of the given system.	8	Parallel Axis Theorem and Radius of Gyration	2	CO3
LLO 9.1 Explain the concept of different geometry of truss	9	Different geometry of trusses up to 15 m. span	2	CO4
LLO 10.1 Explain the concept of frames	10	Perfect frames, imperfect frames, redundant and deficient frames	2	CO4
LLO 11.1 Describe the concept of Point of Zero Shear, S.F max and B.M max and relationship	11	Point of Zero Shear, S.F max and B.M max, relationship between S.F.D and B.M.D	2	CO5

THEORY OF STRUCTURE**Course Code : 323302**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 12.1 Draw of S.F.D and B.M.D of a Simple supported beam with full UDL	12	Draw S.F.D and B.M.D of Simple Supported Beam with full U.D.L	2	CO5
LLO 13.1 Draw of S.F.D and B.M.D of a Simple supported beam with central point load	13	* Draw S.F.D. and B.M.D. of Simple Supported Beam with Central Point Load, Simple Supported Beam with Eccentric point Load.	2	CO5
LLO 14.1 Explain the middle third rule and core or kernel of rectangular section	14	Concept of Core or Kernel of a column for eccentricity about both axes	2	CO6
LLO 15.1 Explain the Euler's theory, assumption and end condition of column, Rankine's Theory	15	Euler's Theory, Rankine's Theory, Long and Short Columns, Various End Conditions	2	CO6

Note : Out of above suggestive LLOs -

- *1 Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

- Question on each Unit

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Demonstration on Respective models	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Mechanics and Forces	CO1	8	2	4	5	11
2	II	Equilibrium of Force System	CO2	8	2	2	8	12
3	III	Centre of Gravity and Moment of Inertia	CO3	8	2	2	8	12
4	IV	Frame and Truss	CO4	7	2	4	6	12

THEORY OF STRUCTURE**Course Code : 323302**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
5	V	Shear Force and Bending Moment	CO5	7	2	4	6	12
6	VI	Analysis of Column	CO6	7	2	5	4	11
Grand Total				45	12	21	37	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Formative assessment (assessment for learning) assignments on each units, Self Learning (Assignment)

Summative Assessment (Assessment of Learning)**XI. SUGGESTED COS - POS MATRIX FORM**

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	2	1	-	-	-	2			
CO2	3	3	-	-	-	-	1			
CO3	3	3	2	-	-	-	1			
CO4	3	3	2	2	-	-	2			
CO5	3	3	2	2	-	-	2			
CO6	3	1	1	1	-	-	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Khurmi R. S.	Applied Mechanics	S. Chand & Co. New Delhi 2014, ISBN : 9788121916431
2	Ramamrutham S.	Engineering Mechanics	S. Chand & Co. New Delhi 2008, ISBN : 9788187433514
3	Ram H. D., Chauhan A. K.	Foundations and Applications of Applied Mechanics	Cambridge University Press, Thomson Press India Ltd., New Delhi, 2015, ISBN:9781107499836
4	Meriam J. L., Kraige L. G.	Engineering Mechanics, Vol. I	Wiley Publication, New Delhi, ISBN:978-81-265-4396

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://structville.com	Theory of structures is a field of knowledge that is concerned with the determination of the effect of loads (actions) on structures
2	www.youtube.com	Videos regarding Theory of Structures

THEORY OF STRUCTURE**Course Code : 323302**

Sr.No	Link / Portal	Description
3	www.nptel.ac.in	Online courses and Study Material for Theory of Structure
4	https://onlinelibrary.wiley.com/doi/book/10.1002/9783433602638	online source of material for theory of strucutre

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 02/07/2024**Semester - 3, K Scheme**

BASIC SURVEYING (ARCHITECTURE)**Course Code : 323303****Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/****Programme Code : AA/ AT/ IX/ IZ****Semester : Third****Course Title : BASIC SURVEYING (ARCHITECTURE)****Course Code : 323303****I. RATIONALE**

This course aim to equip students with the basic principles and theories which underlie the systematic study of topographic features, basic skills of landform analysis through map and field observation. The course mainly deals with the preparation and interpretation of survey drawings, methods, tools and equipment necessary to carry out different survey procedures and recent advancements in the field of landforms survey and measurements.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

To prepare drawings & maps of various types of landforms using survey data.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify the type of survey required for a given situation.
- CO2 - Apply conventional methods of surveying & levelling for architectural & planning projects.
- CO3 - Create contour map / plan for architectural & planning projects.
- CO4 - Apply modern methods of surveying and levelling for architectural & planning projects.
- CO5 - Apply remote sensing and GIS tools in a given architectural & planning projects.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			FA-TH			SA-TH	Total	Practical		SLA						
														FA-PR	SA-PR	Max	Min	Max	Min			
323303	BASIC SURVEYING (ARCHITECTURE)	BSU	SEC	2	-	6	-	8	4	3	30	70	100	40	25	10	25@	10	-	-	150	

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

BASIC SURVEYING (ARCHITECTURE)**Course Code : 323303****V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Classify given type of survey based on purpose, instruments used and nature of field and place.</p> <p>TLO 1.2 Select the type of survey for the given situation.</p> <p>TLO 1.3 Explain scales of existing maps and propose scales for proposed maps / plans.</p> <p>TLO 1.4 Represent landforms graphically using appropriate scale.</p>	<p>Unit - I Overview and classification of survey</p> <p>1.1 Survey – Reading of survey Maps, understanding of features and undulations of Ground purpose and use principles of surveying, definitions, units, scales, symbols and instruments used in Surveying, common errors in surveying and their corrections.</p> <p>1.2 Types of surveying primary and secondary classification. Plane, geodetic, Cadastral, hydro graphic, photogrammetry, aerial, layout survey, control survey, topographical survey, route survey, reconnaissance survey.</p> <p>1.3 Scales: Engineers scale, RF and diagonal scale.</p> <p>1.4 Study of landforms, topography and contours, slope analysis, grading process; graphic representations of landforms.</p>	<p>Presentations Demonstration Lecture Using Chalk-Board Video Demonstrations Hands-on Collaborative learning</p>
2	<p>TLO 2.1 Explain the process of chain surveying as a stepping stone for advanced surveying technology.</p> <p>TLO 2.2 Explain and adopt appropriate techniques for linear measurements.</p> <p>TLO 2.3 Compute horizontal angle using magnetic compass.</p> <p>TLO 2.4 Set out buildings using theodolite.</p> <p>TLO 2.5 Compute height of building using theodolite.</p>	<p>Unit - II Conventional Methods of Surveying</p> <p>2.1 Concise introduction to linear measurements.</p> <p>2.2 Measurement of distance using chain and tape through ranging and traversing to measure a plot.</p> <p>2.3 Concise introduction to angular measurements using magnetic compass.</p> <p>2.4 Angular measurement (both horizontal and vertical) using theodolite.</p> <p>2.5 Application of theodolite in setting out buildings and land surveying.</p>	<p>Presentations Hands-on Video Demonstrations Lecture Using Chalk-Board Collaborative learning Demonstration</p>
3	<p>TLO 3.1 Explain various terminologies related to leveling.</p> <p>TLO 3.2 Classify leveling instruments.</p> <p>TLO 3.3 Classify leveling staffs.</p> <p>TLO 3.4 Compute reduced levels using HI and Rise and Fall Method.</p> <p>TLO 3.5 Explain contour maps / plans as applicable for landscaping, culverts, road projects etc.</p> <p>TLO 3.6 Plot contour maps / plan as per the necessity of an architectural project from reduced level data.</p>	<p>Unit - III Levelling</p> <p>3.1 Terminologies: level surfaces, level line, horizontal and vertical surfaces, datum, benchmark, GTS, permanent. Arbitrary and temporary, reduced level, rise, fall, line of collimation, level back sight, fore sight, intermediate sight, change point, height of instrument.</p> <p>3.2 Types of levels: Dumpy, tilting, auto level, digital level. Components of dumpy level and its fundamental axes. Temporary adjustment of levels.</p> <p>3.3 Types of leveling staff, self-reading staff and target staff.</p> <p>3.4 Calculation of levels using Height of Instrument, Rise and Fall Method.</p> <p>3.5 Introduction to contour plan of hills, valleys and sloping terrain.</p> <p>3.6 Plotting of contours using appropriate contour intervals as required for an architectural project on sloping ground.</p>	<p>Presentations Hands-on Video Demonstrations Lecture Using Chalk-Board Collaborative learning Demonstration</p>

BASIC SURVEYING (ARCHITECTURE)**Course Code : 323303**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	<p>TLO 4.1 Compute distances using Electronic Distance Measurement Devices.</p> <p>TLO 4.2 Explain types and principles of total stations.</p> <p>TLO 4.3 Prepare land surveying map/ plan as required for an architectural project using total station.</p> <p>TLO 4.4 Prepare contour map / plan as required for an architectural project using total station.</p> <p>TLO 4.5 Set out a building with levels as per the foundation plan of building using total station.</p> <p>TLO 4.6 Explain the DGPS survey for architectural and planning projects.</p>	<p>Unit - IV Modern Methods of Surveying</p> <p>4.1 Electronic Distance Measurement Devices.</p> <p>4.2 Total Stations: Types, Working principle and application in surveying.</p> <p>4.3 Traversing using total station, preparation of land surveying maps / plans.</p> <p>4.4 Contouring using total station, data analysis for preparation of plan (import and export to and from total station).</p> <p>4.5 Setting out building, check levels in building construction using total station.</p> <p>4.6 Introduction to Differential Global Positioning Systems (DGPS) for architectural and planning projects.</p>	<p>Presentations</p> <p>Hands-on</p> <p>Video</p> <p>Demonstrations</p> <p>Demonstration</p> <p>Collaborative learning</p> <p>Lecture Using Chalk-Board</p>
5	<p>TLO 5.1 Explain applications of remote sensing in architecture and planning projects.</p> <p>TLO 5.2 Explain applications of GIS in architecture and planning projects.</p> <p>TLO 5.3 Apply open-source GIS computational tools for architecture and planning projects.</p> <p>TLO 5.4 Explain drone surveying and its applications in architectural and planning projects.</p> <p>TLO 5.5 Use official websites for accessing the land maps for architectural and planning projects.</p>	<p>Unit - V Remote Sensing and GIS</p> <p>5.1 Introduction and applications of remote sensing systems in architecture.</p> <p>5.2 Introduction and applications of GIS in architecture.</p> <p>5.3 Use of open-source GIS computer programs for architectural applications.</p> <p>5.4 Introduction to drone surveying and its applications in architecture.</p> <p>5.5 Introduction to official websites for Land Maps like Bhunaksha, Bhuvan, Google Earth, Google Earth Pro etc.</p>	<p>Presentations</p> <p>Hands-on</p> <p>Video</p> <p>Demonstrations</p> <p>Lecture Using Chalk-Board</p> <p>Case Study</p> <p>Demonstration</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Draw symbols, scales, signs used in the Surveying.	1	Preparation of a report on various types of surveys, symbols and signs used in respective surveys.	2	CO1
LLO 2.1 Calculate horizontal angles using Prismatic Compass.	2	Measurement of horizontal angles using Prismatic compass and distances using tape to plot the land with non-orthogonal shape.	6	CO2

BASIC SURVEYING (ARCHITECTURE)**Course Code : 323303**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 3.1 Calculate horizontal angles using Theodolite.	3	Measurement of horizontal angle using method of repetition and horizontal distances using tape to plot the land with non-orthogonal shape.	4	CO2
LLO 4.1 Calculate vertical angles using Theodolite	4	*Measurement of vertical angles using theodolite forming a basis for floor level calculations using trigonometry. (IKS)	2	CO2
LLO 5.1 Calculate distances using Theodolite.	5	Measurement of vertical distances using trigonometry to check the floor levels of a building, use tape for horizontal distance measurement.	2	CO2
LLO 6.1 Set out the building as per the foundation plan using theodolite.	6	*Setting out the building on plot as per the foundation plan using the theodolite.	6	CO2
LLO 7.1 Calculate the reduced levels for the land	7	Calculation of reduced levels for the proposed site using dumpy level.	2	CO3
LLO 8.1 Calculate reduced levels for land divided in a grid as a basis to draw contours.	8	Calculation of reduced levels for the proposed grid on site using dumpy level to form the basis for contouring.	8	CO3
LLO 9.1 Prepare the contour map/plan using calculated reduced level.	9	Plotting of contour map using calculated reduced level using appropriate contour interval.	4	CO3
LLO 10.1 Calculate the distance using Electronic Distance Measuring Device.	10	Use of EDM to calculate the distances for the site.	2	CO4
LLO 11.1 Calculate horizontal, vertical angles, distances, reduced levels using Total Station.	11	*Use of total station to prepare the survey map / plan of the area / plot.	8	CO4
LLO 12.1 Prepare the contour map /plan using Total Station.	12	Use of total station to prepare the contour map / plan of the area / plot.	2	CO4
LLO 13.1 Set out the building as per foundation plan using Total Station	13	Use of total station to set out the building as per the foundation plan.	6	CO4
LLO 14.1 Prepare report on applications of remote sensing and GIS applications relevant to architecture and planning project.	14	Preparation of report on applications of remote sensing and GIS applications relevant to architecture and planning project.	2	CO5
LLO 15.1 Apply Open-Source GIS tools for effective architectural decision making.	15	Use Open-Source GIS tools prepare a contour map, Digital Elevation Model, Site Section etc. for effective architectural decision making.	4	CO5
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> • '* Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Assignment

- Prepare a report on land surveying using conventional surveying methods.
- Prepare a presentation on land surveying using modern surveying methods.
- Prepare a presentation on Applications of Remote Sensing in Architecture.
- Access the land / maps from official website of Maharashtra / Indian as applicable for the given study area

BASIC SURVEYING (ARCHITECTURE)**Course Code : 323303****Micro project**

- Prepare Site Data required for an Architectural Design / Planning project using GIS tools.
- Plot the contour plan using appropriate levelling method for selected area.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Metric Chain made from galvanized mild steel wires 4mm in dia, brass handles with swivel joints, brass tallies provided at every 5 m length of chain - 20 and 30m.	1,2,3,4
2	Pegs of length 400 mm and c/s area of 50 mm x 50 mm	1,2,3,4
3	Arrows 400 mm long and made up of good quality hardened and tempered steel wire of 4 mm in diameter.	1,2,3,4
4	Metallic Ranging rods of 2 m length, circular or octagonal in cross section of 30 mm diameter, Lower shoe of 150 mm long. Painted in black, white and red stripes of 200 mm each.	1,2,3,4
5	QGIS	11
6	Prismatic compass conforming to IS 1957-1961 with stand, made in Gun metal material having diameter of 85-110 mm and the least count of 30 minutes.	2
7	Optical Theodolite conforming to IS 2976 with least count of 20 seconds	3,4
8	Dumpy level and automatic levels conforming to IS: 9613 – 1986 with stand and internal focusing telescope of standard make. and an internal focusing telescope of standard make.	5,6
9	Leveling staff- 2 m and 4 m, telescopic type conforming to IS 11961 -1986 or Folding type conforming to IS 1779 (1961), 5 mm least count	5,6
10	Electronic / Laser Distance Meters	7
11	Total Station with capability to connect with the desktop and transfer CAD files of the conducted surveys.	8,9

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Overview and classification of survey	CO1	4	4	4	2	10
2	II	Conventional Methods of Surveying	CO2	10	4	6	10	20
3	III	Levelling	CO3	8	4	8	8	20
4	IV	Modern Methods of Surveying	CO4	4	2	4	4	10
5	V	Remote Sensing and GIS	CO5	4	2	4	4	10
Grand Total				30	16	26	28	70

BASIC SURVEYING (ARCHITECTURE)**Course Code : 323303****X. ASSESSMENT METHODOLOGIES/TOOLS****Formative assessment (Assessment for Learning)**

- Term work, Assignment, microproject.

Summative Assessment (Assessment of Learning)

- Written Test, Practical Exam, Oral Exam

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	-	-	-	-	-	2			
CO2	3	3	2	3	1	1	2			
CO3	3	3	2	3	1	1	2			
CO4	3	3	2	3	1	1	2			
CO5	3	3	2	2	2	1	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Basak N. N	Surveying and Levelling	McGraw Hill Education, New Delhi ISBN 93-3290-153-8
2	Saikia, M.D., Das.B.M. , Das.M.M.	Surveying	PHI learning pvt. Ltd. New Delhi 20014 ISBN : 978-81-203-3985-9
3	Dr. Ramakant Agrawal, Parshottam Sarathe.	Advanced Surveying - Theory and Practice	AICTE, New Delhi, 978-81-959863-3-0

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://nptel.ac.in/courses/105107122	NPTEL Course on Surveying
2	https://youtube.com/playlist?list=PLLy_2iUCG87DwNVc3Mz1yYIRA42jSQ1tB&feature=shared	NPTEL Course lectures on Advanced Geomatics Engineering
3	https://civilplanets.com/compass-surveying/	Compass Surveying and its types, Temporary adjustments
4	https://www.youtube.com/watch?v=UKw1oScYBys&pp=ygUUZ2VvbWF4IHRvdGFsIHNOYXRpb24%3D	Total Station Surveying Tutorial
5	https://qgis.org/en/site/	QGIS Website
6	https://www.google.com/intl/en_in/earth/about/versions/	Google Earth

BASIC SURVEYING (ARCHITECTURE)**Course Code : 323303**

Sr.No	Link / Portal	Description
Note :		
<ul style="list-style-type: none">Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students		

MSBTE Approval Dt. 02/07/2024**Semester - 3, K Scheme**

Maharashtra State Board Of Technical Education, Mumbai																								
Learning and Assessment Scheme for Post S.S.C Diploma Courses																								
Programme Name		: Diploma In Architecture Assistantship / Architecture / Interior Design & Decoration / Interior Design																						
Programme Code		: AA / AT / IX / IZ										With Effect From Academic Year			: 2023-24									
Duration Of Programme		: 6 Semester										Duration			: 16 WEEKS									
Semester		: Fourth					NCRF Entry Level : 3.5					Scheme			: K									
Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme						Credits	Paper Duration (hrs.)	Assessment Scheme										Total Marks
						Actual Contact Hrs./Week			Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs /Week	Theory			Based on LL & TL				Based on Self Learning						
						CL	TL	LL			FA-TH			SA-TH	Total	Practical		SLA						
																FA-PR	SA-PR	Max	Min	Max	Min	Max	Min	
(All Compulsory)																								
1	ENVIRONMENTAL EDUCATION AND SUSTAINABILITY	EES	VEC	314301	2	3	-	-	1	4	2	1.5	30	70*#	100	40	-	-	-	-	25	10	125	
2	ESTIMATING & COSTING	EST	VEC	324301	-	3	1	2	-	6	3	03	30	70	100	40	25	10	-	-	-	-	125	
3	BUILDING CONSTRUCTION & TECHNOLOGY	BTE	DSC	324302	2	2	-	4	-	6	3	4	30	70	100	40	25	10	25@	10	-	-	150	
4	ARCHITECTURAL DESIGN - II	ADE	DSC	324001	2	2	-	4	2	8	4	-	-	-	-	50	20	50@	20	25	10	125		
5	COMPUTER AIDED DRAWING-II	CAD	SEC	324002	-	2	-	2	-	4	2	-	-	-	-	25	10	25@	10	-	-	50		
6	WORKING DRAWING	WDR	DSC	324003	2	2	-	2	2	6	3	-	-	-	-	50	20	50@	20	25	10	125		
Elective I (Any - Three)																								
7	DISASTER MANAGEMENT	ELC	DSE	324303	2	3	-	2	1	6	3	03	30	70	100	40	25	10	25@	10	25	10	175	
	HOUSING	ELC	DSE	324304	2	3	-	2	1	6	3	03	30	70	100	40	25	10	25@	10	25	10	175	
	LANDSCAPE DESIGN	ELC	DSE	324305	2	3	-	2	1	6	3	03	30	70	100	40	25	10	25@	10	25	10	175	
Total					10	17	1	16	6		20		120	280	400		200		175		100		875	

Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme			Credits	Assessment Scheme												
						Actual Contact Hrs./Week				Self Learning (Activity/Assignment /Micro Project)	Notional Learning Hrs /Week	Paper Duration (hrs.)	Theory			Based on LL & TL				Based on Self Learning		Total Marks
						CL	TL	LL					FA-TH	SA-TH	Total	Practical				SLA		
																FA-PR	SA-PR	SLA				
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min													
<p>Abbreviations : CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment,SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment</p> <p>Legends : @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination</p> <p>Note :</p> <ol style="list-style-type: none"> 1. FA-TH represents average of two class tests of 30 marks each conducted during the semester. 2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester. 3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work. 4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks 5. 1 credit is equivalent to 30 Notional hrs. 6. * Self learning hours shall not be reflected in the Time Table. 7. * Self learning includes micro project / assignment / other activities. <p>Course Category : Discipline Specific Course Core (DSC) , Discipline Specific Elective (DSE) , Value Education Course (VEC) , Intern./Apprenti./Project./Community (INP) , AbilityEnhancement Course (AEC) , Skill Enhancement Course (SEC) , GenericElective (GE)</p>																						

ENVIRONMENTAL EDUCATION AND SUSTAINABILITY**Course Code : 314301**

Programme Name/s	: Architecture Assistantship/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical and Electronics Engineering/ Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Hotel Management & Catering Technology/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Computer Science/ Textile Technology/ Electronics & Computer Engg./ Travel and Tourism/ Textile Manufactures
Programme Code	: AA/ AE/ AI/ AL/ AN/ AO/ AT/ BD/ CE/ CH/ CM/ CO/ CR/ CS/ CW/ DC/ DD/ DE/ DS/ EE/ EJ/ EK/ EP/ ET/ EX/ FC/ HA/ HM/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ ML/ MU/ PG/ PN/ PO/ SC/ SE/ TC/ TE/ TR/ TX
Semester	: Fourth / Sixth
Course Title	: ENVIRONMENTAL EDUCATION AND SUSTAINABILITY
Course Code	: 314301

I. RATIONALE

The survival of human beings is solely depending upon the nature. Thus, threats to the environment directly impact on existence and health of humans as well as other species. Depletion of natural resources and degradation of ecosystems is accelerated due to the growth in industrial development, population growth, and overall growth in production demand. To address these environmental issues, awareness and participation of individuals as well as society is necessary. Environmental education and sustainability provide an integrated, and interdisciplinary approach to study the environmental systems and sustainability approach to the diploma engineers.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Resolve the relevant environmental issue through sustainable solutions

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify the relevant Environmental issues in specified locality.
- CO2 - Provide the green solution to the relevant environmental problems.
- CO3 - Conduct SWOT analysis of biodiversity hotspot
- CO4 - Apply the relevant measures to mitigate the environmental pollution.
- CO5 - Implement the environmental policies under the relevant legal framework.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

ENVIRONMENTAL EDUCATION AND SUSTAINABILITY**Course Code : 314301**

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme									
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL		Total Marks			
				CL	TL	LL			FA-TH			SA-TH	Total	Practical					SLA		
														FA-PR	SA-PR	SLA					
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min										
314301	ENVIRONMENTAL EDUCATION AND SUSTAINABILITY	EES	VEC	3	-	-	1	4	2	1.5	30	70*#	100	40	-	-	-	-	25	10	125

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Explain the need of studying environment and its components.</p> <p>TLO 1.2 Investigate the impact of population growth and industrialization on the relevant environmental issues and suggest remedial solutions</p> <p>TLO 1.3 Explain the Concept of 5 R w.r.t. the given situation</p> <p>TLO 1.4 Elaborate the relevance of Sustainable Development Goals in managing the climate change</p> <p>TLO 1.5 Explain the concept of zero carbon-footprint with carbon credit</p>	<p>Unit - I Environment and climate change</p> <p>1.1 Environment and its components, Types of Environments, Need of environmental studies</p> <p>1.2 Environmental Issues- Climate change, Global warming, Acid rain, Ozone layer depletion, nuclear accidents. Effect of population growth and industrialization</p> <p>1.3 Concept of 5R, Individuals' participation in i) 5R policy, ii) segregation of waste, and iii) creating manure from domestic waste</p> <p>1.4 Impact of Climate change, Factors contributing to climate change, Concept of Sustainable development, Sustainable development Goals (SDGs), Action Plan on Climate Change in Indian perspectives</p> <p>1.5 Zero Carbon footprint for sustainable development, (IKS-Environment conservation in vedic and pre-vedic India)</p>	Lecture Using Chalk-Board Presentations

ENVIRONMENTAL EDUCATION AND SUSTAINABILITY

Course Code : 314301

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
2	<p>TLO 2.1 Justify the importance of natural resources in sustainable development</p> <p>TLO 2.2 Explain the need of optimum use of natural resources to maintain the sustainability</p> <p>TLO 2.3 Differentiate between renewable and non-renewable sources of energy</p> <p>TLO 2.4 Suggest the relevant type of energy source as a green solution to environmental issues</p>	<p>Unit - II Sustainability and Renewable Resources</p> <p>2.1 Natural Resources: Types, importance, Causes and effects of depletion. (Forest Resources, Water Resources, Energy Resources, Land resources, Mineral resources), (IKS- Concepts of Panchmahabhuta)</p> <p>2.2 Impact of overexploitation of natural resources on the environment, optimum use of natural resources</p> <p>2.3 Energy forms (Renewable and non-renewable) such as Thermal energy, nuclear energy, Solar energy, Wind energy, Geothermal energy, Biomass energy, Hydropower energy, biofuel</p> <p>2.4 Green Solutions in the form of New Energy Sources such as Hydrogen energy, Ocean energy & Tidal energy</p>	Lecture Using Chalk-Board Presentations
3	<p>TLO 3.1 Explain the characteristics and functions of ecosystem</p> <p>TLO 3.2 Relate the importance of biodiversity and its loss in the environmental sustainability</p> <p>TLO 3.3 Describe biodiversity assessment initiatives in India</p> <p>TLO 3.4 Conduct the SWOT analysis of the biodiversity hot spot in India</p> <p>TLO 3.5 Explain the need of conservation of biodiversity in the given situation</p>	<p>Unit - III Ecosystem and Biodiversity</p> <p>3.1 Ecosystem - Definition, Aspects of ecosystem, Division of ecosystem, General characteristics of ecosystem, Functions of ecosystem</p> <p>3.2 Biodiversity - Definitions, Levels, Value, and loss of biodiversity</p> <p>3.3 Biodiversity Assessment Initiatives in India</p> <p>3.4 SWOT analysis of biodiversity hot spot in India</p> <p>3.5 Conservations of biodiversity - objects, and laws for conservation of biodiversity</p>	Lecture Using Chalk-Board Presentations Video Demonstrations
4	<p>TLO 4.1 Classify the pollution based on the given criteria</p> <p>TLO 4.2 Justify the need of preserving soil as a resource along with the preservation techniques</p> <p>TLO 4.3 Maintain the quality of water in the given location using relevant preventive measures</p> <p>TLO 4.4 State the significance of controlling the air pollution to maintain its ambient quality norms</p> <p>TLO 4.5 Compare the noise level from different zones of city with justification</p> <p>TLO 4.6 Describe the roles and responsibilities of central and state pollution control board</p>	<p>Unit - IV Environmental Pollution</p> <p>4.1 Definition of pollution, types- Natural & Artificial (Man- made)</p> <p>4.2 Soil / Land Pollution – Need of preservation of soil resource, Causes and effects on environment and lives, preventive measures, Soil conservation</p> <p>4.3 Water Pollution - sources of water pollution, effects on environment and lives, preventive measures, BIS water quality standards for domestic potable water, water conservation</p> <p>4.4 Air pollution - Causes, effects, prevention, CPCB norms of ambient air quality in residential area</p> <p>4.5 Noise pollution - Sources, effects, prevention, noise levels at various zones of the city</p> <p>4.6 Pollution Control Boards at Central and State Government level: Norms, Roles and Responsibilities</p>	Lecture Using Chalk-Board Presentations

ENVIRONMENTAL EDUCATION AND SUSTAINABILITY**Course Code : 314301**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	<p>TLO 5.1 Explain Constitutional provisions related to environmental protection</p> <p>TLO 5.2 Explain importance of public participation (PPP) in enacting the relevant laws</p> <p>TLO 5.3 Use the relevant green technologies to provide sustainable solutions of an environmental problem</p> <p>TLO 5.4 Explain the role of information technology in environment protection</p>	<p>Unit - V Environmental legislation and sustainable practices</p> <p>5.1 Article (48-A) and (51-A (g)) of Indian Constitution regarding environment, Environmental protection and prevention acts</p> <p>5.2 Public awareness about environment. Need of public awareness and individuals' participation. Role of NGOs</p> <p>5.3 Green technologies like solar desalination, green architecture, vertical farming and hydroponics, electric vehicles, plant-based packaging</p> <p>5.4 Role of information technology in environment protection and human health</p>	<p>Lecture Using Chalk-Board Presentations Video Demonstrations</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES : NOT APPLICABLE.**VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)****Assignment**

- Suggest the steps to implement (or improve the implementation) of the 5R policy in your home/institute stating your contribution
- Draft an article on India's Strategies to progress across the Sustainable Development Goals
- Make a chart of Renewable and non-renewable energy sources mentioning the advantages and disadvantages of each source
- Conduct the SWOT analysis of biodiversity hotspot in India
- Prepare a mind-mapping for the zero carbon footprint process of your field
- Prepare a chart showing sources of pollution (air/water/ soil), its effect on human beings, and remedial actions
- Any other assignment on relevant topic related to the course suggested by the facilitator

UNICEF Certification(s)

- Students may complete the self-paced course launched by Youth Leadership for climate Exchange under UNICEF program on portal www.mahayouthnet.in . The course encompasses five Modules in the form of Units as given below:

- Unit 1: Living with climate change
- Unit 2 : Water Management and Climate Action
- Unit 3: Energy Management and Climate Action
- Unit 4 : Waste Management and Climate Action
- Unit 5 : Bio-cultural Diversity and Climate Action

If students complete all the five Units they are not required to undertake any other assignment /Microproject/activities specified in the course. These units will suffice to their evaluations under SLA component

Micro project

- Technical analysis of nearby commercial RO plant.
- Comparative study of different filters used in Household water filtration unit
- Evaluate any nearby biogas plant / vermicomposting plant or any such composting unit on the basis of sustainability and cost-benefit
- IKS-Study and prepare a note on Vedic and Pre-Vedic techniques of environmental conversion

ENVIRONMENTAL EDUCATION AND SUSTAINABILITY**Course Code : 314301**

Visit a local polluted water source and make a report mentioning causes of pollution
Any other activity / relevant topic related to the course suggested by the facilitator

Activities

- Prepare a report on the working and functions of the PUC Center machines and its relevance in pollution control.
- Prepare and analyse a case study on any polluted city of India
- Prepare a note based on the field visit to the solid waste management department of the municipal corporation / local authority
- Record the biodiversity of your institute/garden in your city mentioning types of vegetation and their numbers
- Visit any functional hall/cultural hall /community hall to study the disposal techniques of kitchen waste and prepare a report suggesting sustainable waste management tool
- Watch a video related to air pollution in India and present the summary
- Any other assignment on relevant topic related to the course suggested by the facilitator

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and may be considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Nil	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Environment and climate change	CO1	8	4	4	4	12
2	II	Sustainability and Renewable Resources	CO2	10	4	4	8	16
3	III	Ecosystem and Biodiversity	CO3	8	4	4	4	12
4	IV	Environmental Pollution	CO4	12	4	8	6	18
5	V	Environmental legislation and sustainable practices	CO5	7	4	4	4	12
Grand Total				45	20	24	26	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Two-unit tests (MCQs) of 30 marks will be conducted and average of two-unit tests considered. Formative assessment of self learning of 25 marks should be assessed based on self learning activity such as UNICEF Certification(s)/Microproject/assignment/activities. (60 % weightage to process and 40 % to product)

Summative Assessment (Assessment of Learning)

ENVIRONMENTAL EDUCATION AND SUSTAINABILITY**Course Code : 314301**

- Online MCQ type Exam

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	-	1	-	-	3	2	3			
CO2	-	2	2	-	3	2	3			
CO3	-	-	-	-	3	1	2			
CO4	1	-	-	-	3	2	2			
CO5	1	-	2	-	3	2	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Y. K. Singh	Environmental Science	New Age International Publishers, 2006, ISBN: 81-224-2330-2
2	Erach Bharucha	Environmental Studies	University Grants Commission, New Delhi
3	Rajagopalan R.	Environmental Studies: From Crisis to Cure.	Oxford University Press, USA, ISBN: 9780199459759, 0199459754
4	Shashi Chawla	A text book of Environmental Science	Tata Mc Graw-Hill New Delhi
5	Arvind Kumar	A Text Book of Environmental science	APH Publishing New Delhi (ISBN 978-8176485906)

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://sdgs.un.org/goals	United Nation's website mentioning Sustainability goals
2	http://www.greenbeltmovement.org/news-and-events/blog	Green Belt Movement Blogs on various climatic changes and other issues
3	http://www.greenbeltmovement.org/what-we-do/tree-planting-for-watersheds	Green Belt Movement's work on tree plantation, soil conservation and watershed management techniques
4	https://www.youtube.com/@ierekcompany/videos	International Experts For Research Enrichment and Knowledge Exchange – IEREK's platform to exchange the knowledge in fields such as architecture, urban planning, sustainability
5	www.mahayouthnet.in	UNICEF Initiative for youth leadership for climate action

ENVIRONMENTAL EDUCATION AND SUSTAINABILITY**Course Code : 314301**

Sr.No	Link / Portal	Description
6	https://eepmoefcc.nic.in/index1.aspx?lsid=297&lev=2&lid=1180&langid=1	GOI Website for public awareness on environmental issues
7	https://egyankosh.ac.in/handle/123456789/61136	IGNOU's Initiative for online study material on Environmental studies
8	https://egyankosh.ac.in/handle/123456789/50898	IGNOU's Initiative for online study material on sustainability
9	https://sustainabledevelopment.un.org/content/documents/11803Official-List-of-Proposed-SDG-Indicators.pdf	Final list of proposed Sustainable Development Goal indicators
10	https://sustainabledevelopment.un.org/memberstates/india	India's Strategies to progress across the SDGs.
11	https://www.un.org/en/development/desa/financial-crisis/sustainable-development.html	Challenges to Sustainable Development
12	https://nptel.ac.in/courses/109105190	NPTEL course on sustainable development
13	https://onlinecourses.swayam2.ac.in/cec19_bt03/preview	Swayam Course on Environmental studies (Natural Resources, Biodiversity and other topics)
14	https://onlinecourses.nptel.ac.in/noc23_hs155/preview	NPTEL course on environmental studies which encompasses SDGs, Pollution, Climate issues, Energy, Policies and legal framework
15	https://www.cbd.int/development/meetings/egmbped/SWOT-analysis-en.pdf	SWOT analysis of Biodiversity
16	https://www.sanskrit.nic.in/SVimarsha/V2/c17.pdf	Central Sanskrit University publication on Vedic and pre Vedic environmental conservation

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

ARCHITECTURAL DESIGN - II**Course Code : 324001**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/

Programme Code : AA/ AT/ IX/ IZ

Semester : Fourth

Course Title : ARCHITECTURAL DESIGN - II

Course Code : 324001

I. RATIONALE

This course is designed so that students will learn ergonomic and anthropometry approaches towards space design and area statement formations for commercial space design. This course will focus on small commercial Institutional building design up to 2000 sqm. to 5000 sqm. plot size. covering maximum G+3 building structure. Interior Design course can focus designing a commercial Retail store / Spa / Restaurant/ Office / Bank / Experience center of 500 sqm. To 700 sqm.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Undertake surveys of various types of commercial / Institutional spaces to plan and design it as per the need of society.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Explain the importance of typologies for commercial / institutional spaces.
- CO2 - Apply all theoretical learning about the predesign concepts in the final design conventional methods of architectural design / Interior spaces project.
- CO3 - Prepare design for space envelope architecture / interior design space.
- CO4 - Design technical and sustainable approach towards the designed project.
- CO5 - Demonstrate skills to represent the ideas in 3D model.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL			Based on SL							
				CL	TL	LL						Practical										
												FA-TH	SA-TH	Total		FA-PR	SA-PR	SLA				
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min											
324001	ARCHITECTURAL DESIGN - II	ADE	DSC	2	-	4	2	8	4	-	-	-	-	-	50	20	50@	20	25	10	125	

ARCHITECTURAL DESIGN - II**Course Code : 324001****Total IKS Hrs for Sem. : 2 Hrs**

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 List various types of commercial space in chart form with its requirements of area and document / explain anthropometry data</p> <p>TLO 1.2 Develop & prepare mind maps to understand predesign and conceptual requirements.</p> <p>TLO 1.3 Prepare case studies (one shall be online and one bookcase).</p> <p>TLO 1.4 Develop a concept / theme of design for the space exploration.</p>	<p>Unit - I Pre-design concept in context with anthropometry and ergonomics.</p> <p>1.1 Human scaling with basic anthropometry data assembling for commercial / institutional architecture / interior spaces.</p> <p>1.2 Predesign concept, check lists and list of space requirements.</p> <p>1.3 Case studies in context of the project</p> <p>1.4 Concept discussions for its correctness of the designated project</p>	<p>Demonstration, Hands-on, Cooperative Learning, Lecture Using Chalk-Board, Presentations, Video Demonstrations, Case Study</p>
2	<p>TLO 2.1 Prepare site plan, bubble diagram & zoning</p> <p>TLO 2.2 Prepare site drawing as per scales provided</p> <p>TLO 2.3 Provide alternative layouts to explore design possibilities</p> <p>TLO 2.4 Produce schematic layout and working model with material board</p>	<p>Unit - II Zoning, planning and area statements</p> <p>2.1 Predesign area statements for zoning & planning.</p> <p>2.2 Site documentation with site plan / measurement plans.</p> <p>2.3 Planning & preparing alternatives plans for understanding of best possible layout / planning.</p> <p>2.4 Schematic layout & working Models with material board.</p>	<p>Demonstration, Presentations, Lecture Using Chalk-Board, Video Demonstrations, Model Demonstration, Collaborative learning</p>
3	<p>TLO 3.1 Draw layout plans as designed to the scale.</p> <p>TLO 3.2 Draw sections as designed to the scale.</p> <p>TLO 3.3 Prepare Proposed Civil Layout (AA/AT) / Existing & Proposed civil Layout (IX/IZ)</p> <p>TLO 3.4 Develop 3D views & sketches & perspective drawings.</p>	<p>Unit - III Planning & designing & 3D modelling.</p> <p>3.1 Scaled layout and sections to understand and demonstrate design</p> <p>3.2 Sections with all structural indications and levels</p> <p>3.3 3D sketches and views, concepts and design related drawing and their solutions</p> <p>3.4 Revision & discussions with mentors in regards of designed project for its corrective measures.</p>	<p>Model Demonstration, Demonstration, Video Demonstrations, Lecture Using Chalk-Board, Hands-on, Collaborative learning, Presentations</p>

ARCHITECTURAL DESIGN - II**Course Code : 324001**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	<p>TLO 4.1 Draw structural elements for designed project(AA/AT)</p> <p>TLO 4.2 Develop center line drawings for designed project (AA/AT)</p> <p>TLO 4.3 Organize site visits for services (AA/AT/IX/IZ)</p> <p>TLO 4.4 Draw structural layouts electrical, Plumbing, Rainwater Harvesting and Fire fighting layouts. (AA/AT)</p> <p>TLO 4.5 Draft all services drawing as per layout like flooring, reflected ceiling, Electrical with lighting, HVAC and networking layouts. (IX / IZ)</p> <p>TLO 4.6 Draw coordination layout showing all overlapping services (IX / IZ)</p>	<p>Unit - IV Structural design development / Service Layouts & Technical drawings</p> <p>4.1 Study model and understand structural requirements. (AA/AT).</p> <p>4.2 Structural issues and solving the problems (AA/AT).</p> <p>4.3 Services its important points to be noted while designing(AA/AT/IX/IZ).</p> <p>4.4 Structural & service drawings for electrical, Plumbing, Rainwater Harvesting and Fire fighting layouts. (AA/AT).</p> <p>4.5 Flooring, reflected ceiling, Electrical with lighting, HVAC and networking layouts.(IX / IZ).</p> <p>4.6 Overlay drawings / coordination layout to understand all services to be provided within space. (IX / IZ).</p>	<p>Demonstration, Video</p> <p>Demonstrations, Presentations, Collaborative learning, Hands-on, Site/Industry Visit, Model Demonstration</p>
5	<p>TLO 5.1 Transfer the manual designed drawings in computer software</p> <p>TLO 5.2 Prepare different layouts & sections</p> <p>TLO 5.3 Produce & Print portfolio on A3 size drawing sheets to evaluate</p> <p>TLO 5.4 Conduct Internal / cross jury for given project</p> <p>TLO 5.5 Assess Final portfolio</p>	<p>Unit - V Project development - Computer skill based.</p> <p>5.1 Transfer prepared manual drawings to software driven outcomes</p> <p>5.2 Print drawings and presentation methodologies</p> <p>5.3 Prefinal portfolio printing</p> <p>5.4 Prefinal drawings prepared and suggestions</p> <p>5.5 Final portfolio submission of the given project</p>	<p>Flipped Classroom, Demonstration, Video</p> <p>Demonstrations, Presentations, Collaborative learning</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare a report on anthropometry data for commercial space designed, sketch to the scale drawings on A1 tracing / Cartridge sheet	1	*Preparation of anthropometry data.	4	CO1
LLO 2.1 List all predesign requirements and preparing a mind map and concept sheet on A1 sheet & client brief	2	Preparation of Mind map and concept drawings.	4	CO1
LLO 3.1 Prepare one online & one book case study to be given on specified topic on A1 sheet with comparative analysis	3	Preparation of Case Study and Zoning Layout	4	CO1
LLO 4.1 Prepare zoning layouts with area statements on tracing sheets – Zoning layouts (minimum 3/5 alternatives)	4	Preparation of Bubble Diagram & zoning Layout	6	CO2

ARCHITECTURAL DESIGN - II**Course Code : 324001**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 5.1 Develop site documents with all site conditions mentioned on layout with contours specifications on 1:100 or 1:200 (AA/AT) / measurement layouts with bear section with all specifications (IKS)	5	Preparation of Site Documentation and Alternative Layouts	4	CO2
LLO 6.1 Prepare alternative options with schematic layouts.	6	Preparation of final site drawings / Measurement Layout.	4	CO2
LLO 7.1 Draft one final alternative to be scaled up as final layouts and sections to understand elevations, Final space plan layout on 1:100 or 1:200 (AA/AT)/ Furniture layout on one A1 sheet on 1:50 scale	7	Preparation of alternative Layouts.	3	CO3
LLO 8.1 Prepare 3D schematic sketches for the design finalized sketches as based scheme finalised. Students shall do the market survey and prepare material chart on A1 sheet for the finalized material board	8	Preparation of 3D Views & Sketches	3	CO3
LLO 9.1 Develop structural layouts & – civil, electrical & plumbing, Firefighting (AA/AT) Final Services L – Flooring, electrical & lighting, Reflected ceiling layouts, HVAC, Networking Layouts (IX / IZ)	9	*Preparation of Services Layouts – Civil Layout / Civil Changes Pre/Post layout/s Services Layouts – Electrical Layout with Lighting Services Layouts – Plumbing Layout Services Layouts – Fire Fighting Layout Services Layouts – Reflected Ceiling Layout (IX / IZ) Services Layouts – HVAC Layout (IX / IZ) Services Layouts – Networking Layout (IX / IZ)	4	CO4
LLO 10.1 Prepare a set of final Drawings with all suggested corrections	10	Preparation of revised Service Drawing	2	CO4
LLO 11.1 Prepare drawings of the given project using Auto cad software.	11	*Preparation of drawings using Auto cad software.	2	CO5
LLO 12.1 Develop 3D model by using cad software's	12	*Preparation of drawings by using autocad software – 3D / Exploded views	4	CO5
LLO 13.1 Draw all service layouts on A1 sheet as specified per schemes	13	Preparation of service drawings	4	CO5
LLO 14.1 Prepare portfolio for prefinal internal assessment and a cross jury	14	Preparation of architectural, technical drawing and model for Internal cross jury	6	CO5
LLO 15.1 Prepare final A1 portfolio signed, stamped & Certified by mentors	15	Preparation of architectural, technical drawings and model for final portfolio submission	6	CO5
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> • '*1 Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

ARCHITECTURAL DESIGN - II**Course Code : 324001****VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)****Micro project**

- Develop a technically sound and sustainable built project with the help of online courses
- Software learning and preparing drawings, Mind maps and flow charts
- Case study data analysis & Mapping
- Material market survey & rate analysis

Assignment

- Conduct visits for (Electrical, Plumbing, HVAC, Fire Fighting, etc.) collect technical information and student shall submit site reports

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	LCD projector & white screen for projection,	All
2	A1 drafting board and all drafting tools, tracing paper, A1 size drawing sheets, A3 Sketchbook, etc.	All
3	Computer loaded with required software's – Auto CAD, Sketchup, Corel Draw, Photoshop, etc..	All
4	A1 plotter or printer facility for students.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Pre-design concept in context with anthropometry and ergonomics.	CO1	6	0	0	0	0
2	II	Zoning, planning and area statements	CO2	6	0	0	0	0
3	III	Planning & designing & 3D modelling.	CO3	6	0	0	0	0
4	IV	Structural design development / Service Layouts & Technical drawings	CO4	6	0	0	0	0
5	V	Project development - Computer skill based.	CO5	6	0	0	0	0
Grand Total				30	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS

ARCHITECTURAL DESIGN - II**Course Code : 324001****Formative assessment (Assessment for Learning)**

- Continuous assessment based on work done through out the semester.

Summative Assessment (Assessment of Learning)

- End Semester Examination, Lab Performance, Viva-voce

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	3	3	0	3	3	3			
CO2	3	3	3	1	3	1	3			
CO3	3	3	2	1	1	1	3			
CO4	3	3	2	3	1	3	3			
CO5	3	3	3	3	2	3	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Ernst Neufert, Peter Neufert	Neufert Architects' Data	Oxford Brooks University; ISBN 10: 1405192534 ISBN 13: 9781405192538
2	Kate Nesbitt (org)	Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965 - 1995	Princeton Architectural Press, 1996; ISBN 10: 156898054X ISBN 13: 9781568980546
3	Francis D. K. Ching	Architecture: Form, Space and Order	Published by Van Nostrand Reinhold, 1979; ISBN 10: 0442215355 / ISBN 13: 9780442215354
4	Frank Lloyd Wright	The Future Of Architecture	Published by Random House Value Publishing, 1988; ISBN 10: 0517030896 / ISBN 13: 9780517030899
5	Karlen Mark	Space planning Basics	Van Nostrand Reinhold, New York, 1992; ISBN 10: 0442009704 ISBN 13: 9780442009700
6	Joseph D Chiara, Julius Panero, & Martin Zelnick,	Time Saver standards for Interior Design & space planning	2nd edition, Mc-Graw Hill professional, 2001, ISBN 10: 0070162999 ISBN 13: 9780070162990
7	Francis.D. Ching & Corky Bingelli	Interior Design Illustrated	Published by Wiley, 2004 ISBN 10: 0471473766 ISBN 13: 9780471473763
8	Julius Panero & Martin Zelnick	Human Dimension & Interior Space : A source book of Design Reference standards	Published by Watson-Guptill, 1979 ISBN 10: 0823072711 ISBN 13: 9780823072712

ARCHITECTURAL DESIGN - II**Course Code : 324001**

Sr.No	Author	Title	Publisher with ISBN Number
9	Karlen Mark, Kate Ruggeri & Peter Hahn	Space Planning Basics	Published by Van Nostrand Reinhold, 1992 ISBN 10: 0442009704 ISBN 13: 9780442009700
10	Maureen Mitton	Interior Design Visual Presentation: A Guide to Graphics, Models, and Presentation Techniques	Published by Wiley, 1999 ISBN 10: 0471292591 ISBN 13: 9780471292593
11	Robert Rengel,	Shaping Interior Space	Published by Fairchild Books, 2003 ISBN 10: 1563672219 ISBN 13: 9781563672217

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.open.edu/openlearn/free-courses/full-catalogue	Design thinking
2	https://www.open.edu/openlearn/free-courses/full-catalogue	People-centred designing
3	https://www3.nhk.or.jp/nhkworld/en/tv/designtalksplus/	DESIGN TALKS plus

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 21/11/2024

Semester - 4, K Scheme

COMPUTER AIDED DRAWING-II**Course Code : 324002**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fourth
Course Title : COMPUTER AIDED DRAWING-II
Course Code : 324002

I. RATIONALE

This subject aims to help students understand the significance of 3D modelling in creating realistic perspectives. The utilization of 3D modelling software not only saves time by minimizing the necessity for model rework but also enhances productivity. Additionally, it fosters the development of proficient presentation skills through the use of various presentation software.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Create 3D objects and models of designed spaces precisely and produce photorealistic rendered images using various rendering software.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Explain the basics of 3D modelling software.
- CO2 - Execute the diverse commands within 3D modeling software.
- CO3 - Draw 3-dimensional objects & models using 3D modelling software.
- CO4 - Produce the photorealistic rendered images, walkthrough & presentations.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme								Total Marks	
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL					
				CL	TL	LL			FA-TH			SA-TH	Total	Practical				SLA			
														FA-PR	SA-PR	SLA					
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min										
324002	COMPUTER AIDED DRAWING-II	CAD	SEC	2	-	2	-	4	2	-	-	-	-	-	25	10	25@	10	-	-	50

Total IKS Hrs for Sem. : 0 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

COMPUTER AIDED DRAWING-II**Course Code : 324002****V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 State the types of 3D modelling software. TLO 1.2 Describe the necessity of 3D modelling software in architectural/ Interior practice. TLO 1.3 Modify the 2D drawings for 3D modelling.	Unit - I Basics of 3D modelling software. 1.1 Overview of 3D modelling computer aided software. 1.2 Introduction to types of 3D modelling software. 1.3 File formats of 2D drawings for 3D modeling.	Demonstration, Presentations, Hands-on, Flipped Classroom
2	TLO 2.1 Describe the setting up template & layouts in 3D modelling software. TLO 2.2 Elaborate the tools & 3D-Navigation techniques of 3D modelling software. TLO 2.3 Describe the different types of tool bars along with tools. TLO 2.4 Create a 3D model of a given object/ Project.	Unit - II Setting-up 3D Interface, modelling & drafting techniques. 2.1 Introduction to setting up the template & understanding the layout. 2.2 Interface of 3D modelling software, navigating in 3D. 2.3 Tools description & types of tool bars. Creation of basic shapes, objects & models. 2.4 Creation of 3-D models using a software.	Flipped Classroom, Presentations, Hands-on, Demonstration
3	TLO 3.1 Elaborate the concept of surfaces & modelling techniques. TLO 3.2 Describe the material applications, modifications & grouping in 3D modelling software. TLO 3.3 Define the concept of 3D warehouse & integration of objects and models. TLO 3.4 Discuss the concepts & importance of plugins in 3D modelling software.	Unit - III Surfaces, materials, 3D Warehouse & Plugins. 3.1 Concept of surfaces & surface modelling techniques. 3.2 Material applications to objects & models in 3D modelling software. 3.3 Introduction of 3D Warehouse & their integration with 3D models. 3.4 Concepts & applications of plugins in 3D modelling software.	Flipped Classroom, Presentations, Video Demonstrations, Hands-on
4	TLO 4.1 Describe concept & principles of rendering in 3D modelling software. TLO 4.2 Discuss the rendering set up in V-Ray & Lumion. TLO 4.3 Define plugins in rendering techniques for 3D modelling. TLO 4.4 Create a walkthrough of a chosen project in computer aided 3D modelling software. TLO 4.5 Create a presentation of given project using computer aided tools.	Unit - IV Computer aided rendering, presentation & walkthrough. 4.1 Introduction to rendering & rendering principals. 4.2 Overview of rendering set up, optimization techniques in software's like V-Ray & Lumion. 4.3 Real-time rendering technologies & rendering plugins. 4.4 Presentation & walkthrough creation in computer aided 3D modelling software.	Flipped Classroom, Presentations, Video Demonstrations, Hands-on

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
--	-------	--	----------------	--------------

COMPUTER AIDED DRAWING-II**Course Code : 324002**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Select suitable 2D drawing for given 3D model. LLO 1.2 Modify the given 2D drawing for 3D model drafting. LLO 1.3 Set up the 2D drawing format in appropriate version for 3D modelling.	1	* Modifications of 2D drawings for 3D modelling.*	2	CO1 CO2
LLO 2.1 Explain types of templates & suitable template as per 2D drawing. LLO 2.2 Prepare a standard sheet template using layout tool in 3D modelling software like Sketch Up. LLO 2.3 Export the layout sheet into pdf format for printing.	2	* Creation of templates and Layouts.	2	CO1 CO2
LLO 3.1 Prepare a sheet of tools for 3D modelling sketch-up software. LLO 3.2 Prepare a sheet for types of toolbars in sketch-up 3D modelling software.	3	* Application of tools and toolbars.	2	CO2
LLO 4.1 Explain the interface of sketch up 3D modelling software. LLO 4.2 Demonstrate the navigating techniques in sketch-up 3D modelling software. LLO 4.3 Prepare a sheet on Interface and navigation tools of sketch-up 3D modelling software.	4	* Interface of 3D modelling and navigation techniques.	2	CO2 CO3
LLO 5.1 Draw the basic shapes in 3D modelling software. (8-10 shapes) LLO 5.2 Prepare a sheet of basic shapes (minimum 6 shapes) in sketch-up 3D modelling software.	5	Creation of basic shapes like Rectangle, Circle, Square, Triangle.	2	CO2 CO3
LLO 6.1 Demonstrate the object creation like door, window & furniture elements in sketch-up 3D modelling software. LLO 6.2 Prepare a sheet of basic objects (minimum 3 objects) in sketch-up 3D modelling software.	6	* Creation of objects like door, window, furniture elements.	2	CO2 CO3
LLO 7.1 Demonstrate the model creation of basic chosen project like residential unit/commercial building/ space formation in interiors. LLO 7.2 Draft a 3D model of a chosen project like residential unit/commercial building/ space formation in interiors. LLO 7.3 Prepare a sheet of a drafted model in sketch-up 3D modelling software using layout tool.	7	* Development of 3D model for a project.	2	CO2 CO3
LLO 8.1 Explain surface modelling techniques. Elaborate wireframe models, surface models, and solid models. LLO 8.2 Draft an object and apply surface modelling techniques to a given object. (Minimum 3 objects) LLO 8.3 Prepare a sheet of given objects in sketch-up 3D modelling software by using layout tool.	8	Application of surface modelling techniques.	2	CO2 CO3

COMPUTER AIDED DRAWING-II**Course Code : 324002**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 9.1 Match the suitable material to given model in sketch-up 3D modelling software. LLO 9.2 Demonstrate the Edit material option and create a new material option in sketch-up 3D modelling software. LLO 9.3 Prepare the sheet for material application of drafted model in sketch-up 3D modelling software by using layout tool.	9	* Application of materials to objects and models.	2	CO2 CO3
LLO 10.1 Demonstrate the 3D warehouse of sketch-up 3D modelling software. LLO 10.2 Select the suitable objects/ materials for a drafted model in sketch-up 3D modelling software. LLO 10.3 Prepare the sheet for integration of 3D warehouse models using in sketch-up 3D modelling software by using layout tool.	10	* 3D warehouse and object integration in 3D modelling.	2	CO2 CO3
LLO 11.1 Setup the plugins in 3D modelling software. LLO 11.2 Select the suitable plugin for 3D drafting in sketch-up 3D modelling software. LLO 11.3 Prepare a sheet of plugins used in sketch-up 3D modelling software by using layout tool.	11	* Operations of plugins in 3D modelling software.	2	CO2 CO3
LLO 12.1 Select the suitable rendering software for given 3D model to render. (V-Ray, Lumion) LLO 12.2 Demonstrate the tools and techniques in rendering software. LLO 12.3 Render a drafted model using rendering software. LLO 12.4 Prepare a sheet for tools of rendering software in sketch-up 3D modelling software by using layout tool.	12	* Rendering software and applications of rendering tools.	2	CO4
LLO 13.1 Setup the rendering software plugins in 3D modelling software. LLO 13.2 Select the suitable plugin for rendering the chosen model. LLO 13.3 Prepare a sheet of plugins used for rendering in rendering software.	13	Operations of plugins in rendering software.	2	CO4
LLO 14.1 Create a realistic rendered images of a chosen project in rendering software. LLO 14.2 Prepare a sheet of rendered images using computer aided presentation tools.	14	* Creation of realistic 3D rendered images of 3D model.	2	CO4
LLO 15.1 Setup the presentation of a given project using computer aided presentation tools. LLO 15.2 Prepare a presentation of a given project (Plan, Sections, 3D's, Rendered Images).	15	* Presentation with the aid of 3D modeling software.	2	CO4
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> • '*' Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

COMPUTER AIDED DRAWING-II**Course Code : 324002**

- Interior Design Concepts: Experiment with interior layouts, furniture placement, and color schemes. SketchUp allows you to visualize how different elements will fit together in a room. Try designing a cozy living room, a functional kitchen, or a stylish bedroom.
- Model Creation: Create 3D model in SketchUp. Define the geometry, add textures, materials, and components. Pay attention to details like lighting fixtures, furniture, and other elements that will enhance the realism of chosen scene.
- Camera Placement: Position your camera within the model. Think about the best angles to showcase your design. Adjust the field of view, focal length, and perspective to achieve the desired composition.
- Materials and Textures: Apply appropriate materials and textures to surfaces. Use high-resolution images for realistic results. Consider reflective surfaces, roughness, and transparency.
- Render Settings: Choose a rendering engine or plugin (such as V-Ray, Enscape, or Twilight Render). Adjust settings like resolution, quality, and rendering time. Set up global illumination, ambient occlusion, and other effects.
- Render Output: Click the render button. The software will process selected scene and generate a high-quality image. Save the output in a suitable format (JPEG, PNG, etc.).

Micro project

- DIY Home Renovation Projects - Use SketchUp to plan and visualize your home improvement projects. Whether it's remodeling a room, designing custom furniture, or creating built-in storage solutions.
- Watch the basic tutorial videos on YouTube to explore the tools & commands of sketch up.
<https://www.youtube.com/watch?v=qgt2s9RzvKM>

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Color printer preferably for the output of A-3 size paper.	2,3,4,5,6,7,8,9,10,11,12,13,14,15
2	LCD projector/ Smart Interactive Display Panel of latest configuration.	2,3,4,5,6,7,8,9,10,11,12,13,14,15
3	Latest software subscriptions of AUTO CAD, SKETCH-UP, LUMION, V-RAY, ENSCAPE and PHOTOSHOP software.	All
4	Computer Specifications: Processor (CPU): A multi-core processor (Intel Core i7 or AMD Ryzen) with high clock speed is ideal. Memory (RAM): At least 16 GB RAM for smooth modeling and rendering. Graphics Card (GPU): A dedicated GPU with good OpenGL support. Storage: SSD for faster loading times. Operating System: Windows 10 or macOS.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Basics of 3D modelling software.	CO1	7	0	0	0	0
2	II	Setting-up 3D Interface, modelling & drafting techniques.	CO2,CO3	8	0	0	0	0
3	III	Surfaces, materials, 3D Warehouse & Plugins.	CO2,CO3	7	0	0	0	0

COMPUTER AIDED DRAWING-II**Course Code : 324002**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
4	IV	Computer aided rendering, presentation & walkthrough.	CO4	8	0	0	0	0
Grand Total				30	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- The continuous internal assessment for laboratory practical.

Summative Assessment (Assessment of Learning)

- End semester internal practical exam for laboratory learning

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	2	2	1	2	2			
CO2	3	2	2	3	1	2	2			
CO3	3	2	2	3	1	2	2			
CO4	3	2	2	2	1	2	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Aidan Chopra, Laura Town, Chris Pichereau	Introduction to Google SketchUp, 2nd edition	Publisher: Wiley ISBN: 1118214382
2	Aidan Chopra	Google SketchUp 8 For Dummies	Publisher: For Dummies ISBN: 0470916826
3	Chris Grover	Google SketchUp: The Missing Manual	Publisher: O'Reilly Media, Inc. ISBN: 9780596521462
4	Hujun Bao and Wei Hua	Real-Time Graphics Rendering Engine	Publisher: Springer Publishing Company, Incorporated ISBN: 978-3-642-18342-3
5	Bhatt, N.D.	Engineering Drawing	Charotar Publications, Anand, 2016 ISBN: 978-93-80358-96

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
-------	---------------	-------------

COMPUTER AIDED DRAWING-II**Course Code : 324002**

Sr.No	Link / Portal	Description
1	https://www.sketchupschool.com/	SketchUp School is an online platform dedicated to teaching individuals how to master SketchUp, a powerful 3D modelling software widely used in various industries including architecture, interior design, construction and more.
2	https://www.thesketchupessentials.com/sketchup-tutorials/	The SketchUp Essentials provides comprehensive tutorials covering a wide array of topics. From fundamental concepts like navigation and basic modelling techniques to more advanced topics such as rendering, animation, and plugin integration.
3	https://learn.sketchup.com/	The learning portal serves as a valuable resource for beginners. It offers an ever-growing library of learning tracks designed to help students become an active SketchUp user.
4	https://www.sketchupclub.com/2024/01/10-online-tutorials-for-sketchup.html	Sketchup Club is a platform that caters to students, artists and enthusiasts. Sketchup Club explores various extensions and plugins that enhance the SketchUp experience. Sketchup Club features a post on V-Ray for SketchUp, a 3D rendering software that seamlessly integrates with SketchUp. It allows students to create photorealistic visualizations.
5	https://slidesgo.com/interior-design	Slides go offers a collection of Interior Design Google Slides & PPT Templates that cater to both designers and amateur decorators. Whether students are passionate about tidiness, attuned to visual aesthetics, or simply create home decorating, these templates are designed to inspire and enhance interior design presentations.
<p>Note :</p> <ul style="list-style-type: none"> Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students 		

MSBTE Approval Dt. 21/11/2024

Semester - 4, K Scheme

WORKING DRAWING**Course Code : 324003**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fourth
Course Title : WORKING DRAWING
Course Code : 324003

I. RATIONALE

The aim of this course is to introduce working drawings and their significance in the construction of buildings, furniture designs & interior design and decoration. Students will learn the essential components of working drawings like technical indications, annotation systems, styles and drawing standards. Student will be able to develop and convert the intent of an architectural design, interior space design into a set of drawings and documents that are technically correct and complete for work execution on site.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Prepare the working drawings & documents so as to explain properly the architectural, interior space design decisions to the executing agencies.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify different components of working drawings, information denoting styles in graphical & annotative manner.
- CO2 - Apply the design & technical information on plans & layouts to be sent on site for execution.
- CO3 - Apply the design & technical information on sections & elevations to be sent on site for execution.
- CO4 - Use the knowledge & technical information about building services and incorporate it in the service layout drawings for execution.
- CO5 - Explain the various working details on execution drawings

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SL	LH	NLH		Paper Duration	Theory			Based on LL & TL				Based on SL		
				CL	TL	LL						FA-TH	SA-TH	Total	Practical		SLA				
															FA-PR	SA-PR	Max	Min	Max	Min	
324003	WORKING DRAWING	WDR	DSC	2	-	2	2	6	3	-	-	-	-	-	50	20	50@	20	25	10	125

WORKING DRAWING**Course Code : 324003****Total IKS Hrs for Sem. : 2 Hrs**

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Explain the purpose of Working drawings, their importance in execution of any design. Get acquainted with different stages and components of working drawing set to be issued to site.</p> <p>TLO 1.2 Collect and study any actual working drawing set of any live / already built project from any site or practicing architect.</p>	<p>Unit - I Introduction to Working Drawing</p> <p>1.1 Components of working drawing set, drawing names, their specific purpose on site, the information given in the drawings, universal indications and annotations to be used in working drawings.</p> <p>1.2 Working drawing sets copy issued on site by architects showing different styles and methods used to convey the architectural information.</p>	<p>Lecture Using Chalk-Board/ White board, Presentations & class discussions, Display of actual GFC drawings, Collaborative learning, Drawing collection from live site / Practicing Architect and discussion on it in the class</p>
2	<p>TLO 2.1 Draw building envelope using diagonal and coordinate Method</p> <p>TLO 2.2 Identify vertical structural members of the structure and their exact positioning in the drawing.</p> <p>TLO 2.3 Draw the floor plans showing important building elements & annotating the spaces.</p> <p>TLO 2.4 Locate existing structural elements on site & proposed changes in any of them as per design approved by client.</p> <p>TLO 2.5 Prepare interior design layouts (Plans) of the project with proper indications and annotations.</p>	<p>Unit - II Working Drawings (Plans & Layouts)</p> <p>2.1 Building outline (setting out plan) properly annotated with respect to Site Boundary</p> <p>2.2 Center line plan of the project with reference to the setting out plan</p> <p>2.3 Floor Plan Drawing with important building elements like walls, columns, doors, windows, projections, weather protections, claddings.</p> <p>2.4 Existing floor plan & proposed changes in any of them as per design.</p> <p>2.5 Interior Furniture layouts, False ceiling layout & electrical layout.</p>	<p>White board / Chalk-board explanations, Video Demonstrations, Studio discussions,</p>

WORKING DRAWING**Course Code : 324003**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	<p>TLO 3.1 Explain the purpose and significance of sectional drawings & the information given through them on site.</p> <p>TLO 3.2 Incorporate the different information through the drawings of whole and part detail sections of the given project.</p> <p>TLO 3.3 Explain the purpose & information denoted in the building elevations.</p> <p>TLO 3.4 Prepare the schedule of openings and finishes.</p>	<p>Unit - III Working Drawings (Sections & Elevations)</p> <p>3.1 Sections through important areas of the project with required information and annotations.</p> <p>3.2 Full sections and Part detail sections of the building showing civil elements, finishes and annotations.</p> <p>3.3 All sides building elevations with proper annotations, levels & finishes indications.</p> <p>3.4 Door & windows schedule with sizes, levels, types, finishes etc.</p>	Lecture Using Chalk-Board, Presentations, Collaborative learning
4	<p>TLO 4.1 Explain water supply and sewer systems at Site Level & Building Level.</p> <p>TLO 4.2 Prepare the drawings of toilet details showing water supply & drainage systems, sanitary fixtures details etc.</p> <p>TLO 4.3 Explain electrical & lighting systems at Site Level & Building Level</p> <p>TLO 4.4 Explain HVAC systems at Site Level & Building Level</p> <p>TLO 4.5 Explain Fire fighting systems at Site Level & Building Level</p>	<p>Unit - IV Building Services Details</p> <p>4.1 Water supply and Drainage layouts at Site Level & Building Level.</p> <p>4.2 Water supply and drainage layouts of toilets and sanitary fixing details.</p> <p>4.3 Electrical & Lighting layouts at Site Level & Building Level.</p> <p>4.4 HVAC Layouts at Site Level & Building Level</p> <p>4.5 Fire fighting Layouts at Site Level & Building Level</p>	Video Demonstrations, Case Study, Lecture Using Chalk-Board, Collaborative learning
5	<p>TLO 5.1 Explain the standard details of various architectural components like window framings, kitchen platforms, staircase finishes, railings and other fixtures.</p> <p>TLO 5.2 Explore various flooring materials (such as natural stones, tiles, hardwood, vinyl, etc.), their technical specifications & characteristics like durability, slip resistance, and maintenance.</p> <p>TLO 5.3 Explain how to represent wall finishes, dado (lower wall cladding), and decorative elements.</p> <p>TLO 5.4 Explain the importance of sectional/elevational details & external/Internal fenestration details.</p>	<p>Unit - V Building Component Details</p> <p>5.1 Drawing set of details of various architectural components like window framings, kitchen platforms, staircase finishes, railings and other fixtures.</p> <p>5.2 Flooring layouts showing different laying patterns (e.g., herringbone, diagonal, straight) for aesthetic and functional purposes.</p> <p>5.3 Wall finishes drawings and sectional details showing different finishes, dado, cladding, and decorative elements.</p> <p>5.4 external & Internal fenestration sections & sectional & elevational details at bigger scales.</p> <p>5.5 Elevation drawings mentioning finishes, color codes etc.</p>	Classroom Lecture, Presentations, Collaborative learning

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
--	-------	--	----------------	--------------

WORKING DRAWING**Course Code : 324003**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Analyze the working drawings collected from the industry and reproduce showing different elements.	1	Analysis of different working drawings collected from the Industry.	2	CO1
LLO 2.1 Prepare the Site plan with building outline of the given project with proper origin point, all required measurements & annotations.	2	Site plan preparation of a given project.	2	CO2
LLO 3.1 Prepare the Center line plan of the given project showing all vertical structural members, all required measurements & annotations.	3	*Center line plan preparation of a given project.	2	CO2
LLO 4.1 Prepare the working floor plan of the given project showing all civil components, all required measurements & annotations.	4	*Working floor plans preparation of the given project.	2	CO2
LLO 5.1 Prepare the furniture layout plan of the given project showing all proposed furniture units, all required measurements & annotations.	5	Furniture layout plans preparation of the given project.	2	CO2
LLO 6.1 Prepare the false ceiling layout plan of the given project showing all proposed false ceilings, all required measurements, annotations & construction details.	6	False ceiling layout plans preparation of the given project.	2	CO2
LLO 7.1 Prepare the electrical layout plan of the given project showing all electrical fitting components, all required measurements, annotations & fixing details.	7	*Electrical layout plans preparation of the given project.	2	CO2
LLO 8.1 Prepare minimum 2 cross sections of the given project, showing important details, all required measurements, annotations.	8	*Cross sections preparation of the given project.	2	CO3
LLO 9.1 Prepare Elevations of the given project, showing important levels, all required measurements and annotations.	9	*Elevations of the given project.	2	CO3
LLO 10.1 Prepare water supply and Drainage layouts at site Level & building Level, all required measurements, annotations & details.	10	Water supply and drainage layout preparation of the given project.	2	CO4
LLO 11.1 Prepare Electrical & lighting layouts at site Level & building Level, all required measurements, annotations & details.	11	Electrical & lighting layout preparation of the given project.	2	CO4
LLO 12.1 Prepare flooring layouts showing start tile, all required measurements, annotations & details.	12	Flooring layout preparation of the given project.	2	CO5
LLO 13.1 Prepare Toilet details with all sanitary fittings, fixtures, tiling layouts, dado, all required measurements, annotations & details.	13	*Toilet detail drawings preparation of the given project.	2	CO5
LLO 14.1 Prepare Kitchen platform details with all materials, fixing details, dado, all required measurements, annotations & details.	14	Kitchen platform details preparation of the given project.	2	CO5
LLO 15.1 Prepare 'wardrobe' working details with all materials, hardware, fixing details, finishes, all required measurements & annotations.	15	Furniture unit 'Wardrobe' working details preparation of the given project.	2	CO5

WORKING DRAWING**Course Code : 324003**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 16.1 Prepare 'TV unit with paneling' working details with all materials, hardware, fixing details, finishes, all required measurements & annotations.	16	Furniture unit 'TV unit with paneling' working details preparation of the given project.	2	CO5
LLO 17.1 Prepare 'Bed with side tables' working details with all materials, hardware, fixing details, finishes, all required measurements & annotations.	17	Furniture unit 'Bed with side tables' working details preparation of the given project.	2	CO5
LLO 18.1 Furniture unit 'Sofa' working details preparation of the given project.	18	Prepare 'Sofa' working details with all materials, hardware, fixing details, finishes, all required measurements & annotations.	2	CO5

Note : Out of above suggestive LLOs -

- '*' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

- Study of Fire fighting systems: Visiting site to understand services & collecting a service drawing set (Fire fighting) of existing / on going project prepared by industry expert / practicing professional. Understanding the technical and practical aspects of those drawings and creating a report including photos, sketches, drawings and information brochures.
- Study of HVAC systems: Visiting site to understand services & collecting a service drawing set (HVAC) of existing / on going project prepared by industry expert / practicing professional. Understanding the technical and practical aspects of those drawings and creating a report including photos, sketches, drawings, information brochures.
- Case study: Case study of an existing project to understand working details, materials, finishes and fixing techniques.
- Documentation of Building facade details: Visiting, understanding & analyzing an existing building facade with materials, finishes, characteristics, fixing details etc. Preparation of report with detail sketches, site photos and relevant technical information.

Micro project

- Market survey: Visiting various vendors, suppliers and shops for study of various building materials to understand their technical specifications and requirements.
- Market survey 2: Visiting various vendors, suppliers and shops for study of various Interior finishing materials to understand their technical specifications and requirements.

WORKING DRAWING**Course Code : 324003****Note :**

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	LCD projector & white screen for projection, CPU connected to Projector system/ smart board. 2. A1 drafting board and all drafting tools. 3. Computer loaded with required drafting & modelling softwares eg. Auto CAD, Sketchup. 4. A1 plotter or printer facility for student.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction to Working Drawing	CO1	2	0	0	0	0
2	II	Working Drawings (Plans & Layouts)	CO2	8	0	0	0	0
3	III	Working Drawings (Sections & Elevations)	CO3	8	0	0	0	0
4	IV	Building Services Details	CO4	6	0	0	0	0
5	V	Building Component Details	CO5	6	0	0	0	0
Grand Total				30	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Continuous assessment based on Drawing assignment submissions, Site visit reports & Teamwork presentations done throughout the semester..

Summative Assessment (Assessment of Learning)

- Internal Viva on the Drawing set Portfolio prepared during the semester.

XI. SUGGESTED COS - POS MATRIX FORM

WORKING DRAWING**Course Code : 324003**

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	1	-	-	2	2			
CO2	3	3	1	1	-	2	2			
CO3	3	3	1	1	-	2	2			
CO4	3	3	1	1	-	2	2			
CO5	3	3	1	1	-	2	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Keith Styles	Working Drawings Handbook	978-0851397122
2	Ralph W. Liebing	Architecture Working Drawings	John Wiley & Sons 978-0471348764
3	Fred Stitt	Working Drawing Manual	978-0070615540

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.behance.net/search/projects/working%20drawings	Drawings for execution, estimating costing, shop drawings for specialized jobs, information related to sizes of structural members, material representation drawing discipline for coordination sets of drawing .
2	https://quifstudio.com/2022/11/14/episode-2-site-plan-working-drawings/	Architecture working drawing , Standard symbol and annotations in working drawing,
3	https://design40.com/blog/2022/08/10/interior-design-drawing/	Working drawings are also called as GFC - Good For Construction drawings as they are basically approval drawings which are break down in details for execution.

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 21/11/2024

Semester - 4, K Scheme

ESTIMATING & COSTING**Course Code : 324301**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fourth
Course Title : ESTIMATING & COSTING
Course Code : 324301

I. RATIONALE

This course aims to equip the students to apply the knowledge and skills for calculating the quantities, cost of materials, labour and tools required for Architectural / Interior design project. It is often required to use local material for which the rates are varying in greater extent across the country. The rate analysis justifies the rates to be finalized for various items of works based on local market survey for budget provision. Additionally, it incorporates the use of various software tools for precise and efficient quantity determination.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Calculate the Quantities and Estimated Project Cost for an Architecture / Interior Design Project.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Apply the principles of estimating & costing for different specifications relevant to the Architectural / Interior Design Project.
- CO2 - Calculate quantities and cost for items of works relevant to the Architectural / Interior Design Project.
- CO3 - Calculate rates for an item of work using the rate analysis process relevant to the Architectural / Interior Design Project.
- CO4 - Select appropriate type of tenders, contracts relevant to the Architectural / Interior Design Project.
- CO5 - Use relevant software for estimating the quantities and cost of items of works relevant to the Architectural / Interior Design Project.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SL	LH	NL			Theory			Based on LL & TL				Based on SL			
				CL	TL	LL						FA-TH	SA-TH	Total	Practical		SLA					
															FA-PR	SA-PR	Max	Min	Max	Min		
324301	ESTIMATING & COSTING	EST	VEC	3	1	2	-	6	3	03	30	70	100	40	25	10	-	-	-	-	125	

ESTIMATING & COSTING**Course Code : 324301****Total IKS Hrs for Sem. : 0 Hrs**

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain principles of estimation and mode of measurement. TLO 1.2 Classify the estimate as relevant to the Architectural / Interior design project. TLO 1.3 Select the rates provided in SSR for appropriate items of work as relevant to the Architectural / Interior design project. TLO 1.4 Interpret the given drawing / information to prepare estimate.	Unit - I Estimating, Costing and Specification 1.1 Introduction to estimation, costing and mode of measurement specific to an Architectural / Interior design project. 1.2 Types of estimate, Use guidelines of IS 1200 for estimation. 1.3 Introduction to State Scheduled of Rates (SSR) for the cost estimation. 1.4 Drawing /information required for preparation of estimates.	Demonstration, Video Demonstrations, Presentations, Lecture Using Chalk-Board
2	TLO 2.1 Explain the items of work as they relate to the architectural / interior design project. TLO 2.2 Describe the measurement sheet. TLO 2.3 Explain various methods for calculations of quantities for an item of work. TLO 2.4 Calculate the quantities for the Civil / Interior work as they relate to the Architectural / Interior design project.	Unit - II Estimation of Civil / Interior Work 2.1 Items of works specific to an Architectural / Interior design project. 2.2 Introduction to measurement sheet. 2.3 Methods for calculations of quantities. 2.4 Estimation of quantities for the Civil / Interior work.	Demonstration, Video Demonstrations, Presentations, Lecture Using Chalk-Board
3	TLO 3.1 Explain the rate analysis. TLO 3.2 Apply the process of rate analysis for an item of work. TLO 3.3 Describe the types of work, task work and wages for different types of labour. TLO 3.4 Calculate rates for an item of work as they relate to the Architectural / Interior design project.	Unit - III Rate Analysis 3.1 Terminologies, purpose and factors affecting analysis of rates. 3.2 Procedure of rate analysis. 3.3 Types of labours, task work, wages for labourers as per SSR. 3.4 Rate analysis for important items of work specific to an Architectural / Interior Design Project.	Demonstration, Video Demonstrations, Presentations, Lecture Using Chalk-Board

ESTIMATING & COSTING**Course Code : 324301**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	TLO 4.1 Explain the process of tendering. TLO 4.2 Classify the tenders TLO 4.3 Prepare the tender documents TLO 4.4 Describe the process of E-tendering TLO 4.5 Describe the types of contracts	Unit - IV Tenders and Contracts 4.1 Terminologies, purpose and process of tendering 4.2 Types of tenders 4.3 Contents of tender document 4.4 E-tendering process 4.5 Types of contracts	Demonstration, Video Demonstrations, Lecture Using Chalk-Board, Presentations
5	TLO 5.1 Use the relevant software for preparing the detailed estimate for a given work. TLO 5.2 Introduction to BIM (Building Information Modeling) for quantity, estimation and costing for given project.	Unit - V Estimation using E-Tools 5.1 Use the computer / softwares / programmers for detailed estimate preparation of works. 5.2 Use the softwares for detailed estimate preparation of works.	Demonstration, Video Demonstrations, Presentations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare the check list of items to be executed with units for detailed estimate of the given structure from the given drawing.	1	Preparation of check list of items to be executed	2	CO1
LLO 2.1 Determine a report on market rates for given material, labour wages, hire charges of tools & equipment required to construct the given structure.	2	Preparation of report on market Survey	2	CO1
LLO 3.1 Prepare the detailed specification for the given items using DSR (for any ten items)	3	Elaborate specification for the given items*	2	CO1
LLO 4.1 Enlist the information required / types of drawings to be prepared for the process of estimating and costing.	4	Analyze the drawings to be prepared / information to be collected for the estimation*	4	CO1
LLO 5.1 Enlist items of work required for an Architectural / Interior design project.	5	Analyze items of works.	4	CO2
LLO 6.1 Prepare a measurement sheet for an Architectural / Interior design project.	6	Outline measurement sheet*	2	CO2
LLO 7.1 Prepare a report on methods of estimation for an Architectural / Interior design project.	7	Preparation of report on methods of estimation.	2	CO2
LLO 8.1 Prepare detailed estimates for an Architectural / Interior design project.	8	Calculation of quantities of items of work*	4	CO2
LLO 9.1 Perform rate analysis for a given architectural / interior design project.	9	Describes the analysis of rates*	4	CO3
LLO 10.1 Prepare a report on types of labour required for an Architectural / Interior design project.	10	Report on types of labour required for a given project.	2	CO3
LLO 11.1 Determine the labourers required for an Architectural / Interior design project.	11	Task work of different types of labour	2	CO3
LLO 12.1 Prepare a report on market rates for different types of labour required for an Architectural / Interior design project	12	Report on market rate for different types of labour required for a given project	2	CO3
LLO 13.1 Analyze rates of items of work for an Architectural / Interior design project.	13	Calculation of rates of important items of work for a given project*	4	CO3
LLO 14.1 Classify the different type of tender for an Architectural / Interior design project.	14	Types of tender*	2	CO4
LLO 15.1 Classify the different type of contract for an Architectural / Interior design project.	15	Types of contract.	2	CO4

ESTIMATING & COSTING**Course Code : 324301**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 16.1 Identify different E-tools of Estimation required for an Architectural / Interior design project.	16	E-tools of Estimation	2	CO5
LLO 17.1 Operate and practice E-tool software of estimation for given Architectural / Interior design project.	17	Operation of E-tool of Estimation.	4	CO5
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> *' Marked Practicals (LLOs) Are mandatory. Minimum 80% of above list of lab experiment are to be performed. Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

- Assignment on rate analysis.

Micro project

- Prepare bill of quantities using software.
- Prepare detailed Estimate of an Architectural /Interior work.
- Prepare rate analysis of an Architectural /Interior work.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	MS Excel, PRISM, Rebarman – Reinforcement Bar Management Software, BIM tool etc.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Estimating, Costing and Specification	CO1	8	2	4	8	14
2	II	Estimation of Civil / Interior Work	CO2	12	4	4	10	18
3	III	Rate Analysis	CO3	12	2	6	10	18
4	IV	Tenders and Contracts	CO4	9	2	6	6	14

ESTIMATING & COSTING**Course Code : 324301**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
5	V	Estimation using E-Tools	CO5	4	2	2	2	6
Grand Total				45	12	22	36	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Formative assessment (assessment for learning) assignments on each units, Self Learning (Assignment)

Summative Assessment (Assessment of Learning)

- Nil

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	-	-	-	-	3			
CO2	3	3	3	3	3	3	3			
CO3	3	3	3	3	3	3	3			
CO4	3	3	1	3	3	3	2			
CO5	3	2	2	3	3	3	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Datta B. N.	Estimating and Costing	UBS Publishers Distributors Pvt. Ltd. New Delhi ISBN:978817476725
2	Peurifoy, Rebert I., Oberlender, Garold	Estimating and Construction Cost (Fifth Edition)	Mcgraw Hill Educaion, New Delhi. ISBN-13:9780073398013
3	Birdie G. S.	Estimating and Costing	Dhanpat Rai Publishing Company Ltd. New Delhi ISBN:9789384378134
4	Patil B. S.	Civil Engineering Contracts and Estimates	Orient Longman Mumbai ISBN: 97881737715594
5	Chakraborti M.	Estimating and Costing, Specification and Valuation in Civil Engineering	Monojit Chakraborti, Kolkata ISBN:9788185304366

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	http://www.ensoftindia.com/	Required Software's are available
2	https://newtonindia.com/	Providing Innovative Software Solutions
3	https://mahatenders.gov.in , www.mahapwd.com	Tender Related Information

ESTIMATING & COSTING**Course Code : 324301**

Sr.No	Link / Portal	Description
Note : <ul style="list-style-type: none">Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students		

MSBTE Approval Dt. 21/11/2024**Semester - 4, K Scheme**

BUILDING CONSTRUCTION & TECHNOLOGY**Course Code : 324302**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fourth
Course Title : BUILDING CONSTRUCTION & TECHNOLOGY
Course Code : 324302

I. RATIONALE

In the Building Construction & Technology course, students will acquire understanding of material properties and behaviors, along with their testing methods. They will explore various construction techniques, applying both time-honored and innovative scientific methods to diverse building types. This knowledge base will pave way for mastering advanced technologies and construction methods, enabling them to skillfully manage field construction, maintenance, and repair work. With these skills, students will be equipped to oversee construction projects, ensuring they meet high-quality standards. The Advanced Construction Technology segment further enhances their proficiency, focusing on the operation and effectiveness of cutting-edge construction equipment, fostering their ability to select the appropriate tools and methods for efficient construction processes.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply modern construction techniques and practices for a given Building construction project.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify different components of retaining wall, types of foundation, different waterproofing treatments and finishes for single basement structure.
- CO2 - Explain building assembly with Stanchion, Beams, Metal Deck Flooring, various structural steel members and connections for multi-Storey buildings.
- CO3 - Identify components of different types of steel trusses for a given building structure.
- CO4 - Explain different types of wall cladding and glazing for a given building structure.
- CO5 - Use different types of plants, advanced tools and machineries in building construction Industry.
- CO6 - Apply different steps involved in maintenance and demolition work of a building.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SL	LH	NLH		Paper Duration	Theory			Based on LL & TL				Based on SL		
				CL	TL	LL						Total	Practical		SLA						
													FA-TH	SA-TH	FA-PR	SA-PR	Max	Min	Max	Min	
324302	BUILDING CONSTRUCTION & TECHNOLOGY	BTE	DSC	2	-	4	-	6	3	4	30	70	100	40	25	10	25@	10	-	-	150

BUILDING CONSTRUCTION & TECHNOLOGY**Course Code : 324302****Total IKS Hrs for Sem. : 2 Hrs**

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Evaluate the engineering principles that govern the stability and durability of single basements and retaining walls.</p> <p>TLO 1.2 Apply design knowledge to create effective single basement spaces and retaining walls, considering factors like soil pressure, water table, and load distribution.</p> <p>TLO 1.3 Identify and choose appropriate materials for construction that ensure longevity and resistance to environmental stresses.</p> <p>TLO 1.4 Master the construction methods specific to basements and retaining walls, including waterproofing, drainage systems, and reinforcement strategies.</p> <p>TLO 1.5 Explain the safety protocols and maintenance requirements to preserve the structural health of basements and retaining walls over time.</p>	<p>Unit - I Single basement structure</p> <p>1.1 Engineering principles that ensure the stability and durability of underground structures. Study real-world case studies to understand the challenges.</p> <p>1.2 Single basements and retaining walls by considering soil mechanics, hydrostatic pressure, and load distribution. Use simulation software to model different scenarios and their impact on design efficacy.</p> <p>1.3 Properties of construction materials suitable for subterranean use and their long-term performance. Compare traditional and modern materials through hands-on laboratory testing.</p> <p>1.4 Latest construction methods for basements and retaining walls. Implement waterproofing, install drainage systems, and apply reinforcement strategies in a controlled environment.</p> <p>1.5 Regular maintenance and the safety protocols necessary to ensure the longevity of structures. Participate in workshops focused on inspection techniques and preventive measures for basements and retaining walls.</p>	Case Study, Presentations

BUILDING CONSTRUCTION & TECHNOLOGY**Course Code : 324302**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
2	<p>TLO 2.1 Explain the design criteria, including the Allowable Stress Design (ASD) and Load and Resistance Factor Design (LRFD) philosophy for structural steel.</p> <p>TLO 2.2 Explain the structural properties of steel and its designation according to Indian Standards.</p> <p>TLO 2.3 Design various structural steel members and connections for multi-Storey buildings</p>	<p>Unit - II Steel Structures</p> <p>2.1 Tension members, compression members (columns), built-up sections, beams (flexural members), and plate girders.</p> <p>2.2 Various types of bolted and welded connections for structural steel components.</p> <p>2.3 single and double angle section struts and I-section compression members.</p> <p>2.4 Types of trusses, their components, and usability.</p> <p>2.5 Connection between purlins and roof covering in truss systems.</p> <p>2.6 Principles, procedures, and codal requirements to analyze and design tension members, compression members, bases, beams, and connections.</p> <p>2.7 Latest developments in steel structures, including considerations for sustainability and environmental impact.</p>	<p>Video Demonstrations, Case Study, Presentations</p>
3	<p>TLO 3.1 Explain the purpose of building cladding and its role in protecting structures from external elements.</p> <p>TLO 3.2 Apply design principles to select appropriate cladding materials based on factors like aesthetics, durability, insulation, and maintenance.</p> <p>TLO 3.3 Explain proper installation techniques for cladding materials, including weatherproofing, fastening, and joint detailing.</p>	<p>Unit - III Building Cladding and Glazing</p> <p>3.1 Types of cladding materials (such as metal, stone, glass, or composite panels) and their properties. Analyze the advantages and disadvantages of various cladding systems.</p> <p>3.2 Impact of cladding on energy efficiency, thermal performance, and overall building sustainability. Evaluate the compatibility of cladding systems with the architectural design and structural requirements.</p> <p>3.3 Maintenance requirements for cladding and glazing systems to ensure long-term functionality and aesthetics. Address common challenges related to water infiltration, condensation, and material degradation.</p> <p>3.4 Stick systems involved in assembling the curtain wall frame (mullions) and glass or opaque panels piece by piece on-site.</p> <p>3.5 Importance of proper installation techniques for achieving a weather-tight and structurally sound curtain wall. advantages and disadvantages of both interior and exterior glazed curtain wall systems.</p> <p>3.6 Structural behaviour of curtain wall.</p> <p>3.7 Role of curtain walls in shaping building aesthetics, energy efficiency, and occupant comfort.</p>	<p>Site/Industry Visit, Case Study, Video Demonstrations</p>

BUILDING CONSTRUCTION & TECHNOLOGY**Course Code : 324302**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	<p>TLO 4.1 State all advanced machinery used in construction industry.</p> <p>TLO 4.2 State all advanced plants and equipments used in construction.</p> <p>TLO 4.3 Differentiate between the Earth moving and hauling equipments</p> <p>TLO 4.4 Explain with sketch all advanced plants and equipments used in construction.</p>	<p>Unit - IV Advanced Machinery, Plants and Equipments.</p> <p>4.1 Earth moving machineries, Handling, Hoisting, Conveying, Pumping, Compacting, Pile driving, Drilling equipments, Plants for Grouting, Guniting and Hot Mix Plant, Concrete Mix Plant, Ready Mix Plant, etc.</p> <p>4.2 List factors affecting the selection of equipments depending on the various parameters.</p> <p>4.3 Equipments for excavation like Power Shovel, drag line, Calm Shell, Scoop, Trenching equipments, Wheel mounted belt loaders. Equipments for Earth moving equipments like Tractors, Boulders, Graders, Scrapers, Rippers, etc</p> <p>4.4 Conveying equipments like Belt conveyors, Buckets, Chutes</p> <p>4.5 Pumping equipments like Water pumps and concrete pumps.</p> <p>4.6 Vibrators for concrete consolidation like Internal, Surface, Platform and form vibrators.</p>	Case Study, Site/Industry Visit
5	<p>TLO 5.1 Choose the flooring material for the given type of building with justification.</p> <p>TLO 5.2 Explain the procedure for laying and construction of given type of door.</p> <p>TLO 5.3 Describe the procedure of Plastering and pointing for Use given type of construction.</p> <p>TLO 5.4 Select the relevant type of paint material(s) to be used for the given type of building surface proofing and damp proofing or the given type of building construction.</p> <p>TLO 5.5 Describe safe practices to be used during the construction of the given type of building.</p>	<p>Unit - V Building Maintainance</p> <p>5.1 Cracks : Causes and Types of Cracks. Identification and Repair of Cracks. Grouting and Guniting.</p> <p>5.2 Settlement of Foundation: Types, Causes and Remedial measures.</p> <p>5.3 Demolition: Necessity, Method of Demolition- Hand Demolition, Machine Demolition, Controlled Blasting. Demolition Implosion, Precautions During Demolition</p> <p>5.4 Water Proofing: Necessity and importance. Material used for Water Proofing, Non conventional method of water proofing- Introduction of crystalline water proofing, cement base polymer' coatings. conventional water proofing methods-brick bat coba waterproofing, Box type water Proofing, Injection/grouting. Plinth Protection necessity and material used, Damp Proof Course.</p>	Case Study, Presentations, Site/Industry Visit

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare a drawing of a retaining wall for a single basement structure to a suitable scale indicating the details of a retaining wall for a given building structure.	1	*Preparation of drawing of a retaining wall for a basement.	4	CO1
LLO 2.1 Prepare detail drawing indicating drainage system of a basement to a suitable scale for a given building structure.	2	Preparation of drawing of a drainage system of a single basement structure.	4	CO1

BUILDING CONSTRUCTION & TECHNOLOGY**Course Code : 324302**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 3.1 Prepare a drawing of a retaining wall for a single basement structure to a suitable scale indicating the details of a retaining wall for a given building structure.	3	preparation of drawing of a retaining wall for a basement.	2	CO1
LLO 4.1 Prepare detail drawing indicating drainage system of a basement to a suitable scale for a given building structure.	4	*Preparation of drawing of a drainage system of a single basement structure.	2	CO1
LLO 5.1 Prepare a report on different waterproofing treatments and materials for a given basement structure	5	Preparation of report on a waterproofing of a basement.	4	CO1
LLO 6.1 Prepare a report on safety protocols and maintainance requirements to preserve the structural health of a basement and retaining walls over time.	6	*Preparation of report on safety protocol of a single basement structure.	4	CO1
LLO 7.1 Prepare sketches of different types of steel trusses used in building construction	7	Preparation of sketches of different types of steel trusses.	2	CO2 CO3
LLO 8.1 Prepare a drawing of North light truss indicating its components and joinery details.	8	Preparation of a drawing of a North Light Truss.	2	CO2 CO3
LLO 9.1 Prepare sketch of multistorey steel frame building assembly with stanchion, beams and metal deck	9	Preparation of sketches for a multistorey steel building.	2	CO2 CO3
LLO 10.1 Prepare a report on different wall cladding materials available in market for a given building structure.	10	Preparation of report on wall cladding material of a building.	2	CO4
LLO 11.1 Prepare a report on different wall cladding adhesives available in market	11	Preparation of report on wall cladding adhesives of a building	2	CO4
LLO 12.1 Prepare a report on different wall curtain material available in market for a given building structure.	12	Preparation of report of structural glazing of a building	2	CO4
LLO 13.1 Prepare a report on advanced tools used in building construction industry.	13	Preparation of report on advanced tools in building construction.	2	CO5
LLO 14.1 Prepare a report on advanced plants and machineries used in building construction industry.	14	Preparation of report on advanced plants and machineries in building construction.	2	CO5
LLO 15.1 Prepare a report on water pumps and concrete pumps used in building construction industry.	15	Preparation of reports of water pumps used in construction.	2	CO5
LLO 16.1 Prepare a report on different steps involved in maintenance and demolition of a given building structure.	16	Preparation of report on steps involved in a maintenance and demolition work of a given building structure.	2	CO6
LLO 17.1 Prepare the sketches of different tools and equipments used in demolition work for a given building structure.	17	Preparation of report on demolition of a given building structure.	2	CO6
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> • ** Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

BUILDING CONSTRUCTION & TECHNOLOGY**Course Code : 324302****Assignment**

- Site visit to building typologies included in curriculum and preparation of report along with presentation.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Measuring Tape, Drawing Board, Drafting Tools, Microsoft Office,	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Single basement structure	CO1	6	3	6	6	15
2	II	Steel Structures	CO2,CO3	8	4	5	6	15
3	III	Building Cladding and Glazing	CO4	4	4	4	6	14
4	IV	Advanced Machinery, Plants and Equipments.	CO5	6	4	3	6	13
5	V	Building Maintainance	CO6	6	3	4	6	13
Grand Total				30	18	22	30	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Term work (Lab Manual and drawing sheet), Question and Answers in class room as well as at the time of Practical. Note: Each practical will be assessed considering 60% weightage to process related and 40 % weightage to product related.

Summative Assessment (Assessment of Learning)

- Laboratory Performance, Unit Tests , Midterm Exam, Self-learning, Term Work, Seminar/Presentations.

XI. SUGGESTED COS - POS MATRIX FORM

BUILDING CONSTRUCTION & TECHNOLOGY**Course Code : 324302**

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	1	3	2	2	2	3	3			
CO2	2	2	2	2	2	2	3			
CO3	2	2	2	2	2	2	3			
CO4	2	2	3	2	3	2	2			
CO5	2	1	2	3	1	3	2			
CO6	2	3	2	2	2	2	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	S.P. Arora and Bindra	Building Construction	Dhanpat Rai Publication, Delhi Edition 2013.ISBN: 9788189928803
2	Francis D.K. Ching.	Building construction illustrated	Wiley India,USA, 2014,ISBN: 978-1- 118- 45834-1
3	S.C.Rangawala	Building Construction	Chariotar Publication,Dist-Anand ISBN-13 : ? 978-9385039041
4	B. C.Punmia and A.K Jain	Building Construction	Frewall Media, 2005 ISBN 9788170080534
5	S.S.Bhavikatti	Building Construction	Vikas Publication House Pvt. Ltd., New Delhi (ISBN: 978-93259-6079-4 1
6	Sandip Mantri	A to Z Building Construction	Satya Prakashan; New Delhi (2015) ISBN-13: 978-8176849692

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://youtu.be/J6qNbQ2h4Xk	MCQs of Building Construction
2	https://www.buildofy.com/home-design	Independent media firm that broadcast architecture films and eBooks of amazing houses in India.
3	https://www.gujaratguardianglass.com/in/en/our-glass/modiguard	MODIGUARD® brings to your innovative interior glass solutions that add character to your design project with enamouring reflections and flawless colour neutrality.
4	https://www.saint-gobain.co.in	The worldwide leader for Habitat, mainly for new residential construction and renovation

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

DISASTER MANAGEMENT**Course Code : 324303**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fourth
Course Title : DISASTER MANAGEMENT
Course Code : 324303

I. RATIONALE

Disaster management plays an integral role in keeping communities safe. It involves coordinating resources, such as risk management control systems, and responsibilities, such as following best practice policies, needed to prevent, prepare for, respond to and recover from emergencies. This course aims to make students aware of various types of disasters, mitigation, rescue, and relief operations.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply the principles of disaster management for disaster risk reduction in case of any natural or manmade disaster.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - EXPLAIN VARIOUS TYPES OF DISASTERS.
- CO2 - APPLY THE PRINCIPLES OF DISASTER RISK REDUCTION (DRR).
- CO3 - EXPLAIN THE HIERARCHY OF DISASTER MITIGATION AND MANAGEMENT.
- CO4 - EXPLAIN DISASTER RISK MANAGEMENT IN INDIA .
- CO5 - PREPARE A CASE STUDY REPORT ON DISASTER RELATED TOPICS.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			FA-TH			SA-TH	Total	Practical		SLA						
														FA-PR	SA-PR	Max	Min	Max	Min			
324303	DISASTER MANAGEMENT	ELC	DSE	3	-	2	1	6	3	03	30	70	100	40	25	10	25@	10	25	10	175	

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

MSBTE Approval Dt. 21/11/2024

Semester - 4, K Scheme

DISASTER MANAGEMENT**Course Code : 324303**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain Natural Disaster. TLO 1.2 Describe manmade Disaster.	Unit - I TYPES OF DISASTERS 1.1 Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc. – Classification, Causes, Impacts including social, economical, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability – Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Do's and Don'ts during various types of Disasters. 1.2 Definition: Types of Manmade disasters – Fire, Industry, Terrorist, Crowd hazards, Dos and Don'ts during various types of Disasters.	Video Demonstrations, Presentations, Collaborative learning, Case Study, Lecture Using Chalk-Board
2	TLO 2.1 Describe Disaster Management cycle – Phases, Culture of safety, prevention, Mitigation. TLO 2.2 Various stake holder or preparedness in disaster.	Unit - II DISASTER RISK REDUCTION (DRR) 2.1 Various stages of disaster inter related to each other. 2.2 Preparation for disaster reduction before / during / after.	Case Study, Presentations, Collaborative learning, Video Demonstrations
3	TLO 3.1 Describe Roles and responsibilities of Urban and Local Bodies of state and national levels. TLO 3.2 Describe Community level and various NGO'S contribution. TLO 3.3 Explain Early Warning System – Advisories from Appropriate Agencies.	Unit - III HIERARCHY OF DISASTER MITIGATION AND MANAGEMENT 3.1 Awareness about the various authorities responsible for mitigation in disaster. 3.2 Awareness about the various Community level and various NGO'S contribution in disaster. 3.3 Awareness about Early Warning System – stake-holders- Institutional Processes and Advisories from Appropriate Agencies.	Presentations, Video Demonstrations, Collaborative learning, Lecture Using Chalk-Board
4	TLO 4.1 Describe 'Bhuj' (Gujrat, India) earthquake 2001- highlights and case study. TLO 4.2 Explain Landslides in Uttarakhand (India) 16 June 2013. TLO 4.3 Explain Terrorist attack Mumbai 26th November 2008.	Unit - IV DISASTER RISK MANAGEMENT IN INDIA 4.1 Preparedness (before during and after) for disaster risk management 4.2 Collection of Data base of releif and rescue. 4.3 Policy for rehabilitation by various authorities.	Video Demonstrations, Case Study, Presentations, Collaborative learning

DISASTER MANAGEMENT**Course Code : 324303**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 Explain the rehabilitation work done during cyclone in Odissa. TLO 5.2 Describe the rehabilitation work done during earthquake in Gujrat.	Unit - V APPLICATIONS AND FIELD WORK /CASE STUDIES 5.1 Interaction with Beneficiaries for effective rehabilitation. 5.2 Roles and responsibilities of authorities during disaster.	Video Demonstrations, Presentations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare a report on Natural Disaster. LLO 1.2 Prepare a report Manmade Disaster.	1	*Different Types of Natural and Manmade Disaster.	10	CO1 CO2
LLO 2.1 Tutorial based on various stages inter related to each other. 3R-(Relief, Rescue, Rehabilitation). LLO 2.2 Tutorial based on Learning to be prepared before / during / post Disaster.	2	*Tutorial based on Disaster Risk Reduction (DRR).	15	CO1 CO2
LLO 3.1 Prepare and present a report on various authorities responsible for mitigation in disaster. LLO 3.2 Prepare and present a report on awareness about the various community level and various NGO's contribution in disaster. LLO 3.3 Prepare and present a report on awareness about early warning system, stake holders, Institutional processes and advisories from appropriate agencies.	3	Report writing and presentation.	15	CO1 CO2 CO3
LLO 4.1 Prepare and present a report and a case study on disaster risk management in India case example.	4	*Presentation of case study report.	15	CO1
LLO 5.1 Prepare and present a report on applications and field work/case studies (NDRF).	5	Presentation of case study.	15	CO1
Note : Out of above suggestive LLOs -				
<ul style="list-style-type: none"> *1 Marked Practicals (LLOs) Are mandatory. Minimum 80% of above list of lab experiment are to be performed. Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- First aid treatment and rescue methods in Disaster.
- Training Workshop By NDRF

DISASTER MANAGEMENT**Course Code : 324303****Note :**

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Basic Disaster rescue equipment's with Disaster management cell in campus. (Rope, Wheel chair, helmet, Oxygen mask, Ropes, bandages, First-aid Kit.	2

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	TYPES OF DISASTERS	CO1,CO2	5	4	2	4	10
2	II	DISASTER RISK REDUCTION (DRR)	CO1,CO2,CO3	10	6	3	6	15
3	III	HIERARCHY OF DISASTER MITIGATION AND MANAGEMENT	CO1,CO2,CO3	10	6	3	6	15
4	IV	DISASTER RISK MANAGEMENT IN INDIA	CO1,CO2,CO3	10	6	3	6	15
5	V	APPLICATIONS AND FIELD WORK /CASE STUDIES	CO1,CO2	10	6	3	6	15
Grand Total				45	28	14	28	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Tutorials based on CO2 (30 MARKS)

Summative Assessment (Assessment of Learning)

- End semester examination 3 hours (70 marks)

XI. SUGGESTED COS - POS MATRIX FORM

DISASTER MANAGEMENT**Course Code : 324303**

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	2	0	0	1	0	3			
CO2	3	0	0	2	0	3	3			
CO3	3	0	0	0	2	0	3			
CO4	0	2	2	0	0	3	3			
CO5	0	2	0	0	3	3	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Singhal J.P.	Disaster Management, Laxmi Publications, 2010	ISBN-10: 9380386427 ISBN-13: 978-9380386423
2	Tushar Bhattacharya	Disaster Science and Management, McGraw Hill India Education Pvt. Ltd., 2012.	. ISBN-10: 1259007367, ISBN-13: 978-1259007361
3	IIT Kanpur	Earthquake tips IIT Kanpur	9788190613071
4	Dr. Manish Shrikhande	Earthquake Resistance Design of Structures	978-8120328921
5	Dr. Manish Shrikhande	Proceedings of 17th Symposium on Earthquake Engineering	978-9819916078

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.unccd.int/cbm/free-course-disaster-risk-reduction-and-management	Free Course in Disaster Risk Reduction and Management
2	https://iisd.in/product/diploma-in-disaster-management/	An ISO Certified Govt. Registered Skill Development Training and Vocational Education Autonomous Organization
3	https://nptel.ac.in/	Natural disasters and their phenomenon

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

HOUSING**Course Code : 324304**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fourth
Course Title : HOUSING
Course Code : 324304

I. RATIONALE

This course aims to equip the students with the knowledge and skills of Housing, covers various aspects such as urban housing challenges, housing policy, affordability issues, sustainable housing solutions and the impact of socio-economic factors on housing. This course aims to equip the students with the knowledge and skills of housing. The course covers various aspects of housing such as urban housing challenges, housing policy, affordability issues, sustainable housing solutions and the impact of socio-economic factors on housing.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Plan and execute housing work as per the needs of society.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify different characteristics of housing areas.
- CO2 - Apply principles & elements for housing design.
- CO3 - Implement relevant policies for a housing typology.
- CO4 - Plan various aspects of neighborhood.
- CO5 - Select different construction materials & techniques of housing construction.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			Total			Practical		SLA								
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min					
324304	HOUSING	ELC	DSE	3	-	2	1	6	3	03	30	70	100	40	25	10	25@	10	25	10	175	

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

HOUSING**Course Code : 324304****V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Describe various housing patterns in India. TLO 1.2 Explain Socio-cultural aspects influencing a housing design. TLO 1.3 Explain roles of housing design based on needs, environmental impact and sustainability.	Unit - I Introduction of Housing. 1.1 Introduction and overview of Housing. 1.2 Definition and scope of housing. 1.3 Significances & characteristics of housing design.	Presentations, Lecture Using Chalk-Board, Collaborative learning
2	TLO 2.1 Prepare a report on own house on various principles of housing. TLO 2.2 Explain Importance of elements such as accessibility to site, orientation of site, contours, setbacks, wind flow, drainage, soil condition, Existing flora fauna and building bye laws. TLO 2.3 Prepare one live case study report and one book case study on various typologies on individual bases.	Unit - II Principles and Elements of housing. 2.1 Principles – aspects, prospect, privacy, grouping, roominess, furniture requirement, sanitation, flexibility and practical considerations. 2.2 Importance of elements Accessibility to site, orientation of site, contours, setbacks, wind flow, drainage, soil condition & existing flora fauna. 2.3 Theory based examples on Principles and elements.	Presentations, Lecture Using Chalk-Board, Site/Industry Visit
3	TLO 3.1 Prepare list of low cost materials used in building construction TLO 3.2 Prepare a report on different important aspects of housing based on guidelines TLO 3.3 Differentiate housing schemes and categories on the basis of Income groups. TLO 3.4 Prepare a report on different settlement patterns.	Unit - III Typologies and Policies of housing. 3.1 Single-family dwellings, Multi-family housing, Affordable housing, Specialized housing (detached, semi-detached, courtyard/patio, Row house, core house & apartment house) 3.2 Definition, Importance & classification of zoning with examples 3.3 Housing schemes for LIG, MIG, EWS, Agencies for housing schemes – MHAHA, HUDCO, CIDCO, PMAY, etc 3.4 Settlement planning pattern, associated forms, typical Vedic village, towns (Dandaka, Nandyavartha etc.), typology of Shelters and civic buildings of ancient architecture in reference to following civilization: Indus Valley, Aryan / Vedic Civilization, Buddhist Architecture, Indo Aryan & Dravidian Architecture.(IKS).	Lecture Using Chalk-Board, Presentations, Collaborative learning
4	TLO 4.1 Prepare layout of ideal Neighbourhood on A3 sheet. TLO 4.2 Prepare report on different concepts of Neighbourhoods.	Unit - IV Neighbourhood. 4.1 An ideal Neighbourhood. 4.2 Modern concepts of town planning 4.3 Neighbourhood models of Clarence stein and Clarence A Perry, N.L.Engelhard & Jose Sert.	Presentations, Lecture Using Chalk-Board, Presentations

HOUSING**Course Code : 324304**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 Prepare a list of low cost materials used in affordable construction. TLO 5.2 Prepare a report on different aspects of Housing based on guidelines. TLO 5.3 Prepare a case study on urban poor housing, trends and future.	Unit - V Low cost construction materials and techniques of housing. 5.1 Introduction and Overview, History of World Affordable Housing. 5.2 Design of affordable Housing, Materials and different Techniques in construction. 5.3 Urban Poor Housing, Trends and Future.	Lecture Using Chalk-Board, Presentations, Collaborative learning

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare a report on types of Housing	1	*Preparation of report on types of Housing as per historical timeline.	2	CO1
LLO 2.1 Prepare a report on scope of Housing in India.	2	*Scope of Housing	2	CO1
LLO 3.1 Prepare a report on different characteristics & significance of housing design.	3	*Characteristics of housing	2	CO1
LLO 4.1 Prepare a report/A3 sheet layout or Draw sketches with notes explaining principles of housing	4	Application of principles of Housing	2	CO2
LLO 5.1 Draw to suitable scale on A2 size tracing /cartridge sheet, showing various layers of site depicting different elements of housing.	5	Importance of elements of Housing.	2	CO2
LLO 6.1 Prepare presentation on awardee architects housing projects explaining principles and elements of design.	6	Preparation of housing projects of renowned awardees Architects.	2	CO2
LLO 7.1 Prepare a live case study report on Housing project, explaining the principles and elements of design.	7	Preparation of case study of Housing principles and elements.	2	CO2
LLO 8.1 Prepare drawing of own House layout on suitable scale on A2 tracing / cartridge sheet	8	*Preparation of different typology of Housing.	2	CO3
LLO 9.1 Prepare a report on classification of Zoning & its importance.	9	*Classification of zoning.	2	CO3
LLO 10.1 Prepare a report on different typologies (LIG, MIG, HIG & EWS) of housing depending on socio-economic aspects.	10	Categorization of Housings	2	CO3
LLO 11.1 Prepare layout of Ideal Neighborhood using google earth on suitable scale with various requirements of Neighborhood.	11	Ideal Neighborhood planning & their requirements on different scales.	2	CO4
LLO 12.1 Prepare sketches on different concepts of town planning.	12	*Modern concepts of town planning.	2	CO4
LLO 13.1 Prepare a report on Neighborhood models of Clarence Stein, Clarence A Perry, N.L Engelhard & Jose Sert	13	Neighborhood model development.	2	CO4
LLO 14.1 Prepare a report on low cost affordable housing in India.	14	Preparation of comprehensive report on affordable housing	2	CO5
LLO 15.1 Prepare a report on different techniques of construction for low cost housing.	15	Construction techniques of low cost housing.	2	CO5

HOUSING**Course Code : 324304**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
Note : Out of above suggestive LLOs -				
<ul style="list-style-type: none"> *1 Marked Practicals (LLOs) Are mandatory. Minimum 80% of above list of lab experiment are to be performed. Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Prepare a report on neighborhood planning by visiting different sites of a housing schemes.
- Prepare a report on different typologies of housing by visiting different sites of a housing schemes.
- Compare different housing schemes on basis of principles and elements of housing. Visit related departments offering the housing schemes. Prepare a report and present in the class.
- Prepare a physical model of a house based on Vernacular Architectural studies for various climatic zones in India.

Assignment

- Prepare a layout plan showing percentage of land use by visiting a near by housing scheme.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Sketch book, computer desktop, Microsoft office, sketching & drafting tools, LCD Projector, drafting board, Plotter or Printer .	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction of Housing.	CO1	5	3	3	4	10
2	II	Principles and Elements of housing.	CO2	10	4	5	6	15
3	III	Typologies and Policies of housing.	CO3	5	3	3	4	10
4	IV	Neighbourhood.	CO4	10	3	5	7	15
5	V	Low cost construction materials and techniques of housing.	CO5	15	5	5	10	20
Grand Total				45	18	21	31	70

X. ASSESSMENT METHODOLOGIES/TOOLS

MSBTE Approval Dt. 21/11/2024

Semester - 4, K Scheme

HOUSING**Course Code : 324304****Formative assessment (Assessment for Learning)**

- Team work, assignment, Micro project (60% weightage to process & 40% weightage to product).

Summative Assessment (Assessment of Learning)

- Pen and paper test (written test), Practical exam, oral exam.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	1	1	0	1	0	2			
CO2	2	2	1	1	2	1	3			
CO3	2	1	2	1	1	1	3			
CO4	2	2	2	2	2	2	2			
CO5	2	3	2	3	3	2	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	C.S. Rangwala	Town Planning	Charotar Publishing House Pvt. 8185594813, 9788185594811
2	Brooks. R. G	Site Planning: Environment, Process and development. Michigan	Pearson, 1998 - ISBN 10: 0558421938 ISBN 13: 9780558421939
3	Abir Bandyopadhyay	Town Planning	Books and allied P. Ltd ISBN-13: 978-8187134657 ISBN-10: 8187134658.
4	G.K Hiraskar	Fundamentals of Town Planning	Publisher. Dhanpat Rai Publication ISBN-10. 8189928899; ISBN-13. 978-8189928896

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.academia.edu/31873937/rural_development_policy_and_planning_lecture_notes	Rural development policy and planning lecture
2	https://www.classcentral.com/report/swayam-moocs-course-list/	Courses
3	https://www.homify.sg/ideabooks/2000070/12-cheap-building-materials-for-a-low-costhome	Low Cost building materials
4	https://nptel.ac.in/courses/124106009	Introduction to History of Architecture in India.

HOUSING**Course Code : 324304**

Sr.No	Link / Portal	Description
5	https://youtu.be/t2bUAfmHG6s?feature=shared	Vernacular Architecture & Traditional Constructional practices

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 21/11/2024**Semester - 4, K Scheme**

LANDSCAPE DESIGN**Course Code : 324305**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/

Programme Code : AA/ AT/ IX/ IZ

Semester : Fourth

Course Title : LANDSCAPE DESIGN

Course Code : 324305

I. RATIONALE

This course is the art of creating, designing, and planning indoor and outdoor spaces. It aims to equip the students with concepts and principles of landscaping, different landscape styles, plant study, and elements of landscape. It will allow students to embrace landscape design in a manicured and predictable way. Landscape design promotes the improvement of environment.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply elements and principles of landscape design, the planning process, ergonomics and anthropometry. The students will be able to appreciate the importance of landscape design and acquire knowledge effectively in the landscape design field.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Explain the scope and need of landscaping using elements and principles in the given situation.
- CO2 - Suggest various landscape styles for indoor and outdoor spaces.
- CO3 - Identify various types of softscapes.
- CO4 - Suggest various types of hardscapes.
- CO5 - Select the appropriate tools and equipments required for landscaping.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Paper Duration		Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					Total	Practical		SLA							
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min	Max	Min		
324305	LANDSCAPE DESIGN	ELC	DSE	3	-	2	1	6	3	03	30	70	100	40	25	10	25@	10	25	10	175

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

LANDSCAPE DESIGN**Course Code : 324305****V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Describe Landscape design.</p> <p>TLO 1.2 Explain scope of landscape design.</p> <p>TLO 1.3 Explain the need of landscape design.</p> <p>TLO 1.4 Describe different landscape principles.</p> <p>TLO 1.5 Explain different landscape Elements.</p>	<p>Unit - I Introduction To Landscape Design</p> <p>1.1 Introduction to Landscape design.</p> <p>1.2 Scope of Landscape : Indoor landscape , Outdoor landscape.</p> <p>1.3 Need of Landscape : Need and necessity, Aesthetics and environment.</p> <p>1.4 Landscape Principles : Balance , Harmony , Rhythm , Scale , Proportion , Emphasis etc.</p> <p>1.5 Elements of Landscape : Color , Texture , Line of sight , form etc.</p>	<p>Video</p> <p>Demonstrations,</p> <p>Lecture Using Chalk-Board,</p> <p>Presentations,</p> <p>Case Study</p>
2	<p>TLO 2.1 Explain different types of feature of English garden style.</p> <p>TLO 2.2 Explain different characteristics of Mughal gardens.</p> <p>TLO 2.3 Explain various elements and principles of Spanish gardens.</p> <p>TLO 2.4 Explain different types and features of Japanese landscape style.</p> <p>TLO 2.5 Explain various characteristics of Chinese Landscape style.</p>	<p>Unit - II Landscape Styles</p> <p>2.1 English Gardens: Introduction, Characteristics, Elements and case studies.</p> <p>2.2 Mughal Gardens: Introduction, Characteristics, Elements and case studies.</p> <p>2.3 Spanish Gardens: Introduction, Characteristics, Elements and case studies.</p> <p>2.4 Japanese Gardens: Introduction, Characteristics, Elements and case studies.</p> <p>2.5 Chinese Gardens: Introduction, Characteristics, Elements and case studies.</p>	<p>Case Study,</p> <p>Presentations,</p> <p>Video</p> <p>Demonstrations,</p> <p>Lecture Using Chalk-Board,</p> <p>Site/Industry Visit</p>
3	<p>TLO 3.1 Describe Annual, biennials and herbaceous perennials.</p> <p>TLO 3.2 Select various types of Shrubs.</p> <p>TLO 3.3 Differentiate Trees on the basis of their classification.</p> <p>TLO 3.4 Identify the climbers and creepers.</p> <p>TLO 3.5 Identify the cactus and succulents.</p> <p>TLO 3.6 Distinguish between Indoor and Outdoor plants.</p> <p>TLO 3.7 Suggest ornamental plants and bulbous plants for given spaces.</p>	<p>Unit - III Introduction to Softscape</p> <p>3.1 Annual, Biennials and Herbaceous perennials.</p> <p>3.2 Shrubs: Evergreen Shrubs, Deciduous Shrubs, Flowering Shrubs, Fruit-Bearing Shrubs etc.</p> <p>3.3 Trees: Flowering, fall foliage, fast growing, evergreen, dwarf trees, etc.</p> <p>3.4 Climbers and Creepers.</p> <p>3.5 Cactus and Succulents.</p> <p>3.6 Indoor and Outdoor plants.</p> <p>3.7 Ornamental Plants and Bulbous plants.</p>	<p>Lecture Using Chalk-Board</p> <p>Site/Industry Visit</p> <p>Presentations</p> <p>Video</p> <p>Demonstrations</p>
4	<p>TLO 4.1 Describe the hard elements of landscape.</p> <p>TLO 4.2 Suggest the material used for Hardscape.</p>	<p>Unit - IV Introduction to Hardscape</p> <p>4.1 Hard elements of landscape : Paths, Driveways, Fencing, Decking, Patios, Steps, Walls, Sculptures, Gates etc.</p> <p>4.2 Hardscape Materials: Brick, Gravel, Rock, Concrete, Asphalt, Timber, Metals, Glass etc .</p>	<p>Lecture Using Chalk-Board</p> <p>Presentations</p> <p>Site/Industry Visit</p>

LANDSCAPE DESIGN**Course Code : 324305**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 List the hand tools used by landscaper. TLO 5.2 Suggest the equipments used for outdoor landscaping. TLO 5.3 Demonstrate the Planting tools used in landscaping.	Unit - V Landscape Tools and Equipments 5.1 Hand tools: Shovel, Rakes, Pruning Shears, Lawn Mower, Grass Trimmer, Leaf Blower, Hedge Trimmer, Lawn Aerator, etc. 5.2 Equipments used in landscaping: Excavators, Backhoe Loaders, Scrapers, Crawler Loaders, Bulldozers, Trenchers, Motor Graders, etc. 5.3 Planting tools: Digging tools, Watering tools, Cutting tools, Planting tools etc.	Lecture Using Chalk-Board Presentations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Compose photo collage of Indoor landscape Spaces. LLO 1.2 Compose Photo collage of outdoor landscape spaces.	1	*Preparation of Landscape collage for Indoor and Outdoor spaces.	2	CO1
LLO 2.1 Prepare presentation report on Various principles of landscape design.	2	* Applications of Principles of landscape design .	2	CO1
LLO 3.1 Sketch various landscape elements. LLO 3.2 Identify Various elements of landscape design.	3	*Applications of Elements of landscape design.	2	CO1
LLO 4.1 Prepare a report on historical development of various landscape.(IKS)	4	*Presentation on Landscape Styles as per Indian knowledge system.	4	CO1 CO2
LLO 5.1 Prepare graphical presentation on various landscape styles.	5	*Presentation on Landscape Styles.	4	CO2
LLO 6.1 Suggest appropriate plant species for indoor and outdoor spaces. LLO 6.2 Collect plant samples and prepare herbarium sheets.	6	*Preparation of Herbarium Sheets.	4	CO3
LLO 7.1 Compose sample charts on classification of trees. LLO 7.2 Prepare a graphical representation on trees and Shrubs.	7	*Compositions of Trees and Shrubs.	2	CO3
LLO 8.1 Compare between Biennial Plants, Perennial Plants and Annual Plants. LLO 8.2 Identify Biennial Plants, Perennial Plants and Annual Plants.	8	*Composition of types of Plants: Biennial Plants, Perennial Plants, Annual Plants.	2	CO3
LLO 9.1 Identify appropriate materials used for hardscape. LLO 9.2 Suggest hardscaping and softscaping for given Spaces and situations.	9	*Exploration of Hardscape Materials.	2	CO3 CO4
LLO 10.1 Draw Various tools used for landscape design. LLO 10.2 Sketch various hardscape elements.	10	*Exploration of Hardscape Elements.	2	CO4
LLO 11.1 Draw Various hand tools used for landscaping. LLO 11.2 Select appropriate hand tools for landscaping.	11	* Applications of Essential Hand Tools of landscaping.	2	CO5

LANDSCAPE DESIGN**Course Code : 324305**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 12.1 Select appropriate planting tools for landscaping. LLO 12.2 Draw various types of planting tools.	12	*Applications of Planting Tools of landscaping.	2	CO5
LLO 13.1 Identify various equipments used in Landscaping.	13	Applications of Equipment in landscape design.	2	CO5
LLO 14.1 Prepare report of machinery used in Landscape design.	14	Application of Machinery in landscape design.	2	CO5

Note : Out of above suggestive LLOs -

- '*1 Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

- Analyze a nearby landscape spaces, focusing on the application of fundamental principles and elements, and present findings report.
- Visit a local nursery to observe various plant species, their care requirements, and nursery operations, then summarize findings in a concise report highlighting key observations and insights.
- Analyze the historical significance and architectural features of a selected Traditional Gardens through a graphical presentation highlighting its layout
- Create a Zen gardening mood board by selecting serene images of gravel, rocks, and bonsai trees, showcasing simplicity and tranquility through minimalist design elements.
- Create a digital illustration showcasing the water element in the landscape design, emphasizing its flow and interaction with surrounding features.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Computer : Multi core 64-bit processor, 8 GB Boot Drive, 8 GB RAM minimum 200 GB Hard Disk. OR Latest specification at time of procurement.	All

LANDSCAPE DESIGN**Course Code : 324305**

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
2	Projector : Type of display Poly-silicon TFT active matrix Resolution Brightlink 480i: 1024 × 768 pixels (XGA) Brightlink 475Wi / 485Wi: 1280 × 800 pixels (WXGA) Lens F= 1.80, Focal length: 3.71 mm Colour reproduction: Full colour, 16.77 million colours, Focus adjustment- Manual, Zoom adjustment-Digital, Zoom ratio-1:1.35 OR Latest specification at time of procurement.	All
3	Projector Screen: 116" Diagonal viewing screen, Manual pull down Screen for both ceiling and wall usage OR Latest specification at time of procurement.	All
4	B/W Printer: Print speed black (normal, A4) Up to 14 ppm print speed. Duty cycle (monthly, A4) Up to 5000 pages recommended, monthly page volume 250 to 2000 OR Latest specification at time of procurement.	All
5	Camera : Type - 22.3 mm x 14.9 mm CMOS Effective Pixels -Approx. 24.10 megapixels Total Pixels -Approx. 25.80 megapixels Aspect Ratio- 3:2 Low-Pass Filter - Built-in/Fixed Sensor Cleaning - EOS integrated cleaning system.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction To Landscape Design	CO1	8	6	4	2	12
2	II	Landscape Styles	CO2	12	10	6	0	16
3	III	Introduction to Softscape	CO3	12	10	4	2	16
4	IV	Introduction to Hardscape	CO4	8	6	4	4	14
5	V	Landscape Tools and Equipments	CO5	5	4	4	4	12
Grand Total				45	36	22	12	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Studio Performance, Assignments, Self-learning.

Summative Assessment (Assessment of Learning)

- Pen and paper illustration ,Oral Examination to be conducted by faculty.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	-	-	-	2	-	3			
CO2	3	1	2	-	2	1	2			

LANDSCAPE DESIGN**Course Code : 324305**

CO3	3	2	1	-	1	1	2		
CO4	3	2	1	-	1	1	2		
CO5	2	1	-	1	-	1	2		

Legends :- High:03, Medium:02,Low:01, No Mapping: -
 *PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Geoffrey Jellicoe (Author), Susan Jellicoe (Author).	The Landscape of Man: Shaping the Environment from Prehistory to the Present Day.	Thames & Hudson Ltd, ISBN-13 978-0500278192
2	Grant W Reid.	Landscape Graphics.	Watson-Guptill Publications Inc.,U.S, ISBN-13 978-0823073337
3	Tropical Garden Plants in Colour.	T. K. Bose (Author), B. Chowdhury.	South Asia Books,ISBN-13 978-8190017107
4	Mohammad Shaheer ,Geeta Wahi Dua, Adi Pal.	Landscape Architecture In India.	LA,Journal of Landscape Architecture,ISBN-13 978-8192625409
5	K C Sahni.	The Book of Indian Trees.	Oxford,ISBN-13 978-0195645897

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.re-thinkingthefuture.com/landscape-architecture/a2441-the-evolution-of-landscape-architecture/	The Evolution of Landscape Architecture
2	https://www.britannica.com/art/garden-and-landscape-design/Japanese	Historical development of landscape design
3	https://www.ambius.com/resources/blog/plant-profile/the-ultimate-guide-to-indoor-plants#:~:text=Indoor%20plants%20that%20need%20little,is%20adaptable%20to%20various%20environments	Indoor Plants
4	https://goldbio.com/articles/article/indoorplantguide	Indoor Plants
5	https://www.indiaplants.com/	Plants
6	https://plantsinformation.com/plants/hibiscus/	Outdoor Plants
7	https://whereisthenorth.com/7-hardscape-components-of-landscape-in-architecture/	Hardscape
8	https://www.homesandgardens.com/advice/how-to-plan-a-dry-garden	Hardscape

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 21/11/2024

Semester - 4, K Scheme

Maharashtra State Board Of Technical Education, Mumbai																								
Learning and Assessment Scheme for Post S.S.C Diploma Courses																								
Programme Name		: Diploma In Architecture Assistantship / Architecture / Interior Design & Decoration / Interior Design																						
Programme Code		: AA / AT / IX / IZ										With Effect From Academic Year			: 2023-24									
Duration Of Programme		: 6 Semester										Duration			: 16 WEEKS									
Semester		: Fifth					NCrF Entry Level : 4.0					Scheme			: K									
Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme						Credits	Assessment Scheme											
						Actual Contact Hrs./Week			Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs /Week	Paper Duration (hrs.)		Theory			Based on LL & TL				Based on Self Learning		Total Marks		
						CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA			
															Max	Min	Max	Min	Max	Min	Max		Min	
(All Compulsory)																								
1	MANAGEMENT	MAN	AEC	315301	1	3	-	-	1	4	2	1.5	30	70*#	100	40	-	-	-	-	25	10	125	
2	PROFESSIONAL PRACTICE & BUILDING BYELAWS	PP	DSC	325301	2	4	1	-	1	6	3	03	30	70	100	40	-	-	-	-	25	10	125	
3	FUNDAMENTALS OF PYTHON PROGRAMMING	FPP	AEC	313007	-	-	-	2	-	2	1	-	-	-	-	-	25	10	25@	10	-	-	50	
4	ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS	EDS	AEC	314014	-	1	-	2	1	4	2	-	-	-	-	-	50	20	25@	10	25	10	100	
5	ADVANCED ARCHITECTURAL DESIGN	AAD	DSC	325001	2	2	-	6	2	10	5	-	-	-	-	-	50	20	50#	20	25	10	125	
6	INTERIOR DESIGN	IDE	DSC	325002	1	1	-	6	1	8	4	-	-	-	-	-	50	20	50#	20	25	10	125	
Elective II (Any - Three)																								
7	FURNITURE DESIGN	ELC	DSE	325302	-	2	-	4	-	6	3	03	30	70	100	40	25	10	25@	10	-	-	150	
	ROAD SAFETY & MANAGEMENT	ELC	DSE	325303	-	2	-	4	-	6	3	03	30	70	100	40	25	10	25@	10	-	-	150	
	SITE PLANNING	ELC	DSE	325304	2	2	-	4	-	6	3	03	30	70	100	40	25	10	25@	10	-	-	150	
Total					8	13	1	20	6		20		90	210	300		200		175		125		800	

Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme			Credits	Paper Duration (hrs.)	Assessment Scheme										Total Marks	
						Actual Contact Hrs./Week					Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs /Week	Theory			Based on LL & TL				Based on Self Learning		
						CL	TL	LL					FA-TH	SA-TH	Total	Practical		SLA				
																FA-PR	SA-PR	Max	Min	Max		Min
<p>Abbreviations : CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment,SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment</p> <p>Legends : @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination</p> <p>Note :</p> <ol style="list-style-type: none"> 1. FA-TH represents average of two class tests of 30 marks each conducted during the semester. 2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester. 3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work. 4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks 5. 1 credit is equivalent to 30 Notional hrs. 6. * Self learning hours shall not be reflected in the Time Table. 7. * Self learning includes micro project / assignment / other activities. <p>Course Category : Discipline Specific Course Core (DSC) , Discipline Specific Elective (DSE) , Value Education Course (VEC) , Intern./Apprenti./Project./Community (INP) , AbilityEnhancement Course (AEC) , Skill Enhancement Course (SEC) , GenericElective (GE)</p>																						

FUNDAMENTALS OF PYTHON PROGRAMMING**Course Code : 313007**

Programme Name/s : Architecture Assistantship/ Automobile Engineering./ Architecture/ Interior Design & Decoration/
Interior Design/ Mechanical Engineering/ Mechatronics/ Production Engineering/
Programme Code : AA/ AE/ AT/ IX/ IZ/ ME/ MK/ PG
Semester : Third / Fourth / Fifth
Course Title : FUNDAMENTALS OF PYTHON PROGRAMMING
Course Code : 313007

I. RATIONALE

Comprehension of programming languages is crucial for diploma engineering graduates, especially as they engage with various software applications in the mechanical engineering domain. Python, being easy to code, potent, and stands out as an ideal language for introducing computing and problem-solving concepts to beginners. This course enables students to write Python programs and utilize various built-in functions/methods of Python modules/libraries to solve specific problems.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

An ability to prepare python programs for solving simple engineering problems.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Use program designing tools and IDE for python.
- CO2 - Employ python building blocks and data types in the programming.
- CO3 - Implement conditional and looping statements in the python programming.
- CO4 - Implement built in functions and modules in the python programming.
- CO5 - Use NumPy for performing operations on list and array.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Assessment Scheme											
				Actual Contact Hrs./Week			SLH	NLH	Credits	Paper Duration	Theory			Based on LL & TL				Based on SL		Total Marks	
				CL	TL	LL					Practical			SLA							
							FA-TH	SA-TH	Total		FA-PR	SA-PR	Max	Min	Max	Min					
313007	FUNDAMENTALS OF PYTHON PROGRAMMING	FPP	AEC	-	-	2	-	2	1	-	-	-	-	-	25	10	25@	10	-	-	50

FUNDAMENTALS OF PYTHON PROGRAMMING**Course Code : 313007****Total IKS Hrs for Sem. : 0 Hrs**

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Describe the functions of different components of computers and peripherals. TLO 1.2 List the applications of computers in the domain of Mechanical Engineering. TLO 1.3 Create flow chart of given programming problem. TLO 1.4 Describe the given feature of Python programming language.	Unit - I Introduction to Python Programming 1.1 Revision of Computer Components (CPU, I/O devices) 1.2 Applications of computer and programming languages in Mechanical engineering domain. 1.3 Program Designing Tools: Algorithm, Flow Chart. 1.4 Introduction and Features of Python: Open source, Interactive, Interpreted, Object-oriented, Platform independent etc., Installation & working of IDEs.	Presentations Hands-on
2	TLO 2.1 Use different Python building blocks. TLO 2.2 Describe different data types of Python programming. TLO 2.3 Differentiate normal and container data types of Python programming language. TLO 2.4 Write simple Python programs by taking the user's input to solve expressions.	Unit - II Python building blocks & data types 2.1 Python building blocks: Identifiers, Indentation, Comments, Variables, Arithmetic and assignment operators and Expressions. 2.2 Data Types: Integers, float, complex, string and their declaration, data type conversion. 2.3 Accepting input from user: I/O functions. 2.4 Container Types: List, tuple, set and their declaration. 2.5 Write simple python program to display "Welcome" message.	Presentations Hands-on
3	TLO 3.1 Use basic relational and logical operators in python programs. TLO 3.2 Employ decision control statements in python programs. TLO 3.3 Employ looping statements in python programs.	Unit - III Python operators and Control flow 3.1 Relational and Logical operators. 3.2 Decision making statements: if, if-else, if- elif - else statements. 3.3 Looping statements: while loop, for loop, Nested loops. 3.4 Loop manipulation using continue, pass, break statements.	Demonstration Hands-on

FUNDAMENTALS OF PYTHON PROGRAMMING**Course Code : 313007**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	TLO 4.1 Use built-in functions in Python programs. TLO 4.2 Use built-in modules in Python programs. TLO 4.3 Develop user-defined functions in Python for the given purpose.	Unit - IV Python functions and modules 4.1 Functions: Use of built-in functions, data conversion functions, abs, pow, min, max, round, ceil, floor etc. 4.2 Modules: Use of built-in modules- math cmath, random and statistics. 4.3 User-defined function: Function definition, function calling, function arguments and parameter passing, Return statement, scope of variables.	Demonstration Hands-on
5	TLO 5.1 Manipulate the given list. TLO 5.2 Perform different operations on list. TLO 5.3 Use NumPy arrays for faster operations.	Unit - V List and arrays in python 5.1 List: define list (one and multi-dimension), accessing, deleting and updating values in list. 5.2 Basic list operations: slicing, repeating, concatenation and iteration. 5.3 NumPy array: Generate NumPy arrays and construct multidimensional arrays.	Demonstration Hands-on

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Install python IDE. LLO 1.2 Explore the IDE's settings and preferences.	1	Install Python IDE.	2	CO1
LLO 2.1 Draw flow chart for the given problem. LLO 2.2 Write algorithm for the given problem.	2	*Prepare a flow chart and algorithm for simple problem.	2	CO1
LLO 3.1 Use print function to display the message.	3	Write a simple program to display a simple message. (Ex: "Welcome to Python programming")	2	CO2
LLO 4.1 Write and execute a python program to solve a given expression.	4	Write a simple Python program by taking user's input to - - find the area of rectangle - find the area or circle.	2	CO2
LLO 5.1 Write and execute a python program.	5	*Write a program to accept value of Celsius and convert it to Fahrenheit.	2	CO2
LLO 6.1 Use the if - else statement in the python program.	6	Write a python program to find whether the given number is even or odd using if - else statement.	2	CO3
LLO 7.1 Implement the if-elif-else statement in the python program.	7	*Write a python program to check whether a input number is positive, negative or zero using if - elif-else statement.	2	CO3
LLO 8.1 Use appropriate decision-making control statement to solve the given problem.	8	Write a program to accept the three sides of a triangle to check whether the triangle is isosceles, equilateral, right angled triangle.	2	CO3
LLO 9.1 Identify suitable loop and conditional statement for the problem. LLO 9.2 Inscribe the loop and conditional statement in the python program.	9	Write a program that allows the user to input numbers until they choose to stop, and then displays the count of positive, negative, and zero numbers entered (Use while loop).	2	CO3

FUNDAMENTALS OF PYTHON PROGRAMMING**Course Code : 313007**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 10.1 Identify suitable looping statement for multiplication table. LLO 10.2 Implement the for loop for the multiplication table.	10	*Write a python program for printing multiplication table of a given number using for loop. (Ex. 12x1=12 12x2=24 12x10=120)	2	CO3
LLO 11.1 Identify a suitable module for importing a given function. LLO 11.2 Use various mathematical functions available in cmath module.	11	*Write a Python program to demonstrate the use of different mathematical functions (Ex. ceiling, floor etc).	2	CO4
LLO 12.1 Use various functions available in statistics module.	12	*Write a python program to find mean, mode, median and standard deviation using statistics module.	2	CO4
LLO 13.1 Use list data type of Python.	13	Write a python program utilizing a list to display the name of a month based on a given month number.	2	CO5
LLO 14.1 Write programs using Multidimensional list in Python.	14	Write a python program to add or subtract two matrices using multidimensional list.	2	CO5
LLO 15.1 Write programs using Multidimensional list in Python.	15	*Write a python program to multiply two matrices using multidimensional list.	2	CO5
LLO 16.1 Perform metrics operation using NumPy Module	16	*Write a python program to multiply two matrices using NumPy.	2	CO5
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> *Marked Practicals (LLOs) Are mandatory. Minimum 80% of above list of lab experiment are to be performed. Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Not Applicable

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Computer System with all necessary peripherals and internet connectivity.	All

FUNDAMENTALS OF PYTHON PROGRAMMING**Course Code : 313007**

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
2	Any relevant python IDE like IDLE/PyCharm/VSCode/Jupyter Notebook/Online Python Compiler.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE**X. ASSESSMENT METHODOLOGIES/TOOLS****Formative assessment (Assessment for Learning)**

- Term Work

Summative Assessment (Assessment of Learning)

- Practical

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	2	2	3	-	-	2			
CO2	2	2	2	3	-	-	2			
CO3	2	2	2	3	-	-	2			
CO4	2	2	2	3	-	-	2			
CO5	2	2	2	3	-	-	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Kenneth A. Lambert	Fundamentals of Python : First Programs , 2E	Cengage Learning India Private Limited, ISBN: 9789353502898
2	Yashavant Kanetkar, Aditya Kanetkar	Let Us Python - 6th Edition	BPB Publications, ISBN: 9789355515414

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.w3schools.com/python/	Python Programming
2	https://www.tutorialspoint.com/python/index.htm	Python Programming
3	https://www.python.org/	Python Programming
4	https://spoken-tutorial.org/tutorial-search/?search_foss=Pyt	Python Programming

FUNDAMENTALS OF PYTHON PROGRAMMING**Course Code : 313007**

Sr.No	Link / Portal	Description
Note : <ul style="list-style-type: none">Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students		

MSBTE Approval Dt. 02/07/2024**Semester - 3 / 4 / 5, K Scheme**

ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS**Course Code : 314014**

Programme Name/s	: Architecture Assistantship/ Automobile Engineering./ Agricultural Engineering/ Architecture/ Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Food Technology/ Instrumentation & Control/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Surface Coating Technology/ Textile Technology/ Travel and Tourism/ Textile Manufactures
Programme Code	: AA/ AE/ AL/ AT/ DC/ DD/ FC/ IC/ IS/ IX/ IZ/ ME/ MK/ ML/ MU/ PG/ PN/ SC/ TC/ TR/ TX
Semester	: Fourth / Fifth / Sixth
Course Title	: ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS
Course Code	: 314014

I. RATIONALE

Entrepreneurship and Startup is introduced in this curriculum to develop the entrepreneurship traits among the students before they enter into the professional life. By exposing and interacting with entrepreneurship and startup eco-system, student will develop the entrepreneurial mind set. The innovative thinking with risk taking ability along with other traits are to be inculcated in the students through micro projects and training. This exposure will be instrumental in orienting the students in transforming them to be job generators after completion of Diploma in Engineering.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

- Develop project proposals for launching small scale enterprises and starts up.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify one's entrepreneurial traits.
- CO2 - Use information collected from stakeholder for establishing/setting up/founding starts up
- CO3 - Use support systems available for Starts up
- CO4 - Prepare project plans to manage the enterprise effectively

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SL	LH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL						Practical				SLA						
				Max	Max	Max	Min	Max	Min			Max	Min	Max	Min	Max	Min					
314014	ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS	EDS	AEC	1	-	2	1	4	2	-	-	-	-	-	50	20	25@	10	25	10	100	

ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS**Course Code : 314014****Total IKS Hrs for Sem. : 0 Hrs**

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination
Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Compare advantages and disadvantages of Entrepreneurship TLO 1.2 Identify entrepreneurial traits through self-analysis TLO 1.3 Compare risk associated with different type of enterprise	Unit - I Introduction to Entrepreneurship Development 1.1 Entrepreneurship as a career – charms, advantages, disadvantages , scope- local and global 1.2 Traits of successful entrepreneur: consistency, creativity, initiative, independent decision making, assertiveness, persuasion, persistence, information seeking, handling business communication, commitment to work contract, calculated risk taking, learning from failure 1.3 Types of enterprises and their features : manufacturing, service and trading	Presentations Lecture Using Chalk-Board
2	TLO 2.1 Explain Important factors essential for selection of product/service and selection of process TLO 2.2 Suggest suitable place for setting up the specified enterprise on the basis of given data/circumstances with justification. TLO 2.3 Suggest steps for the selection process of an enterprise for the specified product or service with justification. TLO 2.4 Plan a market study /survey for the specified enterprise	Unit - II Startup Selection Process 2.1 Product/Service selection: Process, core competence, product/service life cycle, new product/ service development process, mortality curve, creativity and innovation in product/ service modification / development 2.2 Process selection: Technology life cycle, forms and cost of transformation, factors affecting process selection, location for an industry, material handling. 2.3 Market study procedures: questionnaire design, sampling, market survey, data analysis 2.4 Getting information from concerned stakeholders such as Maharashtra Centre for Entrepreneurship Development[MCED], National Institute for Micro, Small and Medium Enterprises [NI-MSME], Prime Minister Employment Generation Program [PMEGP], Directorate of Industries[DI], Khadi Village Instries Commission[KVIC]	Presentations Lecture Using Chalk-Board

ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS**Course Code : 314014**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	<p>TLO 3.1 Explain categorization of MSME on the basis of turnover and investment</p> <p>TLO 3.2 Describe support system provided by central and state government agencies</p> <p>TLO 3.3 State various schemes of government agencies for promotion of entrepreneurship</p> <p>TLO 3.4 Describe help provided by the non-governmental agencies for the specified product/service</p> <p>TLO 3.5 Compute breakeven point, ROI and ROS for the specified business enterprise, stating the assumptions made</p>	<p>Unit - III Support System for Startup</p> <p>3.1 Categorization of MSME, ancillary industries</p> <p>3.2 Support systems- government agencies: MCED, NI-MSME, PMEGP, DI, KVIC</p> <p>3.3 Support agencies for entrepreneurship guidance, training, registration, technical consultation, technology transfer and quality control, marketing and finance.</p> <p>3.4 Breakeven point, return on investment (ROI) and return on sales (ROS).</p>	<p>Presentations Lecture Using Chalk-Board</p>
4	<p>TLO 4.1 Explain key elements for the given business plan with respect to their purpose/size</p> <p>TLO 4.2 Justify USP of the given product/ service from marketing point of view.</p> <p>TLO 4.3 Formulate business policy for the given product/service.</p> <p>TLO 4.4 Choose relevant negotiation techniques for the given product/ service with justification</p> <p>TLO 4.5 Identify risks that you may encounter for the given type of business/enterprise with justification.</p> <p>TLO 4.6 Describe role of the incubation centre and accelerators for the given product/service.</p>	<p>Unit - IV Managing Enterprise</p> <p>4.1 Techno commercial Feasibility study, feasibility report preparation and evaluation criteria</p> <p>4.2 Ownership, Capital, Budgeting, Matching entrepreneur with the project</p> <p>4.3 Unique Selling Proposition [U.S.P.]: Identification, developing a marketing plan.</p> <p>4.4 Preparing strategies of handling business: policy making, negotiation and bargaining techniques</p> <p>4.5 Risk Management: Planning for calculated risk taking, initiation with low cost projects, integrated futuristic planning, definition of startup cycle, ecosystem, angel investors, venture capitalist</p> <p>4.6 Incubation centers and accelerators : Role and procedure</p>	<p>Presentations Lecture Using Chalk-Board</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Collect information of successful entrepreneurial traits	1	*Preparation of report on entrepreneurship as a career	2	CO1
LLO 2.1 Identify different traits as an entrepreneur from various field LLO 2.2 Suggest different traits from identified problem	2	Case study on 'Traits of Entrepreneur'	2	CO1
LLO 3.1 Explore probable risks for identified enterprise.	3	*Case study on 'Risks associated with enterprise'	2	CO1
LLO 4.1 Identify new product for development LLO 4.2 Prepare a newly developed product	4	*Preparation of report on 'Development of new Product'	2	CO1 CO2

ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS**Course Code : 314014**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 5.1 Identify Process for development of product for new startup	5	Preparation of Report on ' Process selection ' for new startup	2	CO1 CO2 CO3
LLO 6.1 Develop questioner for market survey	6	*Market survey for setting up new Start up	2	CO2 CO3
LLO 7.1 Interpret the use of Technology Life Cycle	7	A Case study on ' Technology life cycle' of any successful entrepreneur.	2	CO3
LLO 8.1 Use information related to support of startups from Government and non-government agencies' LLO 8.2 Prepare report for setting up startup	8	*Preparation of report on 'Information for setting up new startup' from MCED/MSME/KVIC etc	2	CO3 CO4
LLO 9.1 Compute ROI of successful enterprise.	9	Case study on 'Return on Investment (ROI)'of any successful startup	2	CO3
LLO 10.1 Calculate of ROS of any successful enterprise	10	Case study on 'Return on sales (ROS)'of any successful startup	2	CO3
LLO 11.1 Calculate Brake even point of any enterprise	11	Preparation of report on 'Brake even point calculation' of any enterprise.	2	CO3 CO4
LLO 12.1 Prepare feasibility report of given business	12	*Preparation of report on 'feasibility of any Techno-commercial business"	2	CO4
LLO 13.1 Plan a USP of any enterprise.	13	*A case study based on 'Unique selling Proposition (USP) of any successful enterprise	2	CO4
LLO 14.1 Prepare a project report using facilities of Atal Incubation center.	14	*Prepare project report for starting new startup using 'Atal incubation center (AIC)	2	CO1 CO2 CO3 CO4
Note : Out of above suggestive LLOs -				
<ul style="list-style-type: none"> • '*' Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Prepare a ' Women entrepreneurship business plan ' Choose relevant government scheme for the product/service
- Prepare a 'Pitch- desk' for your start up
- Prepare a business plan for a. Market research b. Advertisement agency c. Placement Agency d. Repair and Maintenance agency e. Tour and Travel agency
- Prepare a 'Social entrepreneurship business plan, plan for CSR funding.
- Prepare a business plan for identified projects by using entrepreneurial eco system for the same (Schemes, incentives, incubators etc.)

ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS**Course Code : 314014****Note :**

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and may be considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Computers with internet and printer facility	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction to Entrepreneurship Development	CO1	5	0	0	0	0
2	II	Startup Selection Process	CO2	4	0	0	0	0
3	III	Support System for Startup	CO3	3	0	0	0	0
4	IV	Managing Enterprise	CO4	3	0	0	0	0
Grand Total				15	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)****Summative Assessment (Assessment of Learning)**

- End of Term Examination - Viva-voce

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	2	2	-	-	3	2			
CO2	2	2	2	2	-	3	2			
CO3	2	2	2	2	-	3	2			
CO4	2	2	2	2	-	3	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

ENTREPRENEURSHIP DEVELOPMENT AND STARTUPS**Course Code : 314014****XII. SUGGESTED LEARNING MATERIALS / BOOKS**

Sr.No	Author	Title	Publisher with ISBN Number
1	Dr. Nishith Dubey, Aditya Vyas , Annu Soman , Anupam Singh	Un- boxing Entrepreneurship your self help guide to setup a successful business	Indira Publishing House ISBN-2023,978-93-93577-70-2
2	Gujral, Raman	Reading Material of Entrepreneurship Awareness Camp	Entrepreneurship Development Institute of India (EDI), GOI, 2016 Ahmedabad
3	Chitale, A K	Product Design and Manufacturing	PHI Learning, New Delhi, 2014; ISBN: 9788120348738
4	Charantimath, Poornima	Entrepreneurship Development Small Business Entrepreneurship	Pearson Education India, New Delhi; ISBN: 9788131762264
5	Khanka, S.S.	Entrepreneurship and Small Business Management	S.Chand and Sons, New Delhi, ISBN: 978-93-5161-094-6

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	http://www.mced.nic.in/allproduct.aspx	MCED Product and Plan Details
2	http://niesbud.nic.in/Publication.html	The National Institute for Entrepreneurship and Small Business Development Publications
3	http://niesbud.nic.in/docs/1standardized.pdf	Courses : The National Institute for Entrepreneurship and Small Business Development
4	https://www.nabard.org/content1.aspx?id=23andcatid=23andmid=530	Government Schemes
5	https://www.nabard.org/Tenders.aspx?cid=501andid=24	NABARD - Information Centre
6	http://www.startupindia.gov.in/pdf/file.php?title=Startup%20India%20Action%20Planandtype=Actionandq=Action%20Plan.pdfandcontent_type=Actionandsubmenupoint=action	Start Up India
7	http://www.ediindia.org/institute.html	About - Entrepreneurship Development Institute of India (EDII)
8	http://www.nstedb.com/training/training.htm	NSTEDB - Training
Note :		
<ul style="list-style-type: none"> Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students 		

MSBTE Approval Dt. 21/11/2024

Semester - 4 / 5 / 6, K Scheme

Programme Name/s	: Architecture Assistantship/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Telecommunication Engg./ Electrical and Electronics Engineering/ Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Computer Science/ Textile Technology/ Electronics & Computer Engg.
Programme Code	: AA/ AE/ AI/ AL/ AN/ AO/ AT/ BD/ CE/ CH/ CM/ CO/ CR/ CS/ CW/ DC/ DE/ DS/ EE/ EJ/ EK/ EP/ ET/ EX/ FC/ HA/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ ML/ MU/ PG/ PN/ PO/ SC/ SE/ TC/ TE
Semester	: Fifth / Sixth
Course Title	: MANAGEMENT
Course Code	: 315301

I. RATIONALE

Effective management is the cornerstone of success for both organizations and individuals. It empowers diploma engineers/ professionals to accomplish their tasks with finesse and efficiency through strategic planning and thoughtful execution, projects can optimize finances, enhance safety measures, facilitate sound decision-making, foster team collaboration and cultivate a harmonious work environment. The diploma engineers require leadership and management skills with technical knowledge of the core field to carry out various tasks smoothly. This course aims to instill fundamental management techniques, empowering diploma engineers/ professionals to enhance their effectiveness in the workplace.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the students to attain the following industry identified outcome through various teaching learning experiences: Apply the relevant managerial skills for achieving optimal results at workplace.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Use relevant management skills to handle work situation
- CO2 - Apply appropriate techniques of product, operations and project management
- CO3 - Use comprehensive tools of recent management practices
- CO4 - Plan suitable marketing strategy for a product / service
- CO5 - Utilize supply chain and human resource management techniques for effective management

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

MANAGEMENT**Course Code : 315301**

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					FA-TH	SA-TH	Total	Practical		SLA					
														FA-PR	SA-PR	Max	Min	Max	Min		
315301	MANAGEMENT	MAN	AEC	3	-	-	1	4	2	1.5	30	70*#	100	40	-	-	-	-	25	10	125

Total IKS Hrs for Sem. : 1 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Justify the importance of management thoughts in Indian knowledge system.</p> <p>TLO 1.2 Describe the importance of management in day to day life.</p> <p>TLO 1.3 Explain Henry Fayol's principles of management.</p> <p>TLO 1.4 Describe the role of each level of management in its management hierarchy.</p> <p>TLO 1.5 Practice the self management skills for a given situation</p> <p>TLO 1.6 Apply the required managerial skills for a given situation</p>	<p>Unit - I Introduction to Management</p> <p>1.1 Evolution of management thoughts from ancient/medieval to modern times in India (IKS)</p> <p>1.2 Management: meaning, importance, characteristics, functions & challenges.</p> <p>1.3 Introduction to scientific management- Taylor's & Fayol's principles of management</p> <p>1.4 Levels & functions of management at supervisory level.</p> <p>1.5 Self management skills: Self awareness, self discipline, self motivation, goal setting, time management, decision making, stress management, work life balance and multitasking</p> <p>1.6 Overview of Managerial Skills: negotiation skills, team management, conflict resolution, feedback, leadership</p>	<p>Presentations</p> <p>Case Study</p> <p>Interactive session</p> <p>Quiz competition</p> <p>Mixed Picture Puzzle</p>

MANAGEMENT

Course Code : 315301

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
2	<p>TLO 2.1 Identify the appropriate creativity technique for new product development</p> <p>TLO 2.2 Describe the new product development process for a product / service</p> <p>TLO 2.3 Comprehend the importance of various strategic steps Product Management</p> <p>TLO 2.4 Elaborate Agile product management</p> <p>TLO 2.5 Explain the significance of the Project Management</p> <p>TLO 2.6 Describe the various tools of project management</p>	<p>Unit - II Product, Operations and Project Management</p> <p>2.1 Creativity and innovation management: creativity techniques - brainstorming, checklist, reverse brainstorming, morphological analysis, six thinking hats.</p> <p>2.2 New product development, change management</p> <p>2.3 Product Management -meaning, strategic steps for sustainable design of a product</p> <p>2.4 Agile product management- concept, benefits, principles and manifesto</p> <p>2.5 Project Management: importance, areas within project management,4Ps and phases</p> <p>2.6 Tools of Project Management: PERT and CPM, GANTT & Chart Overview of Estimate and Budget</p>	<p>Presentations</p> <p>Case Study</p> <p>Video</p> <p>Demonstrations</p> <p>Presentations</p> <p>Role Play</p>
3	<p>TLO 3.1 Understand the importance of quality management tools</p> <p>TLO 3.2 Explain the importance of various techniques for optimization and waste minimization</p> <p>TLO 3.3 State the importance of ISO quality standards</p> <p>TLO 3.4 Describe ERP</p> <p>TLO 3.5 State the importance of ISO</p> <p>TLO 3.6 Recognize the importance of customer satisfaction as a competitive advantage</p>	<p>Unit - III Management Practices</p> <p>3.1 Quality circle, kaizen, Six Sigma, TQM</p> <p>3.2 5S, Kanban card system, TPM, Lean Manufacturing: Meaning, Steps and Importance</p> <p>3.3 Quality Standards and ISO: Meaning, ISO 9001:2016, ISO 14000, OSHA 2020</p> <p>3.4 The overview of ERP along with example</p> <p>3.5 Service quality and customer/client satisfaction, servicescape</p>	<p>Presentation</p> <p>Case study</p> <p>Interactive session</p> <p>Quiz</p> <p>Video</p> <p>Demonstration</p> <p>Lecture Using</p> <p>Chalk-Board</p>
4	<p>TLO 4.1 Explain the importance of marketing techniques</p> <p>TLO 4.2 Explain the importance of needs, wants and desires in marketing</p> <p>TLO 4.3 Interpret the traditional and digital marketing techniques</p> <p>TLO 4.4 Plan different aspects of an event management</p>	<p>Unit - IV Marketing Management</p> <p>4.1 Marketing management: meaning, significance, Seven P's of Marketing</p> <p>4.2 Needs, wants and demands in marketing. Customer relationship management</p> <p>4.3 Types of marketing: traditional and digital marketing</p> <p>4.4 Event management: types, different aspects of event management, crisis management</p>	<p>Case Study</p> <p>Interactive session based video</p> <p>Role Play</p> <p>Flipped Classroom</p> <p>Presentations</p>

MANAGEMENT**Course Code : 315301**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	<p>TLO 5.1 State the importance of supply chain and logistics management</p> <p>TLO 5.2 Explain the components of supply chain and logistics Management</p> <p>TLO 5.3 Describe the role of information technology in supply chain & logistics management</p> <p>TLO 5.4 State the significance of Human Resource Management</p> <p>TLO 5.5 Analyze the various methods of recruitment, selection and training for an organization</p> <p>TLO 5.6 List the qualities of a successful supervisor</p>	<p>Unit - V Supply Chain & Human Resource Management</p> <p>5.1 The overview of Supply Chain and logistics Management</p> <p>5.2 Components of Supply Chain and logistics Management</p> <p>5.3 Role of information technology in supply chain & logistics management</p> <p>5.4 Overview of Human Resource Management- Meaning, significance, scope and principles</p> <p>5.5 Recruitment, selection and training of human resources. Chalk Circle</p> <p>5.6 Qualities of a successful supervisor /team leader and types of leadership</p>	<p>Presentations</p> <p>Video</p> <p>Demonstrations</p> <p>Case Study</p> <p>Collaborative learning</p> <p>Video</p> <p>Demonstrations</p> <p>Chalk-Board</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES : NOT APPLICABLE.**VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)****Assignment / Article**

- Make a one page note based on a book of management you read.
- Write a short article on inventory management exploring online learning resources.
- Prepare a report on ISO standards applicable to your field. a. IATF 16949-2016 / SLA-TS 16949-2016, - Automotive Industry b. ISO 22000 — Food safety management c. ISO 50001 — Energy management d. ISO/IEC 27001 - Cyber Security e. ISO/DIS 4931-1 - Buildings and civil engineering works
- Prepare a 4 quadrant matrix of time management for managing the tasks.
- Prepare a report on any one software used for Supply Chain and Logistics Management.
- Prepare a GANTT Chart for project management related to your field.

Note Taking

- Watch a Tedx Talk Video on managerial skills and take notes in the form of keywords.

Case Study

- Prepare a case study and discuss the same on following topics a. Self Management Skills b. Six Thinking Hats c. Kaizen d. Quality Circle e. Safety Measures in different organizations related to your field
- Study the recruitment and selection process of any organization related to your field.
- Prepare a case study on management lessons based on life of Chhatrapati Shivaji Maharaj
- Conduct outbound training on managerial skills. Make a video and upload on social media.

Quizzes

- Participate in online quizzes related to areas of management .

Assignment

MANAGEMENT**Course Code : 315301**

- Workshops to be conducted for students on following topics a. creativity techniques b. time management c. stress management d. negotiation and conflict e. goal setting f. meditation new product development

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED : NOT APPLICABLE**IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction to Management	CO1	13	8	6	4	18
2	II	Product, Operations and Project Management	CO2	8	2	4	6	12
3	III	Management Practices	CO3	8	4	4	6	14
4	IV	Marketing Management	CO4	8	2	4	6	12
5	V	Supply Chain & Human Resource Management	CO5	8	4	4	6	14
Grand Total				45	20	22	28	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- MCQ Based Class Test, Self Learning Activities / Assignment

Summative Assessment (Assessment of Learning)

- Summative Assessment (Assessment of Learning) MCQ based

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3

MANAGEMENT**Course Code : 315301**

CO1	1	1	1	-	-	2	3		
CO2	1	3	3	-	1	3	3		
CO3	1	3	1	-	1	1	3		
CO4	1	2	2	-	1	2	3		
CO5	1	1	2	-	1	2	3		

Legends :- High:03, Medium:02,Low:01, No Mapping: -
 *PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	A. K. Gupta	Engineering Management	S. Chand, ISBN: 81-219-2812-5, 2007, 2nd Edition
2	O. P. Khanna	Industrial Engineering & management	Dhanpat Rai Publication, ISBN: 978-8189928353, 2018
3	Harold Koontz and Heinz Weinrich	Essentials of Management	Tata McGraw Hill Education ISBN: 9789353168148, 2020, 12th edition
4	E. H. McGrath	Basic Managerial Skills for All	PHI ISBN: 978-8120343146, 2011, 9th Edition
5	Andrew DuBrin	Management Concepts and Cases	Cengage Learning, ISBN: 978-8131510537, 2009, 9th edition
6	K. Dennis Chambers	How Toyota Changed the World	Jaico Books ISBN: 978-81-8495-052-6, 2009
7	Jason D. O'Grandy	How Apple changed the World	Jaico Publishing House ISBN: 978-81-8495-052-0, 2009
8	Subhash Sharma	Indian Management	New Age International Private Limited ; ISBN-978-9389802412, 2020, 1st edition
9	Chitale, Dubey	Organizational Behaviour Text and Cases	PHI LEARNING PVT. LTD., ISBN: 978-9389347067, 2019, 2nd Edition

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.debonogroup.com/services/core-programs/six-thinking-hats/	Six Thinking Hats
2	https://hbr.org/1981/09/managing-human-resources	HR Management
3	https://theproductmanager.com/topics/agile-product-management/	Agile Product Management
4	https://www.cdlogistics.ca/freight-news/the-5-components-of-supply-chain-management	Supply Chain Management
5	https://www.infosectrain.com/blog/understanding-the-concepts-of-gantt-chart-and-critical-path-methodology-cpm	PERT, CPM, GANTT Chart
6	https://www.simplilearn.com/best-management-tools-article	Management Tools
7	https://www.psychometrica.in/free-online-psychometric-tests.html	Psychometric Tests
8	https://www.investopedia.com/terms/e/erp.asp	ERP
9	https://asq.org/quality-resources/quality-management-system	QMS
10	https://testlify.com/test-library/creative-thinking/	Psychometric Tests
11	https://www.mindtools.com/	Management Skills
12	https://www.investopedia.com/terms/d/digital-marketing.asp	Digital Marketing

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MANAGEMENT

Course Code : 315301

MSBTE Approval Dt. 24/02/2025

Semester - 5 / 6, K Scheme

ADVANCED ARCHITECTURAL DESIGN**Course Code : 325001**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fifth
Course Title : ADVANCED ARCHITECTURAL DESIGN
Course Code : 325001

I. RATIONALE

Advanced Architecture Design course focuses on various types of Campus design such as Residential/ Commercial/ Institutional campuses. These designs are based on the client / User's requirements including response to the context specific factors like socio-economic, socio-cultural, environmental etc. The design study has been carried out considering the total campus area as 7000 sqm. to 7500 sqm.(AA/AT). Interior design students can focus on the on the holistic interior design of the campus with considerations to lobbies, community areas etc.(IX/IZ)

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Learner will be able to design a given Residential/ Commercial/ Institutional campus considering various aspects such as zoning, circulation within site, distribution of built and open spaces, activity relationships, adjacencies within site and its context.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Develop a pre-design concept of a given project with respect to anthropometry and ergonomics aspects.
- CO2 - Deign a given project using basic standard of zoning and planning.
- CO3 - Prepare different 2D and 3D drawings of a given project.
- CO4 - Develop a layout plan of various services for a given project.
- CO5 - Develop the computer aided drawings using different presentation skills.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					Practical			FA-PR		SA-PR		SLA			
							FA-TH	SA-TH			Total		Max	Min	Max	Min	Max	Min	Max	Min	
				Max	Max	Max	Min	Max			Min	Max	Min	Max	Min	Max	Min	Max	Min		
325001	ADVANCED ARCHITECTURAL DESIGN	AAD	DSC	2	-	6	2	10	5	-	-	-	-	-	50	20	50#	20	25	10	125

ADVANCED ARCHITECTURAL DESIGN**Course Code : 325001****Total IKS Hrs for Sem. : 2 Hrs**

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Enlist basic anthropometry data for given campus spaces.</p> <p>TLO 1.2 Develop mind maps to conceptualise pre-design requirements.</p> <p>TLO 1.3 Analyse online and book case of a given campus.</p> <p>TLO 1.4 Develop a pre-design concept for a given project.</p>	<p>Unit - I Pre-design study in context with anthropometry and ergonomics.</p> <p>1.1 Human scaling with basic anthropometry data assembling for various campus spaces.</p> <p>1.2 Predesign concept, check lists and list of space requirements.</p> <p>1.3 Case studies in context of the project.</p> <p>1.4 Pre-design concepts of projects.</p>	<p>Demonstration</p> <p>Cooperative Learning</p> <p>Lecture Using Chalk-Board</p> <p>Presentations</p> <p>Case Study</p>
2	<p>TLO 2.1 Develop a site plan of a given campus indicating bubble diagram & zoning.</p> <p>TLO 2.2 Prepare site drawing as per scales provided.</p> <p>TLO 2.3 Prepare alternative plans for a given campus.</p> <p>TLO 2.4 Develop working model of layout plan using material board.</p>	<p>Unit - II Zoning, planning and area statements</p> <p>2.1 Predesign area statements for zoning & planning.</p> <p>2.2 Site documentation of a . site plan.</p> <p>2.3 Planning & preparing alternatives plans for understanding of best possible layout / planning.</p> <p>2.4 Schematic layout & working Models with material board.</p>	<p>Demonstration</p> <p>Presentations</p> <p>Lecture Using Chalk-Board</p> <p>Site/Industry Visit</p> <p>Collaborative learning</p> <p>Model</p> <p>Video</p> <p>Demonstrations</p> <p>Cooperative Learning</p>
3	<p>TLO 3.1 Draw various layout plans as per the given scale.</p> <p>TLO 3.2 Draw sections as per the given scale.</p> <p>TLO 3.3 Develop 3D views, sketches & perspective drawings.</p>	<p>Unit - III Planning ,designing & 3D modelling.</p> <p>3.1 Scaled layout and sections to understand and demonstrate design.</p> <p>3.2 Sections with all structural indications and levels.</p> <p>3.3 3D sketches and views, concepts and design related drawing and their solutions.</p>	<p>Model</p> <p>Presentations</p> <p>Video</p> <p>Demonstrations</p> <p>Hands-on</p> <p>Lecture Using Chalk-Board</p> <p>Collaborative learning</p>

ADVANCED ARCHITECTURAL DESIGN**Course Code : 325001**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	<p>TLO 4.1 Draw structural elements of a given design project.(AA/AT).</p> <p>TLO 4.2 Enlist different services and its importance.(AA/AT/IX/IZ).</p> <p>TLO 4.3 Prepare service drawings pertaining to the electrical, plumbing, rainwater harvesting and fire fighting in services (AA/AT)</p> <p>TLO 4.4 Draw layout plans for flooring, reflected ceiling, electrical with lighting, HVAC and networking.(IX / IZ)</p> <p>TLO 4.5 Draw coordination layout showing all overlapping services.(IX / IZ)</p>	<p>Unit - IV Structural design development ,Service Layouts & Technical drawings</p> <p>4.1 Study model and structural requirements. (AA/AT).</p> <p>4.2 Services and its important points for designing (AA/AT/IX/IZ).</p> <p>4.3 Service drawings for electrical, Plumbing, Rainwater Harvesting and Fire fighting services. (AA/AT)</p> <p>4.4 Flooring, Reflected ceiling, Electrical layout, HVAC and networking layouts. (IX / IZ).</p> <p>4.5 Overlay drawings / coordination layout of all services. (IX / IZ)</p>	<p>Video</p> <p>Demonstrations</p> <p>Site/Industry Visit</p> <p>Collaborative learning</p> <p>Case Study</p> <p>Lecture Using Chalk-Board</p>
5	<p>TLO 5.1 Prepare computer aided drawings of a given project.</p> <p>TLO 5.2 Prepare presentation drawings using different methodologies.</p> <p>TLO 5.3 Prepare final portfolios of a given project.</p>	<p>Unit - V Project development - Computer skill based.</p> <p>5.1 Transfer prepared manual drawings to software driven outcomes.</p> <p>5.2 Presentation methodologies using softwares.</p> <p>5.3 Preparation of final portfolios.</p>	<p>Collaborative learning</p> <p>Flipped Classroom</p> <p>Collaborative learning Model</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare a report on collected anthropometry data for a given project.	1	Collection of anthropometry data for a given project.	4	CO1
LLO 1.1 Prepare a report on collected anthropometry data for a given project.	1	Learning through History of Architecture & design	4	CO1
LLO 2.1 Prepare a mind map & concept drawings for a given project.	2	Preparation of Mind map and concept drawings for a given project.	4	CO1 CO2
LLO 3.1 Prepare one online & one book case study report for a given project.	3	Preparation of Case Study report for a given project.	4	CO1 CO3
LLO 4.1 Prepare zoning layouts with area statements on tracing sheets – Zoning layouts (minimum 3/5 alternatives) .	4	Preparation of Bubble Diagram & zoning Layout for a given project.	6	CO2 CO3
LLO 5.1 Prepare the site analysis report for a given project.	5	Preparation of Site Analysis Report for a given project..	4	CO2
LLO 6.1 Prepare the alternative options of site layout plan of given project.	6	Preperation of site layout plan.for a given project..	4	CO2
LLO 7.1 Prepare the final site plan of a given project to a given scale.	7	Preperation of final site plan for a given project..	3	CO3
LLO 8.1 Draw preliminary design development sketches for the given design project.	8	Drawing preliminary design sketches of a given project.	3	CO3
LLO 9.1 Develop Architectural plans ,Furniture layout, Elevations & sections for a given project.	9	Developement of Architectural plans ,Furniture layout, Elevations & sections for a given project.	10	CO4

ADVANCED ARCHITECTURAL DESIGN**Course Code : 325001**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 10.1 Prepare final Services Drawings & Service layouts (electrical , lighting, plumbing, fire fighting, reflected ceiling , HVAC, networking) of a given project.	10	Preparation of final Service (electrical , lighting, plumbing, fire fighting, reflected ceiling , HVAC, networking) drawings of a given project.	2	CO4
LLO 11.1 Develop 2-D drawings using Auto cad software.	11	Development of 2-D drawings using Auto cad software.	2	CO5
LLO 12.1 Develop 3D drawing by using cad software.	12	Development of 3-d drawings by using autocad software.	4	CO5
LLO 13.1 Develop service drawings using AutoCad.	13	Development of service drawings using AutoCad.	4	CO5
LLO 14.1 Prepare final portfolio of a given project.	14	Preparation of final portfolio of a given project.	6	CO5
LLO 15.1 Develop architectural model of a given project.	15	Development of architectural model of a given project.	6	CO5

Note : Out of above suggestive LLOs -

- '* Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Develop a technically sound and sustainable built project with the help of online courses Software learning and preparing drawings, Mind maps and flow charts Case study data analysis & Mapping Material market survey & rate analysis
- Develop technically sound & sustainable built project with the help of online courses & software learning.

Assignment

- Conduct Campus visits for (Electrical, Plumbing, HVAC, Fire Fighting, etc.) collect technical information and student shall submit site reports
- Conduct market survey for architectural & interior products, finishes & prepare a report.
- Conduct visits for electrical, plumbing , HVAC, Fire fighting etc. & prepare a report.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
--------------	---	----------------------------

ADVANCED ARCHITECTURAL DESIGN**Course Code : 325001**

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	LCD projector & white screen for projection. A1 drafting board and all drafting tools, tracing paper, A1 size drawing sheets, A3Sketchbook, etc. Computer loaded with required software's – Auto CAD, Sketchup, Corel Draw,Photoshop, etc.. A1 plotter or printer facility for students.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Pre-design study in context with anthropometry and ergonomics.	CO1	6	0	0	0	0
2	II	Zoning, planning and area statements	CO2	6	0	0	0	0
3	III	Planning ,designing & 3D modelling.	CO3	6	0	0	0	0
4	IV	Structural design development ,Service Layouts & Technical drawings	CO4	6	0	0	0	0
5	V	Project development - Computer skill based.	CO5	6	0	0	0	0
Grand Total				30	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Some of the assignments will be given during the course will be formative assignments

Summative Assessment (Assessment of Learning)

- Some of the assignments will be submitted by the learner at the term end will be summative assessment

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	2	2	1	2	-	2			
CO2	3	3	3	1	2	-	2			
CO3	3	1	2	2	1	-	2			
CO4	3	2	2	2	1	-	2			
CO5	3	2	3	2	1	-	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

MSBTE Approval Dt. 24/02/2025

Semester - 5, K Scheme

ADVANCED ARCHITECTURAL DESIGN**Course Code : 325001**

Sr.No	Author	Title	Publisher with ISBN Number
1	a + t research group	50 HYBRID BUILDINGS	ISBN-13:9788409188222
2	Christopher Alexander	The Timeless Way Of Building	Published by Oxford University Press, ISBN :139780195024029, 0195024028
3	Francis D. K. Ching	Architecture: Form, Space and Order	Published by Van Nostrand Reinhold, 1979; ISBN 10: 0442215355 / ISBN 13: 9780442215354
4	Joseph DeChiara, Julius Panero, Martin Zelnik	Time-Saver Standards for Interior Design and Space Planning	Publisher- McGraw Hill LLC, 9780071704656, 0071704655
5	Dean Schwanke	Mixed-Use Development Handbook (Development Handbook series)	Publisher ? : ? Urban Land Institute,U.S.; 2nd edition, ISBN-10 ? : ? 0874208882 ISBN-13 ? : ? 978-0874208887
6	Ranjit Gunewardane	Technical Standards and Design Guidelines: Mixed - Use Buildings	Publisher AuthorHouse, 2018 ISBN 1546243267, 9781546243267
7	Karlen Mark, Kate Ruggeri & Peter Hahn	Space Planning Basics	Published by Van Nostrand Reinhold, 1992 ISBN 10: 0442009704 ISBN 13: 9780442009700
8	Maureen Mitton	Interior Design Visual Presentation: A Guide to Graphics, Models, and Presentation Techniques	Published by Wiley, 1999 ISBN 10: 0471292591 ISBN 13: 9780471292593
9	Robert Rengel	Shaping Interior Space	Published by Fairchild Books, 2003 ISBN 10: 1563672219 ISBN 13: 9781563672217

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	http://landezine.com/	Landscape architecture
2	https://www.archdaily.com/search/projects/categories/mixed-use-architecture	Architectural Projects for data collection and case study

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

INTERIOR DESIGN**Course Code : 325002**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fifth
Course Title : INTERIOR DESIGN
Course Code : 325002

I. RATIONALE

Interior Design forms an integral part of an space formed and used during Architectural Design. The course enables a learner to understand various concepts, integral design design decisions of interior space usage, aesthetics desired, required services accommodation and attain basic skills required to design a given Interior space. The required graphical and presentation skills shall be developed in the learner to express design (AT/AA) Interior design students can focus on Modular applications in commercial areas, with latest technological needs to be accommodated.(IX/IZ)

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

A learner shall be able to design the interior for residential, small commercial space or Mixed use.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Select suitable and sustainable materials for a given Interior design project
- CO2 - Prepare a project brief for the context, function and specific user group
- CO3 - Prepare drawing Portfolio for Interior design of a given project.
- CO4 - Prepare required service drawings for a given Interior design project.
- CO5 - Prepare Software based presentation drawing portfolio for a given Interior design project.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Paper Duration		Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					Total	Practical		SLA							
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min				
325002	INTERIOR DESIGN	IDE	DSC	1	-	6	1	8	4	-	-	-	-	-	50	20	50#	20	25	10	125

Total IKS Hrs for Sem. : 1 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

INTERIOR DESIGN**Course Code : 325002****V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain the importance of Interior design in architectural planning aspects. TLO 1.2 Identify the typology and scale of a given residential /commercial projects TLO 1.3 Discuss the importance of Case studies, in Interior design projects. TLO 1.4 Select suitable and sustainable material for a given interior design project. TLO 1.5 Use suitable anthropometric data for a given Interior design project..	Unit - I Introduction to Interior Design 1.1 Importance of Interior design, need and scope 1.2 Typological classification of Interior projects - residential and commercial 1.3 Case studies on Interior projects- residential and commercial 1.4 Materials for interior structures and finishes, sustainable aspects and desired aesthetical uses. 1.5 Human Scale and proportion for user comfort, Relevance to functional usage.	Video Demonstrations Demonstration Case Study Presentations Lecture Using Chalk-Board
2	TLO 2.1 Explain the importance of context and its various aspects for a given Interior Design project. TLO 2.2 Identify suitable style and Themes based on the context and user requirements. TLO 2.3 Select suitable materials for a given Style and Theme TLO 2.4 Prepare area allocation list based on the functional space requirements.	Unit - II Context Study and Project brief preparation 2.1 Introduction of Interior design project, Importance of context for the project site. 2.2 Style and Themes as per user requirements. 2.3 Selection of suitable material for the selected theme. 2.4 Functional space requirements, Area allocation list	Video Demonstrations Demonstration Case Study Presentations
3	TLO 3.1 Prepare concept drawing for a given interior design project TLO 3.2 Draw sketches and drawings indicating zoning and bubble diagram for a given interior design project. TLO 3.3 Prepare basic plans, sections, elevations indicating various units such as furniture, necessary elements as partitions etc. for a given interior design project. TLO 3.4 Render prepared drawings for presentation using various techniques and mediums.	Unit - III Sketching, Drafting and Rendering Techniques 3.1 Preparation of concept drawing for Interior design 3.2 Preparation of zoning / bubble diagram including various options for it. 3.3 Preparation of drawings for the proposal of interior design project. 3.4 Rendering prepared drawings for presentation.	Demonstration Presentations Hands-on
4	TLO 4.1 Analyze the space envelope for structure, circulation and function to be accommodated. TLO 4.2 Prepare layout incorporating the changes pertaining to civil engineering. TLO 4.3 Prepare service layout for plumbing, electrical, HVAC, networking, security systems, landscape. (IX/IZ) Prepare service layout for plumbing, electrical, landscape (AT/AA)	Unit - IV Services 4.1 Analysis of given space envelope 4.2 Identification of necessary changes pertaining to civil engineering, Preparation of layout incorporating the changes in it. 4.3 Preparation of Service layouts for various required services such as plumbing, electrical, HVAC, networking, security systems, landscape	Video Demonstrations Case Study Presentations

INTERIOR DESIGN**Course Code : 325002**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	<p>TLO 5.1 Select suitable materials and hardware for the various units of a interior design project.</p> <p>TLO 5.2 Identify suitable construction methods for the various units of interior design project.</p> <p>TLO 5.3 Prepare drawing for the detail with specifications, material and method to be adopted.</p>	<p>Unit - V Detailed scaled drawings of any two units</p> <p>5.1 Selection of suitable materials and hardware for the various units such as furniture, partitions, wall treatments ,false ceiling, door window treatments etc. for interior design project.</p> <p>5.2 Identification of construction methods for the various units of interior design such as furniture, partitions, wall treatments ,false ceiling, door window treatments etc.</p> <p>5.3 Preparation of drawings incorporating various units of interior design project.</p>	<p>Demonstration</p> <p>Presentations</p> <p>Collaborative learning</p>
6	<p>TLO 6.1 Explain a design proposal of a given interior design project using various ways of rendering.</p> <p>TLO 6.2 Identify the required software</p> <p>TLO 6.3 Prepare drawings with rendering for the client approval.</p>	<p>Unit - VI 2D and 3D Presentation Drawings</p> <p>6.1 Various ways to explain the design proposal.</p> <p>6.2 Identification of required software for rendering and presentation.</p> <p>6.3 Preparation of rendered drawings for the client approval.</p>	<p>Video</p> <p>Demonstrations</p> <p>Collaborative learning</p> <p>Cooperative Learning</p>

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 *Prepare report/presentation on Case study visit LLO 1.2 *Prepare report/presentation on Market survey	1	Preparation of a report/presentation on Case study visit and Market Survey	8	CO1
LLO 2.1 *Draw free hand sketches, mind maps for context study and initial concept LLO 2.2 Prepare Mood board, material palette.	2	Preparation of free hand sketches, mind maps for context study and initial concept Preparation of Mood board, material palette.	8	CO2
LLO 3.1 *Prepare sketches, drawing for deriving concept, zoning / bubble diagram LLO 3.2 *Prepare Floor plans showing internal layouts with suitable scale and render them LLO 3.3 *Prepare elevations, Sections showing interior design proposed and render them. LLO 3.4 Prepare internal views/sketches explaining the proposed Interior design and render them	3	Preparation of concept drawing, Floor plans with interior details, sections, elevations and views/sketches.	16	CO3

INTERIOR DESIGN**Course Code : 325002**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 4.1 Prepare layout showing details of flooring LLO 4.2 *Prepare layout and sections showing proposed False ceiling LLO 4.3 *Prepare electrical layout LLO 4.4 Prepare drawings showing plumbing details	4	Preparation of Civil changes layout, Flooring layout, False ceiling layout, Lighting layout, Electrical layout, plumbing layout, and necessary sections.	12	CO4
LLO 5.1 Prepare drawings showing details of any two interior units.	5	Preparation of detail drawing for explaining the construction of interior units	8	CO4
LLO 6.1 Prepare presentation drawings using software for client approval.	6	Preparation of software based presentation drawings for client approval.	8	CO5

Note : Out of above suggestive LLOs -

- '*1 Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Develop a technically sound and sustainable interior design theme with the help of market study and online information. Mind maps, flow diagrams, Software learning and preparing sketches/drawings. Market survey and specifications.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Basic Drafting Tools such as Tee Square, Set Squares, Triangular Scale, Foot Ruler, Drawing Board and Measuring Tape	All
2	Soft Pencils, Pencil Colors, Artists Watercolors	All
3	Software's for making presentation, Image processing video editing, CAD Drawing Software and apps.	All
4	LCD Projector and white screen for projection	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

INTERIOR DESIGN**Course Code : 325002**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction to Interior Design	CO1	4	0	0	0	0
2	II	Context Study and Project brief preparation	CO2	4	0	0	0	0
3	III	Sketching, Drafting and Rendering Techniques	CO3	8	0	0	0	0
4	IV	Services	CO4	6	0	0	0	0
5	V	Detailed scaled drawings of any two units	CO4	4	0	0	0	0
6	VI	2D and 3D Presentation Drawings	CO5	4	0	0	0	0
Grand Total				30	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- The assignments are associated with the continuous assessment of the assignments of the learner for the course work.

Summative Assessment (Assessment of Learning)

- Micro Projects assessments which is at the term end is considered as a summative assessment

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	1	1	2	-	2			
CO2	3	2	2	1	2	-	2			
CO3	3	-	2	1	2	-	2			
CO4	3	2	2	2	2	1	2			
CO5	3	2	2	2	1	-	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Ahmed A. Kasu	Interior Design	978-8185825044
2	Chris Grimley and Mimi Love	The Interior Design Reference & Specification Book: Everything Interior Designers Need to Know Every Day	978-1631593802
3	Joseph DeChiara, Julius Panero, and Martin Zelnik	Time-Saver Standards for Interior Design and Space Planning	978-0071346160

INTERIOR DESIGN**Course Code : 325002**

Sr.No	Author	Title	Publisher with ISBN Number
4	Simon Dodsworth	The Fundamentals of Interior Design	978-2940411781
5	Francis D.K. Ching	Architectural Graphics	978-1119035664
6	Francis D.K. Ching and Steven P. Juroszek	Design Drawing	978-0470533697
7	Corky Binggeli	Materials for Interior Environments	978-1118306352
8	Frida Ramstedt	The Interior Design Handbook	978-0593139318

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://designacademy.io/	courses in interior design, focusing on practical skills and creative processes.
2	https://www.archdaily.com/	ArchDaily is a leading architecture and design website that features articles, projects, and news on interior design.
3	https://design-milk.com/	Design Milk is an online magazine dedicated to modern design, offering a wealth of information on interior design, architecture, furniture, and art.
4	https://www.apartmenttherapy.com/	It provides practical tips and ideas for home improvement and interior design. It features house tours, DIY projects, and expert advice on decorating.
5	https://www.reddit.com/r/interiordesign/?rdt=35782	a community where design enthusiasts and professionals share ideas, ask for advice, and discuss trends and projects.
Note :		
<ul style="list-style-type: none"> Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students 		

MSBTE Approval Dt. 24/02/2025

Semester - 5, K Scheme

PROFESSIONAL PRACTICE & BUILDING BYELAWS**Course Code : 325301**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fifth
Course Title : PROFESSIONAL PRACTICE & BUILDING BYELAWS
Course Code : 325301

I. RATIONALE

The architectural profession in India is governed by the Architect's Act of 1972 and the norms set by the Council of Architecture (COA), New Delhi. This legislation outlines the duties and liabilities of architects and their related employees, ensuring professional standards and ethical practices. This course provides students with essential knowledge about general office procedures followed in an architect's office including duties and liabilities within the profession. The students will be acquainted with the tendering process, documentation, modes of execution of work, payment procedures, various contract clauses and building byelaws. This course will help the students to apply the knowledge gained in the field of architecture.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The learner will be able to prepare contract document for a given architectural project.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Apply codes of conduct applicable in Architectural Practice.
- CO2 - Obtain local authority approvals for a given architectural project.
- CO3 - Prepare tender documents for a given architectural project.
- CO4 - Explain the arbitration process applicable in Architectural projects.
- CO5 - Apply National, State, Local development control regulations and building byelaws for a given architectural project.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SL	H	NL			H	Theory			Based on LL & TL				Based on SL		
				CL	TL	LL							Total			Practical		SLA				
				Max	Max	Min	Max	Min	Max			Min	Max	Min	Max	Min	Max	Min				
325301	PROFESSIONAL PRACTICE & BUILDING BYELAWS	PP	DSC	4	1	-	1	6	3	03	30	70	100	40	-	-	-	-	25	10	125	

PROFESSIONAL PRACTICE & BUILDING BYELAWS**Course Code : 325301****Total IKS Hrs for Sem. : 2 Hrs**

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Define Architects act 1972 and its objectives. TLO 1.2 Explain the duties, liabilities & relationship of employer, Architect & contractor.	Unit - I Architects Act,1972 1.1 Architects act 1972 and its objectives. 1.2 Professional code of conduct. 1.3 The duties, liabilities & relationship of employer, Architect & contractor.	Presentations Site/Industry Visit
2	TLO 2.1 Identify the salient features of an Architect's office. TLO 2.2 Explain various legal aspects involved in getting local authority approvals at various stages of the project.	Unit - II Architect's Office Administration 2.1 Structure of Architects Office & its management & documentation. 2.2 Approvals from Local Authority at various stages of the project – prior to construction and after completion.	Presentations Case Study Flipped Classroom
3	TLO 3.1 Explain various terminologies associated with tendering process. TLO 3.2 Explain various types of tenders applicable in architectural projects. TLO 3.3 Prepare a tender notice for a given architectural project. TLO 3.4 Prepare work order for a given architectural project.	Unit - III Tender 3.1 Definition of tender, invitation of tender, necessity of inviting tender, earnest money, security deposit, retention amount, mobilization fund. 3.2 Classification of tenders, Modes of execution of works, piece work, daily labour. 3.3 Essential characteristics of Tender Notice, Special notice. 3.4 Mode of submission of tenders. 3.5 Opening of Tender, acceptance & rejection of tender, work order letter etc.	Lecture Using Chalk-Board Presentations Flipped Classroom

PROFESSIONAL PRACTICE & BUILDING BYELAWS**Course Code : 325301**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	TLO 4.1 Explain requirements of a valid contract. TLO 4.2 Explain various types of contracts. TLO 4.3 Discuss contract clauses applicable in architectural projects. TLO 4.4 Explain arbitration process applicable in architectural projects. TLO 4.5 Describe various types of certificates related to architectural projects.	Unit - IV Contract 4.1 Definition of the term contract, objects & essential requirements of valid contract. 4.2 Contract documents, types of contract. 4.3 Conditions of contract- Concept, study of some important conditions of contract, retention money, time limit & its importance, compensation for delay, extension of time limit, defect liability period, liquidated damages, extra items etc. 4.4 Arbitration-concept, qualification of Arbitrator, powers & duties of Arbitrator, Arbitral Award, Termination of Contract. 4.5 Payments & functions of issuing following certificates- Interim certificate, certificate of virtual completion, penultimate certificate & final certificate.	Presentations Lecture Using Chalk-Board Demonstration
5	TLO 5.1 Explain the terminologies used in development control regulations. TLO 5.2 Explain National, State, Local development control regulations and building byelaws.	Unit - V Introduction to building byelaws and regulations 5.1 Development Control Regulations (Definitions, Submission requirements, land use and classification of buildings, drawing requirements, setbacks and FSI). 5.2 Codes and Standards – National Building Code 2016/latest edition.	Presentations Lecture Using Chalk-Board Flipped Classroom

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES : NOT APPLICABLE.**VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)****Assignment**

- Collect the Tender Notices from News paper advertisements.
- Collect the different contract documents from Architect's office.

Micro project

- Study of an Architect's Office: Visit an Architect's office and prepare report under following heads: 1. Type of practice. 2. Location of office. 3. Various departments, their working and documentation. 4. Staff structure. 5. Planning of office and analysis.
- Prepare a report on byelaws applicable to residential buildings comes under local Municipal corporation.

PROFESSIONAL PRACTICE & BUILDING BYELAWS**Course Code : 325301****Note :**

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Microsoft Office Software	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Architects Act,1972	CO1	8	6	6	3	15
2	II	Architect's Office Administration	CO2	8	2	6	2	10
3	III	Tender	CO3	16	3	6	6	15
4	IV	Contract	CO3,CO4	16	3	6	6	15
5	V	Introduction to building byelaws and regulations	CO5	12	6	6	3	15
Grand Total				60	20	30	20	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Microproject, Team work, Self Learning (Assignment).

Summative Assessment (Assessment of Learning)

- Theory Paper.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	-	-	2	1	2			
CO2	3	2	1	-	1	1	2			

PROFESSIONAL PRACTICE & BUILDING BYELAWS**Course Code : 325301**

CO3	3	1	1	-	2	1	2			
CO4	3	1	2	-	2	1	2			
CO5	3	1	1	-	2	1	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
 *PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Dr. Roshan H Namavati	Professional Practice	Mr. Anup Lakhani, Lakhani Book Depot, Mumbai , ISBN-10: 9385492667 ISBN-13: 978-9385492662
2	Prof. Madhav Deobhakta, Ar. Meera Deobhakta	Architectural Practice in India	Council of Architecture, 2007, ISBN-13: 9788190662512
3	Council of Architecture	The Architect's Handbook	Council of Architecture
4	B.S. Patil	Civil Engineering Contracts & Estimates	Orient Longman Mumbai, ISBN-10: 9788173719578 ISBN-13: 978-8173719578
5	Govt. of India publication	The Architects Act, 1972 and its amendments	Govt. of India publication
6	Indian Standards Institution	National Building Code (2016)	Govt. of India publication
7	Govt. of Maharashtra, Urban Development Department	Unified Development Control and Promotion Regulations and it's amendments	Govt. of Maharashtra, Urban Development Department

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.coa.gov.in/	Council of Architecture
2	https://www.indiacode.nic.in/bitstream/123456789/1690/1/197220.pdf	Architect's Act 1972

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 24/02/2025

Semester - 5, K Scheme

FURNITURE DESIGN**Course Code : 325302**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fifth
Course Title : FURNITURE DESIGN
Course Code : 325302

I. RATIONALE

Furniture design is a specialized subject within the field of architecture and interior design that focuses on the conceptualization, development, and creation of furniture pieces. This course aims to equip students with comprehensive knowledge and practical skills essential for designing furniture that is functional, aesthetically pleasing, and responsive to contemporary design trends and user needs.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Design compelling, user-centered furniture solutions integrating sustainable practices and contemporary design trends.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Explain evolution and cultural influence of ancient furniture styles on modern design trends.
- CO2 - Apply anthropometric principles for ergonomic comfort within the spaces.
- CO3 - Apply principles of design to create innovative and functional furniture pieces.
- CO4 - Prepare detailed working drawings for given furniture pieces.
- CO5 - Explain joints and joinery techniques to construct furniture pieces.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			Total			Practical		SLA								
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min					
325302	FURNITURE DESIGN	ELC	DSE	2	-	4	-	6	3	03	30	70	100	40	25	10	25@	10	-	-	150	

Total IKS Hrs for Sem. : 0 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Explain scope and need of furniture design.</p> <p>TLO 1.2 Identify ancient Greek furniture from a given furniture data.</p> <p>TLO 1.3 Draw neat sketches of Egyptian furniture.</p> <p>TLO 1.4 Discuss the influence of Egyptian furniture on modern furniture.</p> <p>TLO 1.5 Draw different types of Gothic furniture indicating its characteristics.</p> <p>TLO 1.6 Explain industrial revolution of furniture.</p>	<p>Unit - I Introduction - History of Furniture Design</p> <p>1.1 Introduction to Furniture Design : Scope and Need.</p> <p>1.2 Ancient Greek Furniture Design: Types of furniture, materials, shapes and forms, color and texture.</p> <p>1.3 Egyptian Furniture Design : Egyptian chairs and seating(chairs, tables, storage beds etc.).</p> <p>1.4 Egyptian Furniture Design :Influence on Modern furniture.</p> <p>1.5 Gothic Furniture Design : Gothic chests and armoires (chairs, beds and tables) and characteristics.</p> <p>1.6 Industrial revolution of Furniture.</p>	<p>Case Study</p> <p>Video</p> <p>Demonstrations</p> <p>Lecture Using Chalk-Board</p> <p>Site/Industry Visit</p> <p>Presentations</p>
2	<p>TLO 2.1 Identify types of furniture from a given furniture data.</p> <p>TLO 2.2 Explain physical and spatial characteristics of furniture design.</p> <p>TLO 2.3 Draw different human activities with appropriate dimensions.</p>	<p>Unit - II Types of Furniture and Human Factor</p> <p>2.1 Types of Furniture: Healthcare furniture; Hospitality furniture; Institutional furniture; Multifunctional furniture; Office furniture; Recreational furniture; Religious furniture; Residential furniture; Retail furniture.</p> <p>2.2 Characteristics of furniture design: Physical and spatial characteristics of furniture.</p> <p>2.3 Anthropometry in Furniture Design : Function and Social Use - Human body supports (Sitting, resting, sleeping, eating, cooking, reading, typing, and writing etc.)</p>	<p>Lecture Using Chalk-Board</p> <p>Demonstration</p> <p>Site/Industry Visit</p> <p>Hands-on</p>
3	<p>TLO 3.1 Discuss the importance of functionality in furniture design.</p> <p>TLO 3.2 Explain scale and proportion in relation to space.</p> <p>TLO 3.3 Explain structural and visual balance with neat sketches.</p> <p>TLO 3.4 Select different types of materials and finishes for various furniture.</p>	<p>Unit - III Principles of Furniture Design.</p> <p>3.1 Functionality : Usability of furniture meeting the needs of users. (size, shape, storage capacity, and ease of use.)</p> <p>3.2 Proportion and Scale: Definition and importance, human scale in relation to space.</p> <p>3.3 Balance, Unity, Contrast and variety : Structural and Visual, Symmetry and Asymmetry.</p> <p>3.4 Materials and furnishes : Wood, Glass, Metal, Plastic, upholstery - include various finishes.</p>	<p>Demonstration</p> <p>Lecture Using Chalk-Board</p> <p>Presentations</p> <p>Site/Industry Visit</p>

FURNITURE DESIGN**Course Code : 325302**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	TLO 4.1 Explain Concept and Design brief with appropriate examples. TLO 4.2 Provide detailed specification and material treatments for a given furniture. TLO 4.3 Describe scope and importance of technical drawings in furniture design. TLO 4.4 Prepare an estimate for any furniture object using detailed estimate method.	Unit - IV Furniture Design and Working Drawing 4.1 Concept Development and Design Brief : Brainstorming ; Sketching and creating initial concept and requirements. 4.2 Specifications and Detail of design : Detailed specification , Material , Finalizing dimensions and Proportions. 4.3 Technical drawings : Plan , Elevation , Section and 3D view(Detailed working drawings). 4.4 Estimation and costing : Detailed Estimate method, labor charges , contingencies and designers fees.	Lecture Using Chalk-Board Hands-on Demonstration
5	TLO 5.1 Define various technical terms of joinery in furniture design. TLO 5.2 Explain different types of joints with neat sketches. TLO 5.3 State application process of different joints used in furniture design.	Unit - V Sustainable Practices -Construction Techniques 5.1 Joinery : Technical terms - Sawing , Chamfering , Bevel, Mitring , Housing and Rebating. 5.2 Types of Joints : Mortise and Tenon Joint, Dovetail Joint, Dado Joint, Rabbet Joint, Bridle Joint ,Butt Joint, Tongue and Groove Joint, Biscuit Joint, Dowel Joint etc. 5.3 Assembly and Application : Assembly technics , Applications and Innovations.	Lecture Using Chalk-Board Hands-on Demonstration

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare a presentation report on Ancient furniture styles.	1	*Ancient Furniture Design Styles.	4	CO1
LLO 2.1 Prepare Literature case study report on Industrial revolution and Furniture design.	2	Literature Case study : Industrial Revolution and Furniture Design.	4	CO1
LLO 3.1 Compare Egyptian and Greek chairs through sketches.	3	*Comparison of Egyptian and Greek chairs.	4	CO1
LLO 4.1 Suggest types of furniture for given spaces. LLO 4.2 Compose photo collage of different types of furniture.	4	Composition of various types of Furniture.	4	CO2
LLO 5.1 Provide standard dimensions for different working postures from given prints. LLO 5.2 Draw standing and sitting postures and give dimensions to it.	5	*Anthropometry and Ergonomics in Furniture design.	6	CO2
LLO 6.1 List at least three strengths and three weaknesses of the given Furniture design regarding its functionality. LLO 6.2 Redesign a given furniture drawing for enhancing its functionality.	6	*Functionality: Principle of Furniture Design	6	CO3
LLO 7.1 Compose a photo collage showing various furniture designs emphasizing proportion and scale considerations.	7	*Proportion and scale : Principle of Furniture Design.	4	CO3

FURNITURE DESIGN**Course Code : 325302**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 8.1 Arrange multiple furniture pieces within a given room layout, emphasizing balance between different items.	8	Balance : Principle of Furniture design.	4	CO3
LLO 9.1 Suggest detailed specifications for a given furniture Drawing.	9	*Drawings and Specifications in Furniture Design.	4	CO4
LLO 10.1 Draw working drawings including plan, sectional elevation and 3D view for a given furniture piece.	10	*Technical and Working Drawings.	8	CO4
LLO 11.1 Prepare an estimate for given furniture piece.	11	Estimate in Furniture design.	4	CO4
LLO 12.1 Compose a photo collage of various furniture indicating different joinery.	12	Types of Joints in Furniture Design.	4	CO5
LLO 13.1 Draw various joints used in furniture design.	13	*Joints and Joinery in Furniture Design.	8	CO5
LLO 14.1 Prepare a report on application techniques used in Furniture design.	14	Assembly and applications techniques in Furniture design.	4	CO5
LLO 15.1 Draw and make a report on innovative joinery techniques using modern tools and technologies, ensuring both aesthetic appeal and structural integrity.	15	Draw Innovative Joinery Techniques	4	CO5

Note : Out of above suggestive LLOs -

- '* Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

- Visit a local furniture shop/mall/factory and prepare a visit report .
- Prepare a literature case study report on ancient furniture.
- Prepare visual board using small cutouts of furniture.

Micro project

- Prepare small furniture objects from locally available material or Waste materials.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED**MSBTE Approval Dt. 24/02/2025****Semester - 5, K Scheme**

FURNITURE DESIGN**Course Code : 325302**

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Software : AutoCAD	2,4,5
2	Computer : Multi core 64-bit processor, 8 GB Boot Drive, 8 GB RAM minimum 200 GB Hard Disk. OR Latest specification at time of procurement.	All
3	Projector : Type of display Poly-silicon TFT active matrix Resolution Bright link 480i: 1024 ×768 pixels (XGA) Bright link 475Wi / 485Wi:1280 × 800 pixels (WXGA) Lens F= 1.80, Focal length: 3.71 mm Color reproduction: Full color, 16.77 million colors, Focus adjustment-Manual, Zoom adjustment-Digital, Zoom ratio-1:1.35 OR Latest specification at time of procurement	All
4	Projector Screen: 116" Diagonal viewing screen, Manual pull down Screen for both ceiling and wall usage OR Latest specification at time of procurement.	All
5	B/W Printer: Print speed black (normal, A4) Up to 14 ppm print speed. Duty cycle (monthly,A4) Up to 5000 pages recommended, monthly page volume 250 to 2000 OR Latest specification at time of procurement.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction - History of Furniture Design	CO1	8	8	4	4	16
2	II	Types of Furniture and Human Factor	CO2	6	4	4	4	12
3	III	Principles of Furniture Design.	CO3	6	6	4	4	14
4	IV	Furniture Design and Working Drawing	CO4	6	4	4	8	16
5	V	Sustainable Practices -Construction Techniques	CO5	4	4	4	4	12
Grand Total				30	26	20	24	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Studio Performance and Assignments

Summative Assessment (Assessment of Learning)

- Pen and paper illustration ,Practical Examination to be conducted by faculty.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	0	2	0	2	0	2			

FURNITURE DESIGN**Course Code : 325302**

CO2	3	2	3	2	2	0	2			
CO3	3	2	2	1	2	0	2			
CO4	3	2	2	2	2	0	2			
CO5	3	1	1	0	1	0	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Sembach – Leuthauser - Gossel	20th Century Furniture Design	Taschen - 3-8228-0276-X
2	Miller, Judith	Furniture World styles from classical to contemporary	DK - 1 405306548
3	Design museum fifty	Fifty chairs that changed the world	Conran - 9781840915402
4	Fiell Charlotte and Peter	Design of the 20th century	Taschen - 9783836541060
5	Axel Ritter	Smart Materials in Architecture, Interior Architecture and Design: In Architecture, erior Architecture and Design	Birkhauser - 978-3764373276
6	Hodges, Felice and Dent Coad , Emma and Stone, Anne and Sparke, Penny, and Aldersey, Williams Hugh	The New Design Sourcebook	Little, Brown and Co - 0 356 20966 0
7	Jim Postell	Furniture Design Second Edition	John Wiley & Sons- 978-1-118-09078-7
8	Coley, Scott	Elements of Furniture Design: Principles and History of Furniture Design with Analysis of Furniture Made by Thomas Day	Schiffer Publishing Ltd - 9780764367465

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://ffsc.in/assets/pdf/PH_FFSQ0106_Assistant-Furniture-Designer.pdf	Furniture and Furniture sector in India.
2	https://www.youtube.com/results?search_query=furniture+design+tutorials	Furniture design tutorials
3	https://www.finewoodworking.com/	Joints and Joinery , construction technics for typical furniture.
4	https://www.popularwoodworking.com/furniture-projects/	Popular Woodworking Magazine- woodworking projects from simple (but attractive) that use basic joinery, to complex furniture plans using advanced woodworking techniques.
5	https://www.woodmagazine.com/project-plans/furniture	woodworking plans for tables, cabinets, desks, bookcases, entertainment centers, and bedroom furniture.
6	https://woodworkersinstitute.com/category/furniture-cabinetmaking/	Furniture & Cabinetmaking is a bi-monthly magazine, focusing exclusively on fine furniture. It reports on the latest trends and styles from around the world and shares inspirational and thoughtful content that will boost woodworking.
7	https://www.architecturaldigest.com/topic/furniture	Different furniture design solutions

FURNITURE DESIGN**Course Code : 325302**

Sr.No	Link / Portal	Description
Note :		
<ul style="list-style-type: none">Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students		

MSBTE Approval Dt. 24/02/2025**Semester - 5, K Scheme**

ROAD SAFETY & MANAGEMENT**Course Code : 325303**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fifth
Course Title : ROAD SAFETY & MANAGEMENT
Course Code : 325303

I. RATIONALE

Effective road safety and management are crucial for reducing traffic accidents, savings lives, and minimizing injuries. implementing various measures such as improved road design, enforcement of traffic laws, and public awareness campaigns can significantly decrease the likelihood of accidents. Efficient road management also ensures smoother traffic flow, reducing congestion and environmental impact. This leads to safer, more reliable, and environmentally sustainable transportation systems. This course aims at to impart required knowledge of road safety measures to the diploma students so that likelihood of road accidents can be minimized.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Minimize the road accidents & fatalities.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Analyze road accident characteristics in a given local region.
- CO2 - Classify road junctions based on its geometric features.
- CO3 - Identify different components of a given pathways for universal accessibility.
- CO4 - Draw different types of parking spaces.
- CO5 - Enlist traffic signals, signs, rules and regulations adopted in our country.
- CO6 - Identify road safety measures during a given event.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										Total Marks		
				Actual Contact Hrs./Week			SL	H	NL		LH	Paper Duration	Theory				Based on LL & TL					Based on SL	
				CL	TL	LL							Practical			SLA							
													FA-TH	SA-TH	Total	FA-PR	SA-PR	Max	Min				
325303	ROAD SAFETY & MANAGEMENT	ELC	DSE	2	-	4	-	6	3	03	30	70	100	40	25	10	25@	10	-	-	150		

ROAD SAFETY & MANAGEMENT**Course Code : 325303****Total IKS Hrs for Sem. : 0 Hrs**

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Discuss road safety scenarios in the given locality. TLO 1.2 Explain road accidents & its characteristics in the given locality. TLO 1.3 Demonstrate five P's of road safety.	Unit - I Introduction to Road Safety 1.1 Introduction and overview of road safety 1.2 Road traffic accidents scenarios. Road Safety and its importance, Characteristics of accidents. 1.3 Road safety awareness - Five P's of Road safety education: 1. Pre-school road safety education 2. Practical rather than theory education 3. Principles of own development as regards to road safety education. 4. Presentations on road safety education 5. Place for road safety education in syllabus	Presentations Collaborative learning Demonstration
2	TLO 2.1 Identify types of roads on a selected area. TLO 2.2 Enlist the types of road junctions in a given area. TLO 2.3 Identify different components of a given pathways for universal accessibility TLO 2.4 Draw different types of parking spaces.	Unit - II Types of Roads. 2.1 Introduction and different types of roads (Primary, secondary & tertiary), 2.2 Typology of roads as per standards, Heirachy of junctions (T, Y, Staggered, Skewed, Cross, Scissors). 2.3 Pathways - provision for universal accessibility, sidewalks, central dividers, footpaths and central railings 2.4 Types of Parking, bus bays(Zones), bicycle lanes, off-street loading/unloading facilities.	Presentations Collaborative learning Site/Industry Visit Demonstration
3	TLO 3.1 Discuss traffic control measures in a given situation. TLO 3.2 Identify types of traffic signals & signs on a given road segment. TLO 3.3 Prepare a report on rules and regulations of traffic in local region. TLO 3.4 Identify road safety indicators in a given road segment.	Unit - III Traffic Control 3.1 Introduction to traffic control measures. 3.2 Types of Traffic signals, advance AI systems & Signs. 3.3 Awareness about rules and regulations of traffic in India. 3.4 Road safety indicators/markings, barricades, speed breakers, table tops, traffic lighted bollards, reflectors, traffic cones & drums.	Presentations Collaborative learning Demonstration Site/Industry Visit

ROAD SAFETY & MANAGEMENT**Course Code : 325303**

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	TLO 4.1 Prepare a report on the road safety measures adopted by the local authority. TLO 4.2 Discuss the role of road safety team in casualty reduction. TLO 4.3 Prepare a report on human behavior with respect to road safety in local area.	Unit - IV Road Safety Measures 4.1 Measures to improve road safety: road safety planning, 4.2 Road safety team and their role in casualty reduction. 4.3 Traffic safety and human behaviour.	Lecture Using Chalk-Board Presentations Collaborative learning
5	TLO 5.1 Prepare a report on the efforts taken by Government on Road Safety.	Unit - V Road Safety Events 5.1 Efforts taken by Government on road Safety.	Presentations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare a report on road safety and its importance	1	Road Safety and its importance	4	CO1
LLO 2.1 Prepare a report on activity conducted on any 1 of the 5 P's.	2	Five P's of Road safety education	4	CO1
LLO 3.1 *Draw a sketches of various types of road in a local region.	3	Types of Roads	4	CO2
LLO 4.1 *Prepare a report on different typology of roads, Right of way (ROW) with sections as per standards.	4	Typology of roads as per Indian standards.	4	CO2
LLO 5.1 *Prepare a report on online case study on different types of junctions.	5	Hierarchy of road junctions.	4	CO2
LLO 6.1 *Prepare a report on various components of roads, provision for universal accessibility, sidewalks, central dividers, footpaths and central railings.	6	Components of roads.	4	CO2
LLO 7.1 *Prepare a report with sketches on types of parking spaces required for different types vehicles.	7	Types of Parking.	4	CO2
LLO 8.1 *Prepare a report with sketches on types of Traffic signals & Signs.	8	Types of Traffic signals & Signs.	4	CO3
LLO 9.1 *Prepare a report on Rules and regulations of traffic in India (as per govt regulatory authority such as state RTO)	9	Rules and regulations of traffic in India	4	CO3
LLO 10.1 *Prepare a report on market survey/case study on Road safety indicators/markings, barricades, speed breakers, table tops, traffic lighted bollards, reflectors, traffic cones & drums..	10	Road safety components	4	CO3
LLO 11.1 Prepare a report on road safety provisions made by authorities during public events.	11	Measures to improve road safety	4	CO4
LLO 12.1 Prepare a report on interview with road safety persons such as Traffic police, wardens, etc.	12	Road safety team and their role in casualty reduction.	4	CO4
LLO 13.1 Prepare a report on analysis of instances of traffic violation through various means.	13	Traffic safety and human behavior.	4	CO4

ROAD SAFETY & MANAGEMENT**Course Code : 325303**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 14.1 Prepare case study report of efforts taken by govt authority on road safety.	14	Efforts taken by Government on Road Safety	4	CO5
LLO 15.1 Prepare a report on road safety measures adopted in foreign countries.	15	Road safety measures in other countries.	4	CO5
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> *' Marked Practicals (LLOs) Are mandatory. Minimum 80% of above list of lab experiment are to be performed. Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Suggestions for enhancement of road safety in a neighborhood. Identify faults in an existing road in a Neighborhood, through graphical representation. Suggest appropriate ways and means to improvise road safety. Representation through drawings.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Sketchbook, Computer desktop, drawing software, LCD Projector, sketching and drafting tools, Printer.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Introduction to Road Safety	CO1	6	2	4	8	14
2	II	Types of Roads.	CO2	7	4	4	8	16
3	III	Traffic Control	CO3	7	4	4	8	16
4	IV	Road Safety Measures	CO4	6	2	4	8	14
5	V	Road Safety Events	CO5	4	2	2	6	10
Grand Total				30	14	18	38	70

X. ASSESSMENT METHODOLOGIES/TOOLS

ROAD SAFETY & MANAGEMENT**Course Code : 325303****Formative assessment (Assessment for Learning)**

- Team work, assignment, Micro project (60% weightage to process & 40% weightage to product)

Summative Assessment (Assessment of Learning)

- Pen & paper test (written test), Sessional.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	0	0	2	0	3			
CO2	3	2	0	1	2	0	3			
CO3	3	3	2	1	2	0	3			
CO4	3	3	3	1	2	1	3			
CO5	3	2	2	1	2	2	3			
CO6										

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Prabha Shastri Ranade	Road Safety Management: Issues and Perspectives	SBS Publishers and Distributors Pvt Ltd, ISBN: 9788131405314
2	Indian Roads Congress	Manual on Road Safety Audit	Publisher - Indian Roads Congress, ISBN: IRCSP88-2019
3	Praveen Chandra Shetty	Mission Advanced Road Safety 2019–2024 (An Insight into Road Traffic Accidents on Indian Motorways)	Walnut Publication (24 July 2019) ISBN-10 ? : ? 8194208610, ISBN-13 ? : ? 978-8194208617
4	By - Ashwini Bagga & Nisha Bagga	Essentials of Road Safety	Himanshu Publications (1 January 2015) ISBN-10 : ? 817906462X, ISBN-13: ? 978-8179064627
5	By - Naresh Raghavan	Car driving School Manual for India: The Essential Book for All drivers	Notion Press; 1st edition (3 July 2019); Notion Press Media Pvt Ltd No,50 ,Chettiyar Agaram Main Road , Vanagaram , Chennai - 600095 ISBN-10 : ? 1645872556, ISBN-13 : ? 978-1645872559

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://morth.nic.in/sites/default/files/road_safety_books.pdf	Road Safety Signage & Signs

ROAD SAFETY & MANAGEMENT**Course Code : 325303**

Sr.No	Link / Portal	Description
2	www.unescap.org/sites/default/files/2.12.India_.pdf	Road Accidents in India Issues & Dimensions, Ministry of Road Transport & Highways Government of India

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 24/02/2025**Semester - 5, K Scheme**

SITE PLANNING**Course Code : 325304**

Programme Name/s : Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code : AA/ AT/ IX/ IZ
Semester : Fifth
Course Title : SITE PLANNING
Course Code : 325304

I. RATIONALE

Site planning is an integral stage in the process of Architectural Design. This course enables learners to analyze various layers of site planning - physical environment, climate analysis, development of site program and zoning, services, circulation, site design processes and strategies including creation of site plans.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The learner shall be able to develop a detailed site plan for a given design project.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Prepare a site plan of an existing site applying basic site planning concepts.
- CO2 - Prepare a detailed project brief of a given architectural project.
- CO3 - Develop a site zoning plan of a given architectural project.
- CO4 - Develop a sustainable site plan incorporating sustainable development strategies.
- CO5 - Develop a site volumetric model of a given architectural project.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			FA-TH			SA-TH	Total		Practical		SLA					
													Max	Min	Max	Min	Max	Min	Max	Min		
325304	SITE PLANNING	ELC	DSE	2	-	4	-	6	3	03	30	70	100	40	25	10	25@	10	-	-	150	

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

SITE PLANNING

Course Code : 325304

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain Principles of Site Planning. TLO 1.2 Explain various mapping methods- physical and digital. TLO 1.3 Interpret the scale of the plan of a given site. TLO 1.4 Apply graphical representation styles to the site plan.	Unit - I Principles of Site Planning 1.1 Physical context - location, topography, climate, vegetation, views and other existing features of the site. 1.2 Mapping the physical environment - collecting data in the form of maps, plans and photographs. 1.3 Mapping the intangible aspects of the site - cultural, socio-economic, sensory experience of the site. 1.4 Preparation of a scaled site plan of the existing site.	Site Visit Case study Lecture Using Chalk-Board Presentations
2	TLO 2.1 Explain various aspects of project brief as per site requirements. TLO 2.2 Develop area calculation tables using anthropometric data and space design standards. TLO 2.3 Conduct SWOT analysis of a given project site. TLO 2.4 Prepare a detailed site report using SWOT analysis conclusions.	Unit - II Site Programming 2.1 The project brief and its site requirements. 2.2 Site Programming - various functions and their area requirements based on the anthropometric data and space design standards. 2.3 SWOT analysis to understand the strength of the site, enumerate its weaknesses, identify opportunities offered by the site and possible threats, which need to be encountered. 2.4 A site report based on the SWOT analysis of the site and project brief.	Case Study Presentations Lecture Using Chalk-Board Collaborative learning
3	TLO 3.1 Explain principles and importance of zoning. TLO 3.2 Developing built forms for different building structures. TLO 3.3 Develop a zoning plan for a given project site. TLO 3.4 Draw site sections indicating building plinth levels of a given project site. TLO 3.5 Explain various types of circulation networks.	Unit - III Site Zoning 3.1 Zoning plan - allotting areas for various functions of the design program 3.2 Building envelopes - orientation and form of the built volumes, setbacks 3.3 Built and Unbuilt - ratios of built and unbuilt, open space requirements, placement of site services 3.4 Calculating building plinth levels as per site sections. 3.5 Circulation - pedestrian and vehicular, horizontal and vertical, fire escape plans	Case Study Model Demonstration Lecture Using Chalk-Board Collaborative learning
4	TLO 4.1 Explain the importance of Sustainable Site Planning. TLO 4.2 Explain various sustainable development goals for sustainable site planning. TLO 4.3 Explain various sustainable site development strategies to achieve sustainable development goals.	Unit - IV Sustainable Site Planning 4.1 Evaluation of the site plan - environmental impacts, project costing, cultural impacts, user friendly 4.2 Social objectives - employment generation, water management, waste management, public recreational open spaces, improving health conditions etc. 4.3 Sustainable strategies - rain water harvesting, solar panels, sewage treatment plant, organic waste composter, sustainable building materials and other environmentally sustainable strategies.	Case Study Lecture Using Chalk-Board Demonstration Presentations
5	TLO 5.1 Draw site plan, sections and setting out plan on AutoCAD. TLO 5.2 Develop a 3D physical model of a given site using suitable model making materials.	Unit - V Architectural Drawings and Models 5.1 Detailed Site plan and site sections on AutoCAD using various commands. 5.2 Setting out plan of the site on AutoCAD. 5.3 A 3D physical model of a given site using suitable model making materials.	Model Demonstration Video Demonstrations Presentations

SITE PLANNING**Course Code : 325304****VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Identify the principles adopted for site planning through case study.	1	*Case study on site planning aspects.	2	CO1
LLO 2.1 Enlist various physical and intangible aspects of a given site.	2	*Identification of various physical and intangible aspects of a given site.	6	CO1
LLO 3.1 Prepare a site plan indicating the existing physical features of the site.	3	Mapping of existing physical features on a site plan.	2	CO1
LLO 4.1 Prepare a site plan indicating the intangible features of the site and overlay on the physical features.	4	Mapping of existing intangible features on the site plan.	2	CO1
LLO 5.1 Prepare an existing site plan to an appropriate scale on AutoCAD.	5	*Drawing an existing site plan to scale on AutoCAD.	4	CO1
LLO 6.1 Prepare a detailed project brief of the given project.	6	*Development of project brief of the given project.	4	CO2
LLO 7.1 Analyze the strengths, weaknesses, opportunities and threats of the project site using SWOT analysis.	7	*Carry out SWOT Analysis of the project site.	4	CO1 CO2
LLO 8.1 Prepare a site report based on the site analysis and project brief.	8	Preparation of a detailed site report.	2	CO1 CO2
LLO 9.1 Prepare a zoning plan to an appropriate scale of the given project site.	9	*Preparation of a zoning plan for the given project site.	6	CO1 CO2 CO3
LLO 10.1 Develop a physical model of various forms of the built environment.	10	*Volumetric explorations through physical models.	6	CO3 CO5
LLO 11.1 Develop various sections of the site to scale.	11	*Development of site sections to scale.	6	CO3
LLO 12.1 Design a Circulation plan incorporating pedestrian and vehicular, horizontal and vertical and fire escape plans.	12	*Design of circulation plan.	4	CO3
LLO 13.1 Prepare a report of various sustainable strategies to be adopted in the site plan.	13	*Implementation of sustainable strategies in the site plan (IKS).	6	CO4
LLO 14.1 Develop proposed site plan and sections on AutoCAD.	14	*Drafting the proposed site plan and sections using AutoCAD.	6	CO2
LLO 15.1 Develop a 3D physical model of the site using appropriate model making materials.	15	*Development of 3D model of the site.	6	CO5
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> *Marked Practicals (LLOs) Are mandatory. Minimum 80% of above list of lab experiment are to be performed. Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Design a Site Plan for the given Architectural Design Project along with Site Analysis sheet, Plans, Sections and 3D Model

Assignment

SITE PLANNING**Course Code : 325304**

- Prepare a detailed site analysis report based on the SWOT Analysis of the given site and project brief.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Model making workshop equipped with laser cutting machine, 3D Printer, model making material laboratory.	15
2	AutoCAD Software version 2015 or above	5,14
3	Computer with specifications such as 8GB RAM, SSD 500GB, LCD Monitor with relevant CAD software. (with the latest configuration)	All
4	Color printer preferably for the output of A-3 size paper All	All
5	LCD projector or SMART Interactive display panel	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Principles of Site Planning	CO1	24	8	4	4	16
2	II	Site Programming	CO2	18	5	5	5	15
3	III	Site Zoning	CO1,CO2,CO3	24	4	4	4	12
4	IV	Sustainable Site Planning	CO4	12	4	7	4	15
5	V	Architectural Drawings and Models	CO2,CO5	12	0	4	8	12
Grand Total				90	21	24	25	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- The continuous internal assessment for laboratory practicals.

Summative Assessment (Assessment of Learning)

- End semester Examination, Lab performance

XI. SUGGESTED COS - POS MATRIX FORM

SITE PLANNING**Course Code : 325304**

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	2	2	2	1	2			
CO2	3	1	2	1	1	-	2			
CO3	3	1	2	1	1	-	2			
CO4	3	1	2	1	3	-	2			
CO5	3	1	2	2	1	-	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Kevin Lynch	Site Planning	The MIT Press, ISBN 0-262-12-106-9
2	Thomas Russ	Site Planning and Design Handbook	McGraw Hill Professional, 2002 ISBN 0071500774, 9780071500777
3	Norman Booth	Foundations of Landscape Architecture: Integrating Form and Space Using the Language of Site Design	John Wiley & Sons, 2011 ISBN 1118129474, 9781118129470
4	Claudia Dinop, Kristin Schwab	Sustainable Site Design: Criteria, Process, and Case Studies for Integrating Site and Region in Landscape Design	John Wiley & Sons, 2010 ISBN 0470640243, 9780470640241
5	Meg Calkins	The Sustainable Sites Handbook	Publisher: John Wiley & Sons Inc ISBN: 9780470643556, 9780470643556
6	James A. LaGro Jr.	Site Analysis: Informing Context-Sensitive and Sustainable Site Planning and Design	Publisher Wiley ISBN-13 978-1118123676

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://thedesigntbridge.in/blog/need-and-elements-of-site-planning	Need and Elements of Site Planning
2	https://indianinstituteofarchitects.com/pdf/exam/study-material/Part%20-%20II/Site%20Planning-%20igbc.pdf	Basics of Site Planning

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

Maharashtra State Board Of Technical Education, Mumbai																								
Learning and Assessment Scheme for Post S.S.C Diploma Courses																								
Programme Name		: Diploma In Interior Design																						
Programme Code		: IZ										With Effect From Academic Year				: 2023-24								
Duration Of Programme		: 6 Semester										Duration				: 16 WEEKS								
Semester		: Sixth										NCrF Entry Level : 4.0				Scheme : K								
Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme					Credits	Paper Duration (hrs.)	Assessment Scheme										Total Marks	
						Actual Contact Hrs./Week			Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs /Week			Theory			Based on LL & TL				Based on Self Learning				
						CL	TL	LL					FA-TH	SA-TH	Total	Practical		SLA						
																FA-PR	SA-PR	Max	Min	Max	Min			
(All Compulsory)																								
1	INTERNSHIP (16 WEEKS)	IN16	INP	323019	-	-	-	-	-	40 - 48	16	-	-	-	-	-	100	40	100#	40	-	-	200	
2	CAPSTONE PROJECT	CP01	SEC	334001	-	-	-	2	4	6	3	-	-	-	-	-	50	20	50#	20	100	40	200	
3	SEMINAR COURSE	SEMC	AEC	324011	-	-	-	1	1	2	1	-	-	-	-	-	25	10	50@	20	25	10	100	
Total								3	5		20		0	0	0		175		200		125		500	
<p>Abbreviations : CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment,SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment</p> <p>Legends : @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination</p> <p>Note :</p> <ol style="list-style-type: none"> 1. FA-TH represents average of two class tests of 30 marks each conducted during the semester. 2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester. 3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work. 4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks 5. 1 credit is equivalent to 30 Notional hrs. 6. * Self learning hours shall not be reflected in the Time Table. 7. * Self learning includes micro project / assignment / other activities. Note: Notional learning hours for internship represents the student engagement hours. <p>Course Category : Discipline Specific Course Core (DSC) , Discipline Specific Elective (DSE) , Value Education Course (VEC) , Intern./Apprenti./Project./Community (INP) , AbilityEnhancement Course (AEC) , Skill Enhancement Course (SEC) , GenericElective (GE)</p>																								

INTERNSHIP (16 WEEKS)**Course Code : 323019**

Programme Name/s : Architecture/ Hotel Management & Catering Technology/ Interior Design & Decoration/ Interior Design/ Surface Coating Technology

Programme Code : AT/ HM/ IX/ IZ/ SC

Semester : Third / Fourth / Sixth

Course Title : INTERNSHIP (16 WEEKS)

Course Code : 323019

I. RATIONALE

Globalization has prompted organizations to encourage skilled and innovative workforce. Internships are educational and career development opportunities, providing practical/ hands on experience in a field or discipline. Summer internship is an opportunity for students to get accustomed to modern industry practices, apply the knowledge and skills they have acquired in the classroom to real-world situations and become familiar with industry environment before they enter the professional world. Keeping this in mind, industrial training is incorporated to all diploma programmes as it enables the student to get equipped with practical skills, soft skills and life skills

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences: • Apply skills and practices to industrial processes.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Observe time/resource management and industrial safety aspects.
- CO2 - Acquire professional experience of industry environment .
- CO3 - Establish effective communication in working environment
- CO4 - Prepare report of assigned activities and accomplishments.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Paper Duration		Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
													Max	Min	Max	Min	Max	Min	Max	Min	
323019	INTERNSHIP (16 WEEKS)	IN16	INP	-	-	-	-	40 - 48	16	-	-	-	-	-	100	40	100#	40	-	-	200

***Credits for Industrial Training are in-line of guidelines of NCrF :**

\$\$ The industrial Training is of 16 weeks considering 36-40 hours per week engagement of students (as per Guidelines of GR of Maharashtra Govt.) with guidance of industry supervisor/Mentor.

NOTE :- For the program offering this course, Industrial training duration will be 16 weeks, which will be accomplished considering the weeks available for that term and the period available immediately after the exam of the earlier term. The institution shall work out necessary details for the same.

V.General guidelines for organizing Industrial training

The Industry/organization selected for Industrial training/ internships shall be Government/Public Limited/ Private limited / Startup /Centre of Excellence/Skill Centers/Skill Parks etc.

a) Duration of Training - 16 weeks students engagement time

INTERNSHIP (16 WEEKS)**Course Code : 323019**

- b) Period of Time slot - 3 rd /4 th /5 th /6 th semester (16 weeks) As per Respective Programme Scheme
- c) Industry area - Engineering Programme Allied industries of large, medium or small-scale, Organization/Govt./ Semi Govt Sectors

VI. Role(s) of Department at the Institute:

Following activities are expected to be performed by the concerned department at the Polytechnics.

S.No	Activity	Suggested Schedule WEEKS
1.	Collecting information about industry available and ready for extending training with its offered capacity of students (Sample Format 1)	First to third week of previous Semester
2.	Allocations of Student and Mentor as per availability (Mentor: Student Ratio (1:15))	Fourth to Six week of previous Semester
3.	Communication with Industry and obtaining its confirmation	Sixth to Eight week of previous Semester
4.	Securing consent letter from parents/guardians of students (Sample Format 2)	Before Tenth week of previous Semester
5.	Enrollment of Students for industrial training (Format 3)	Before 14 th week of previous Semester
6.	Issue of letter to industry for training along with details of students and mentor (Format 4)	Before end of previous Semester
7.	Organize Internship Orientation session for students	Before end of respective Semester
8.	Progressive assessment of industry training by Mentor	Each week during training period
9.	Assessment of training by institutional mentor and Industry mentor	Respective Semester ESE

Suggestions-

- Department can take help of alumina or parents of students having contact in different industries for securing placement.
- Students would normally be placed as per their choices, in case of more demand for a particular industry, students would be allocated considering their potentials. However preference for placement would be given to students who have arranged placement in company with the help of their parents or relatives.
- Principal/HOD/Faculty should address students about industrial safety norms, rules and discipline to be maintained in the industry during training before relieving students for training.
- The faculty members during the visit to industry or sometimes through online mode will check the progress of the student in the training, student attendance, discipline, and project report preparation.

VII. Roles and Responsibilities of students:

- Students may interact with the mentor to suggest choices for suitable industry, if any. In case of students have any contact in industry through their parents or relatives then same may be utilized for securing placement for themselves and their peers.
- Students have to fill the forms/formats duly signed by institutional authorities along with training letter and submit it to training officer/mentor in the industry on the first day of training.
- Students must carry with him/her Identity card issued by the institute during training period.
- Students should follow industrial dressing protocols, if any. In absence of specific protocol student must wear college uniform compulsorily.
- Students will have to get all necessary information from the training officer/mentor at industry regarding schedule of training, rules and regulation of the industry and safety norms to be followed. Students are expected to observe these rules, regulations and procedures.
- Students must be fully aware that if they disobey any rule of industry or do not follow the discipline then non-disciplinary action will be taken .

INTERNSHIP (16 WEEKS)**Course Code : 323019**

- g. Students must Maintain weekly diary (Format 6) by noting daily activities undertaken and get it duly signed from industry mentor or Industrial training in charge.
- h. In case students faces any major problems in industry such as an accident or any disciplinary issue then they should immediately report the same to the mentor at the institute.
- i. Prepare final report about the training for submitting to the department at the time of presentation and viva-voce and get it signed from mentor as well as industry training in charge.
- j. Student must submit the undertaking as provided in Format 5.

VIII. Typographical guidelines for Industry Training report

Following is the suggestive format for preparing the training report. Actual report may differ slightly depending upon the nature of industry. The training report may contain the following

- a. The training report shall be computer typed (English- British) and printed on A4 size paper.
- b. Text Font -Times New Roman (TNR), Size-12 point
- c. Subsection heading TNR- 12 point bold normal
- d. Section heading TNR- 12 capital bold
- e. Chapter Name/ Topic Name – TNR- 14 Capital
- f. All text should be justified. (Settings in the Paragraph)
- g. The report must be typed on one side only with double space with a margin 3.5 cm on the left, 2.5 cm on the top, and 1.25 cm on the right and at bottom.
- h. The training report must be hardbound/ Spiralbound with cover page in black colour. The name of the candidate, diploma (department), year of submission, name of the institute shall be printed on the cover [Refer sample sheet (outer cover)]
- i. The training report, the title page [Refer sample sheet (inner cover)] should be given first then the Certificate followed by the acknowledgment and then contents with page numbers.

IX. Suggestive format of industrial training report

Following format may be used for training report. Actual format may differ slightly depending upon the nature of Industry/ Organization.

1. Title Page
2. Certificate
3. Abstract
4. Acknowledgement
5. Content Page

- Chapter 1 Organization structure of Industry and general layout.
- Chapter 2 Introduction to Industry / Organization (history, type of products and services, turn over and number of employees etc.)
- Chapter 3 Types of Major Equipments/raw materials/ instruments/machines/ hardware/software used in industry with their specifications, approximate cost, specific use and routine maintenance done.
- Chapter 4 Processes/ Manufacturing techniques and methodologies and material handling procedures.
- Chapter 5 Testing of Hardware/Software/ Raw materials/ Major material handling product (lifts, cranes, slings, pulleys, jacks, conveyor belts etc.) and material handling procedures.
- Chapter 6 Safety procedures followed and safety gears used by industry.
- Chapter 7 Particulars of Practical Experiences in Industry/Organization if any in Production/Assembly/Testing/Maintenance.
- Chapter 8 Detailed report of the tasks undertaken (during the training).
- Chapter 9 Special/challenging experiences encountered during training if any (may include students liking & disliking of work places).

INTERNSHIP (16 WEEKS)**Course Code : 323019**

Chapter 10	Conclusion.
Chapter 11	References / sources of information.

X. Suggested learning strategies during training at Industry

- o Students should visit the website of the industry where they are undergoing training to collect information about products, processes, capacity, number of employees, turnover etc.
- o They should also refer the handbook of the major machines and operations, testing, quality control and testing manuals.
- o Students may also visit websites related to other industries wherein similar products are being manufactured.

XI. Tentative week wise schedule of Industry Training

Industrial training is a common course to all Diploma programmes , therefore the industry selection will depend upon the nature of programme and its related industry. The training activity may vary according to nature and size of industry.

The following table details suggestive schedule of industrial training for all programmes offering 16 weeks of internships.

Week No	Details of Activities to be completed during Industry	FA Marks distribution for weekly dairy
1	Introduction of Industry and departments.	5
2	Study of Layout of Industry, Specifications of Machines , raw materials, components available in the industry.	5
3	Study of setup and manufacturing processes.	5
4 to 14	Execute given project or work assigned to the students ,study of safety and maintenance procedures.	20
15	Validation from industry mentor regarding project or work allocated.	25
16	Report writing.	15
Total FA Marks		100

XII. CO-PO Mapping

Table to be created by respective faculty for each project

XIII. Formative Assessment of training**A. Suggested RUBRIC of component FA**

Week No	Task to be assessed	Outcome Achievement - Poor	Outcome Achievement - Moderate	Outcome Achievement -High		Week-wise Total Marks
		Poor Marks	Average Marks	Good Marks	Excellent Marks	
1	Introduction of Industry	Minimal Knowledge of Departments, processes, products and work culture of the company (Marks – 1-4)	Moderate Knowledge of Departments, processes, products and work culture of the company (Marks –5-9)	Good Knowledge of Departments, processes, products and work culture of the company (Marks – 10-12)	Extensive Knowledge of Departments, processes, products and work culture of the company (Marks –13-15)	

INTERNSHIP (16 WEEKS)**Course Code : 323019**

Week No	Task to be assessed	Outcome Achievement - Poor	Outcome Achievement - Moderate	Outcome Achievement -High		Week-wise Total Marks
		Poor Marks	Average Marks	Good Marks	Excellent Marks	
2	Presentation of Layout of Industry, Specifications of Machines, raw materials, components available in the industry	Minimal w.r.t. tasks (Marks –1-4)	Moderate w.r.t. tasks (Marks –5-9)	Good w.r.t. tasks (Marks –10-12)	Extensive w.r.t. tasks (Marks –13-15)	
3	Participation in setup and manufacturing processes	Minimal Participation with poor understanding (Marks –2)	Moderate Participation with poor understanding (Marks –3-4)	Good Participation with poor understanding (Marks –5-8)	Extensive Participation with poor understanding (Marks –9-10)	
4 to 14	Execution of given project or work to the students, Follow of safety and maintenance procedures	Minimal Participation with poor understanding (Marks –5-10)	Moderate Participation with lower level understanding (Marks – 10-14)	Good Participation with Good understanding (Marks – 15-17)	Extensive Participation with excellent understanding (Marks – 18-20)	
15	Validation from industry mentor regarding project or work allocated	Minimal Participation with poor performance (Marks – 8-10)	Moderate Participation with acceptable performance (Marks – 11-15)	Good Participation with good performance (Marks – 16-20)	Extensive Participation with excellent performance (Marks – 20-25)	
16	Diary writing	• Results are not Presented properly, • Project work is summarized and concluded not acceptable • Future extensions are not specified (Marks –1-4)	• Results are Presented just casually • Project work is summarized and concluded casually • Future extensions are casually specified (Marks –5-9)	• Results are Presented well and properly, • Project work is summarized and concluded to a Good level • Future extensions are well specified (Marks –10-12)	• Results are Presented exhaustively • Project work is summarized and elaborated in excellent manner , concluded • Future extensions are excellently specified (Marks – 13-15)	
Total Out of :100						

B. FA Marks are to be maintained in following table**Name of the industry:**

Sr No.	Enrolment Number	Name of student	Marks from FA Table						Total 100
			Week 1	Week 2	Week 3	Week 4 to 14	Week 15	Week 16	

INTERNSHIP (16 WEEKS)**Course Code : 323019**

Marks for (FA) are to be awarded for each week considering the level of completeness of activity observed as per table specified in Sr.No. XIII above, from the daily diary maintained . Feedback from industry supervisor shall also be considered.

Name of mentor:

Signature of Mentor

I. Suggested RUBRIC for SA

Enrollment Number	Observations from Orals				Presentations				Total (100)
	Tasks undertaken (Marks-10)	Overall Understanding (Marks-20)	Creativity /Innovation demonstrated (Marks-5)	Knowledge acquired (Marks-10)	Speech Clarity (Marks-5)	Body Language (Marks-5)	Presentations (Marks-20)	Diary , Report writing and / Product (Marks-25)	

Format-1

Collecting Information about Industry/Organization available for training along with capacity

- 1) Name of the industry/organization:
- 2) Address/communication details with email :
- 3) Contact person details:
 - a) Name:
 - b) Designation:
 - c) Email
 - d) Contact number/s:
- 4) Type: Govt / PSU / Pvt / Large scale / Medium scale / Small scale
- 5) Products/services offered by industry:
- 6)
 - a) Whether willing to offer Industrial training facility during May/ June for Diploma in Engineering students: Yes / No.
 - b) If yes, whether you offer 16 weeks training: Yes/No
 - c) Industrial capacity to offer -possible:

Students	Programme name/ Title				Total
	Civil	Mechanical	Chemical		
Male					
Female					
Total					

7) Whether accommodation available for interns Yes / No.

If yes capacity: _____

8) Whether internship is charged or free:

If charged please specify amount per candidate: _____

Signature of responsible person at Industry:

Format-2**Consent Letter from parents/guardians
(Undertaking from Parents)**

To,
The Principal,

_____,
Subject: Consent for Industrial Training.

Sir/Madam,

I am fully aware that -

i) My ward studying in _____ semester at your _____ institute has to undergo 16 weeks of Industrial training for partial fulfillment towards completion of Diploma in _____ Engineering.

ii) For this fulfillment he/she has been deputed at _____ industry, located at _____ for Industrial training /internship for the period from _____ to _____

With respect to above I give my full consent for my ward to travel to and from the mentioned industry. Further I undertake that –

- My ward will undergo the training at his/her own cost and risk during training and/or stay.
- My ward will be entirely under the discipline of the organization where he/she will be placed and will abide by the rules and regulations in face of the said organization.
- My ward is NOT entitled to any leave during training period.
- My ward will submit regularly a prescribed weekly diary, duly filled and countersigned by the training supervisor of the organization to the mentor faculty of the polytechnic.

I have explained the contents of the letter to my ward, who has also promised to adhere strictly to the requirements. I assure that my ward will be properly instructed to take his own care to avoid any accidents/injuries in the industry. In case of any accident neither industry nor the institute will be held responsible.

Signature of Parent/Guardian :

Name : _____

Address : _____

Phone Number: _____

Date: _____

Name and Signature of the student:

Phone Number of students:

Format-4**Letter to the Industry/Organization for the training along with details of students and mentors**

To,
The HR Manager,

Subject: Placement for Industrial training of ___ weeks in your organization....

Reference: Your consent letter no:

Sir,

With reference to the above we are honored to place the following students from this institute for Industrial training in your esteemed organization as per the arrangement arrived at.

The purpose of this training is to equip the student with some essential skills relevant to the demands of the industry and world of work, as well as to provide exposure to the professional environment and work culture. It is hoped that this training may enhance his/her employability and livelihood opportunities. In view of the above, we kindly request your support in facilitating this Industrial Training for the student. He/she has been adequately oriented and guided on the expectations of this training, including the maintenance of a daily diary during the training period. Additionally, the institute has secured the necessary consent and undertaking from the parent/guardian regarding the guidelines for exit training. In view of all the above industry shall refrain from involving students into the mundane and housekeeping activities. Your cooperation in this regard will be highly appreciated.

Diploma programme in _____ Engg.

Sr.No	Enrollment Number	Name of Student	Name and designation of Mentor

Diploma programme in _____ Engg.

Sr.No	Enrollment Number	Name of Student	Name and designation of Mentor

Kindly extend all possible cooperation to the students for above.

Thanking you

Yours sincerely,
(Principal)
Name of the Institute:
with Seal

Cc- To HoD/Mentor

INTERNSHIP (16 WEEKS)**Course Code : 323019****Format-5****Undertaking by the students**TO
Principal-----
Subject: Undertaking regarding Placement for Industrial training of 12/16/18 weeks durationIReg No:..... S/o/D/o.
.....Studying in ----- at -----
-----Institute at -----fully aware of the Industrial Training requirement and related responsibilities
and participation in the, Industrial training between From:
To.....I assure you that I will be of good behavior and be obedient to the staff and mentor during
the...../Industrial training. I will also abide and will not participate in all activity. I will also
discipline myself within the rules and regulations of the Institution. I am also aware that I am participating in the
..... at my own risk and I will not hold the -----Institute responsible in any way in any
eventuality namely Accident /Injury/death or whatever mishap and I myself will be solely responsible for my
safety.Place :
Date :Signature of the student
Reg. No.**Format-6****Internships Daily Diary**Name of the Student : _____
Name of the mentor (Faculty) : _____
Enrollment Number : _____
Semester : _____
Academic Year : _____

INTERNSHIP (16 WEEKS)**Course Code : 323019**

Week	Day & Date	Discussion Topics/Activity	Details of Work Allotted Till Next Session /Corrections Suggested/Faculty Remarks	Signature of Industry Mentor
Week 01	Mon, Date			
	Tue, Date			
	Wed, Date			
	Thu, Date			
	Fri, Date			
	Sat, Date			
	Mon, Date			
	Tue, Date			
	Wed, Date			
	Thu, Date			
	Fri, Date			
	Sat, Date			
Week n	Mon, Date			
	Tue, Date			
	Wed, Date			
	Thu, Date			
	Fri, Date			
	Sat, Date			

SEMINAR COURSE

Course Code : 324011

Programme Name/s	: Architecture Assistantship/ Agricultural Engineering/ Architecture/ Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Food Technology/ Hotel Management & Catering Technology/ Instrumentation & Control/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Medical Laboratory Technology/ Medical Electronics/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Textile Technology/ Travel and Tourism/ Textile Manufactures
Programme Code	: AA/ AL/ AT/ DC/ DD/ FC/ HM/ IC/ IS/ IX/ IZ/ ML/ MU/ PN/ PO/ SC/ TC/ TR/ TX
Semester	: Fourth / Sixth
Course Title	: SEMINAR COURSE
Course Code	: 324011

I. RATIONALE

Most of the diploma graduates lack the confidence and fluency while presenting papers or interacting verbally and expressing themselves with a large gathering. Seminar presentation boosts the confidence of the students and prepares them precisely for facing the audience, interviews and group discussions. The course on seminar is to enhance student's ability in the art of academic writing and to present it. It also helps broaden the minds of the participants. Through this course on Seminar, students will develop new ideas and perspectives of the subject /themes of emerging technologies and services of their area of studies.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences: Interpret and present a seminar on the selected theme/area of study effectively and confidently to the specific audience and stakeholders.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify topics of seminar presenting to the large gathering at the institute/conference.
- CO2 - Collect relevant and updated data and information to prepare a paper of seminar presentation.
- CO3 - Apply presentation skills.
- CO4 - Create conducive environment for learning and discussion through seminar presentation.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					Total	Practical		SLA							
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min				
324011	SEMINAR COURSE	SEMC	AEC	-	-	1	1	2	1	-	-	-	-	-	25	10	50@	20	25	10	100

V. General guidelines for SEMINAR

- The seminar must be related to emerging trends in the specialised domain programme or may be inter/multi-disciplinary, based on the industry expected outcomes of the programme.

SEMINAR COURSE**Course Code : 324011**

- The individual students have different aptitudes and strengths. Therefore, SEMINAR should match the strengths of students. For this purpose, students shall be asked to select the TITLE (Theme) of SEMINAR they would like to prepare and present.
- Seminar titles are to be finalized in consultation with the faculty mentor.
- Seminar must involve logic development of applications of various technologies/ processes applicable in industry.
- Seminar must be assigned to the single student. However, support of other students may be sorted while presenting the seminar
- Students are required to prepare using relevant software tools, write ups for presentation
- Students shall Submit One Hard copy and one Soft copy each of the presentation and may be encouraged to keep a recorded copy of the presentation made during the seminar.

VI. Guidelines for Seminar preparation and presentation :

Once the title/topic of a seminar has been finalized and allotted to the student, the teacher's role is important as guide, mentor and motivator, to promote learning and sustain the interest of the students.

Following should be kept in mind while preparing and presenting the seminar:

- **Seminar Orientation cum -briefing:** the seminar topics/themes should be innovative, novel and relevant to the curriculum of the programme, and also aligned to the expectations of industry.
- **Seminar Literature survey:** Information search and data collection: the information and data should be authentic, realistic and relevant to the curriculum of the programme.
- **Seminar Preparation, and presentation:** The seminar shall be present with suitable software tools and supporting handout/notes. The presentation of seminar should not be more than 20 minutes including Q-A session.

VII. Criteria of Assessment /Evaluation of Seminar**A. Formative Assessment (FA) criteria**

The assessment of the students for Progressive Assessment (PA) of 25 marks shall be done based on following criteria.

Suggestive RUBRICS

Sr. No.	Criteria	Marks
1	Selection Topic/Theme of seminar	05
2	Literature review and data presentation	03
3	Quality of Preparation and innovativeness	05
4	Q-A handling	05
5	Time Management	02
6	Seminar Presentation report	05
	Total	25

B. Summative Assessment criteria/

The summative assessment of the students End-Semester-Examination (ESE) for 50 marks shall be done by the faculty based on following criteria.

Suggestive RUBRICS

Sr. No.	Criteria	Marks
---------	----------	-------

SEMINAR COURSE**Course Code : 324011**

1	Quality of information/Knowledge presented in SEMINAR	10
2	Creativity, Innovation in SEMINAR presentation	10
3	Response to the question during seminar presentation	10
4	Coverage of Topic	10
5	Neatness in Dressing	05
6	Oratory Skills : Confidence, statement building practice	05
	Total	50

C. Self Learning Assessment

Following RUBRICS shall be used for Self Learning Assessment.

Suggestive Rubrics

Sr. No.	Criteria	Marks
1	Maintenance of Seminar Diary	10
2	Literature Survey	5
3	Practice with Presentation and Language	5
5	Timely Submissions	5
	Total	25

VIII. Suggestive CO-PO Mapping

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)	
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2
CO-1	3	1	0	-	2	2	3		
CO-2	2		2	-	2	1	3		
CO-3	3	1	1	2	1	2	3		
CO-4	2	0	0	2	1	2	3		

IX. Typographical instructions/guidelines for seminar preparation & presentation

- The seminar PPT shall be computer typed (English- British)
- Text Font -Times New Roman (TNR), Size-12 point
- Subsection heading TNR- 12 point bold normal
- Section heading TNR- 12 capital bold
- Chapter Name/ Topic Name – TNR- 14 Capital
- All text should be justified. (Settings in the Paragraph)

- Different colors text/diagrams /tables may used
- The name of the candidate, diploma (department), year of submission, name of the institute shall be printed on the first slide of PPT.

X. Seminar Report

On completion and presentation of Seminar, every student will submit a brief report which should contain the following:

1. Cover Page (as per annexure 1)
2. Title page (as per annexure 2)
3. Certificate by the Guide (as per annexure 3)
4. Acknowledgment (The candidate may thank all those who helped in the execution of the project)
5. Abstract of Paper presented in the seminar (It should be in one page and include the purpose of the seminar & methodology if any .)
6. Index
7. List of Figures
8. Introduction
9. Literature Review
10. Information/Chapters related to Seminar topic
11. Advantages and Disadvantages
12. Conclusion
13. References

NOTE: Seminar report must contain only relevant details of related technology or platform.

Details of Softcopy :

The soft copy of seminar presentation is required to be provided on the back cover of the seminar report in clear packet, which should include the following folders and contents:

1. Presentation (should include a PPT about project in not more than 15 slides)
2. Documentation (should include a word file of the project report)

NOTE: Soft copy must be checked for any harmful viruses before submission.

Annexure-

MSBTE
LOGO

SEMINAR Report

Annexure-

Institute
Logo

“**SEMINAR Title** _____”

as a partial fulfilment of requirement of the

YEAR / SEMESTER DIPLOMA of

Submitted by

Name of Student

Enrollment Number

FOR THE ACADEMIC YEAR 20__20__

(H.O.D)

(Principal)

(Internal Guide)

(External Examiner)

CAPSTONE PROJECT**Course Code : 334001**

Programme Name/s : Architecture Assistantship/ Agricultural Engineering/ Architecture/ Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Food Technology/ Hotel Management & Catering Technology/ Instrumentation & Control/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Medical Laboratory Technology/ Medical Electronics/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Textile Technology/ Travel and Tourism/ Textile Manufactures

Programme Code : AA/ AL/ AT/ DC/ DD/ FC/ HM/ IC/ IS/ IX/ IZ/ ML/ MU/ PN/ PO/ SC/ TC/ TR/ TX

Year : Fourth / Sixth

Course Title : CAPSTONE PROJECT

Course Code : 334001

I. RATIONALE

Projects at institute level provide opportunity towards practical training and help students demonstrate their ability to apply theoretical knowledge effectively. At the same time projects enhance creativity and practical problem-solving abilities, which are crucial for job roles. Thus projects offer practical experience, skill development, and a competitive edge in the job market and better employability.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

Apply and Execute solutions for real field problems effectively as a team within a given time frame and present report.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify field problem from the perspective of project work at institute.
- CO2 - Carry out feasibility & viability analysis (data collection, experiments, resources, cost, support) of the project work.
- CO3 - Apply the acquired knowledge and skills in providing solutions to the real field/industrial problems.
- CO4 - Present Project and its output/ findings / achievements along with its exhibits.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			Practical			FA-PR		SA-PR		SLA						
				Max	Max	Max	Max	Min	Max			Min	Max	Min	Max	Min	Max	Min				
334001	CAPSTONE PROJECT	CP01	SEC	-	-	2	4	6	3	-	-	-	-	50	20	50#	20	100	40	200		

V. General guidelines for PROJECT WORK

- The Project- problems must be related to the programme or may be interdisciplinary, based on the industry expected outcomes.

CAPSTONE PROJECT**Course Code : 334001**

- The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. For this purpose, students should be asked to identify the type of project work they would like to execute.
- Project titles are to be finalized in co-ordination/consultation with the Faculty mentor. However, faculty may form a team of students as per specific roles- Literature survey/data collection, data Analysis, model/prototype developers, testers. Study type project is NOT advisable.
- Project must be assigned to a group of 3-4 students under the guidance of identified faculty mentor.
- Students are required to prepare a prototype/working model/software of the Project and simultaneously prepare a report.
- Students shall Submit One Hard copy and one Soft copy each of Project Report and soft-copy of the project code or the working model.
- Students must maintain a project execution diary having the progress steps and details. The concerned faculty should check the diary on a weekly basis and accordingly interact with students based on the progress shown and keep proper record with feedback if any.
- Project shall address National Thrust area such as Environment, Digitization, Automation, sustainability and similar applicable domains

VI. Project facilitation guidelines:

Once the project has been finalized and allotted to the students, the teacher's role is very important as guide, motivator, catalyser to promote learning and sustain the interest of the students. At the same time the teacher is not expected to guide the students on each step, otherwise it will curb the creativity of the students-group. The teacher has to work as a mentor. Following should be kept in mind while facilitating the project at the institute:

1. Project orientation cum -briefing: the project should be relevant to the curriculum of the programme. The project shall be cost effective taking safety aspects, ethical issues, environmental issues and confidentiality as per expectation of industry (if any) into consideration, The work may be industry sponsored.

2. Information search and data collection: the information and data should be realistic and relevant to the problem /project. Hypothetical data shall not be taken into consideration.

3. Implementation and Monitoring: The project must have important steps /milestones to achieve as per the time frame/action plan prepared by students and faculty. The monitoring mechanism such as daily/weekly dairy (**Annexure**) must be clearly explained and delineated for the students.

VII. Criteria of Assessment /Evaluation of Project work**A. Formative Assessment (FA) criteria**

The assessment of the students under formative for 50 marks shall be done based on following criteria.

Suggestive Rubrics for Assessment of the team (30 marks)

Sr.No.	Criteria	Marks
1	Project Selection & Problem definition	05
2	Literature survey and data collection/ Gathering	05
3	Design / concept of project/ Working - Execution of Project	10
4	Stage wise progress as per Action plan/milestone	05
5	Quality Report Writing	05
Total		30

CAPSTONE PROJECT**Course Code : 334001****Suggestive Rubrics for Individual Assessment**

Sr.No.	Criteria	Marks
1	Contribution as a team member	05
2	Depth of Knowledge	10
3	Presentation	05
Total		20

B. Summative Assessment Criteria

The summative assessment of the students in the End-Semester-Examination (ESE) for 50 marks shall be done based on following criteria. This assessment shall be done by the faculty.

Suggestive RUBRICS

Sr.No.	Criteria	Marks
1	Knowledge and skill-set developed	10
2	Quality & Potential level of project	10
3	Creativity, Innovation and Team work	10
4	Project design, development and Execution	10
5	Presentation of project	10

C. Self Learning Assessment**Max Marks -100**

Sr.No.	Criteria	Max Marks	Marks Obtained
1	Project Selection & Problem definition	20	
2	Literature survey and data collection/ Gathering	10	
3	Design / concept of project/ Working - Execution of Project	30	
4	Stage wise progress as per Action plan/milestone	20	
5	Quality Report Writing	20	

VIII. CO-PO Mapping

CO-PO mapping will vary project wise and shall be prepared by concerned faculty for the given project

IX. Typographical instructions/guidelines for Project report writing

Following is the suggestive format for preparing the training report. Actual report may differ slightly depending upon the nature of industry. The training report may contain the following.

- a. The PROJECT report shall be computer typed (English- British) and printed on A4 size paper.
- b. Text Font -Times New Roman (TNR), Size-12 point
- c. Subsection heading TNR- 12 point bold normal
- d. Section heading TNR- 12 capital bold
- e. Chapter Name/ Topic Name – TNR- 14 Capital
- f. All text should be justified. (Settings in the Paragraph)
- g. The report must be typed on one side only with double space with a margin 3.5 cm on the left, 2.5 cm on the top, and 1.25 cm on the right and at bottom.

CAPSTONE PROJECT**Course Code : 334001**

h. The training report must be hardbound/ Spiralbound with cover page in black colour. The name of the candidate, diploma (department), year of submission, name of the institute shall be printed on the cover [Refer sample sheet (outer cover)]

i. The training report, the title page [Refer sample sheet (inner cover)] should be given first then the Certificate followed by the acknowledgment and then contents with page numbers.

X. Project Report

On completion of the project work, every student will submit a project report which should cover the following points:

1. Cover Page (as per annexure 1)
2. Title page (as per annexure 2)
3. Certificate by the Guide (as per annexure 3)
4. Acknowledgment (The candidate may thank all those who helped in the execution of the project.)
5. Abstract (It should be in one page and include the purpose of the study; the methodology used.)
6. Table of Contents (as per general guidelines): Detailed description of the project (This should be split in various chapters/sections with each chapter/section describing a project activity in totality).

Chapter–1 Introduction (background of the Industry or User based Problem/Task)

Chapter–2 Literature Survey (to finalize and define the Problem Statement)

Chapter–3 Scope of the project

Chapter–4 Methodology/Approach, if any

Chapter-5 Details of designs, working and processes

Chapter-6 Results and Applications

7. Conclusion

8. References (The listing of references should be typed 2 spaces below the heading “REFERENCES” in alphabetical order in single spacing left – justified. It should be numbered consecutively (in square [] brackets, throughout the text and should be collected together in the reference list at the end of the report. The references should be numbered in the order they are used in the text. The name of the author/authors should be immediately followed by the year and other details).

NOTE: Project report must contain only relevant and short mentioned – technology or platform or tools used. It must be more focussed on project work carried out and its implementation

Annexure-I**Project Report**

“Project Title-----”

as a partial fulfilment of requirement of the
THIRD YEAR DIPLOMA IN

Submitted by

1)Name Of Student	Enrollment Number
2)Name Of Student	Enrollment Number
3)Name Of Student	Enrollment Number
4)Name Of Student	Enrollment Number

Are the bonafide on
FOR THE ACADEMIC YEAR

20-----20---

(H.O.D)

(Internal Guide)

(Principal)

(External Examiner)

Institute Name

(An Affiliated Institute of Maharashtra State Board of Technical Education)

CAPSTONE PROJECT**Course Code : 334001**

INDEX		
Sr.No.	Chapter	Page No.
1.	Chapter-1 Introduction (background of the Project Problem)	1
2.	Chapter-2 Literature Survey (to finalize and define the Problem Statement)	5
3.	Chapter-3 Scope of the project	
4	Chapter-4 Methodology/Approach, if any	
5	Chapter-5 Details of designs, working and processes	
6.	Chapter-6 Results and Applications	
7.	REFERENCES	

***Students can add/remove/edit chapter names as per the discussion with their guide**

Annexure - II**PROJECT DIARY (Weekly/Daily)**

Name of the Student : _____

Name of Guide (Faculty) : _____

Enrollment Number : _____ **Semester:** _____ **Project batch**
Number : _____

WEEK : _____

Date	Activity carried out (Details)	Achievement of mile stone/step as per plan	Remark of Faculty
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			

Dated Signature of Faculty

Dated Signature of HOD

Annexure- III

Project Assessment /Evaluation – Summative Assessment (Suggestive)

Roll No./ Enrol. No.	Name of Student	Criteria				
		Knowledge and skill-set developed Max Marks- 10	Quality & Potential level of project Max Marks- 10	Creativity, Innovation and Team work Max Marks- 10	Project design, development and Execution Max Marks-10	Presentation of project Max Marks-10

MSBTE
LOGOInstitute
Logo

Certificate

This is to certify that

Mr./Ms.

bearing examination seat No. has

Satisfactorily completed his/her **PROJECT** entitled

Along with his/her batchmates in partial fulfillment for the

Diploma Course in***< PROGRAMME NAME >******Of the Maharashtra State Board of Technical Education at our Polytechnic during the Academic Year 20 -20 .******The Project is completed by a group consisting of ___ Persons under the guidance of the Faculty Guide***

CAPSTONE PROJECT

Course Code : 334001

Faculty Name and Signature (Internal)	External Expert Name and Signature	HOD Name and Signature with Department Stamp
Date and Time		

MSBTE Approval Dt. 21/11/2024

Semester - 4 / 6, K Scheme