ESTIMATING & COSTING

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

				L	ear	ning	g Sche	eme					Α	ssess	ment	Sch	eme				
Cours	e Course Title	Abbr	Course Category/s	A C Hrs	ctu onta s./W	al act /eek	SIН	NI H	LHCredits Paper		Theo		Theory		Theory TL Practical		L & Based SL		d on L	Total	
Cour			Category	CL	TL	LL	SLII			Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	SI	А	Marks
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
32430	1 ESTIMATING & COSTING	EST	VEC	3	1	2	-	6	3	03	30	70	100	40	25	10	-	-	-	-	125

#### IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code: 324301

## **ESTIMATING & COSTING**

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

#### V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

ESTI	MATING & COSTING	С	ourse 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	<ul><li>TLO 5.1 Use the relevant software for preparing the detailed estimate for a given work.</li><li>TLO 5.2 Introduction to BIM (Building Information Modeling) for quantity, estimation and costing for given project.</li></ul>	<ul> <li>Unit - V Estimation using E-Tools</li> <li>5.1 Use the computer / softwares / programmers for detailed estimate preparation of works.</li> <li>5.2 Use the softwares for detailed estimate preparation of works.</li> </ul>	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

## FSTIMATING & COSTING

ESTIMATING & COSTING		С	ourse Cod	e : 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 -				

- '\*' 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	Ι	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

ESTI	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

		Programme Outcomes (POs)									
Course Outcomes (COs)	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 : *PSOs are	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, Rebort l., 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

Semester - 4, K Scheme

## ESTIMATING & COSTINGCourse Code : 324301Sr.NoLink / PortalDescription

#### 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

#### **BUILDING CONSTRUCTION & TECHNOLOGY**

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Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code	: AA/ AT/ IX/ IZ
Semester	: Fourth
<b>Course Title</b>	: 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 timehonored 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

				L	ear	ning	g Scho	eme					A	ssess	ment	Sch	eme				
Course Code			Course	A C Hrs	onta s./W	al act /eek				-		The	ory		Ba	Based on LL & TL Based SL		d on L			
	Course Litle	Abbr	Category/s				SLH	NLH	Credits	Paper Duration						Prac	tical				Total Morks
				CLTLL		LL	L			Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SL	A	19141 KS
											Max	Max	Max	Min	Max	Min	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.

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 Evaluate the engineering principles that govern the stability and durability of single basements and retaining walls. 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. TLO 1.3 Identify and choose appropriate materials for construction that ensure longevity and resistance to environmental stresses. TLO 1.4 Master the construction methods specific to basements and retaining walls, including waterproofing, drainage systems, and reinforcement strategies. TLO 1.5 Explain the safety protocols and maintenance requirements to preserve the structural health of basements and retaining walls over time.	<ul> <li>Unit - I Single basement structure</li> <li>1.1 Engineering principles that ensure the stability and durability of underground structures. Study real-world case studies to understand the challenges.</li> <li>1.2 Sngle 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.</li> <li>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.</li> <li>1.4 Latest construction methods for basements and retaining walls. Implement waterproofing, install drainage systems, and apply reinforcement strategies in a controlled environment.</li> <li>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.</li> </ul>	Case Study, Presentations

#### V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

BUIL	DING CONSTRUCTION & TE	CHNOLOGY Cou	rse 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	TLO 2.1 Explain the design criteria, including the Allowable Stress Design (ASD) and Load and Resistance Factor Design (LRFD) philosophy for structural steel. TLO 2.2 Explain the structural properties of steel and its designation according to Indian Standards. TLO 2.3 Design various structural steel members and connections for multi-Storey buildings	<ul> <li>Unit - II Steel Structures</li> <li>2.1 Tension members, compression members</li> <li>(columns), built-up sections, beams (flexural members), and plate girders.</li> <li>2.2 Various types of bolted and welded connections for structural steel components.</li> <li>2.3 single and double angle section struts and I-section compression members.</li> <li>2.4 Types of trusses, their components, and usability.</li> <li>2.5 Connection between purlins and roof covering in truss systems.</li> <li>2.6 Principles, procedures, and codal requirements to analyze and design tension members, compression members, bases, beams, and connections.</li> <li>2.7 Latest developments in steel structures, including considerations for sustainability and environmental impact.</li> </ul>	Video Demonstrations, Case Study, Presentations
3	TLO 3.1 Explain the purpose of building cladding and its role in protecting structures from external elements. TLO 3.2 Apply design principles to select appropriate cladding materials based on factors like aesthetics, durability, insulation, and maintenance. TLO 3.3 Explain proper installation techniques for cladding materials, including weatherproofing, fastening, and joint detailing.	<ul> <li>Unit - III Building Cladding and Glazing</li> <li>3.1 Types of cladding materials (such as metal, stone, glass, or composite panels) and their properties.</li> <li>Analyze the advantages and disadvantages of various cladding systems.</li> <li>3.2 Impact of cladding on energy efficiency, thermal performance, and overall building sustainability.</li> <li>Evaluate the compatibility of cladding systems with the architectural design and structural requirements.</li> <li>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.</li> <li>3.4 Stick systems involved in assembling the curtain wall frame (mullions) and glass or opaque panels piece by piece on-site.</li> <li>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.</li> <li>3.7 Role of curtain walls in shaping building aesthetics, energy efficiency, and occupant comfort.</li> </ul>	Site/Industry Visit, Case Study, Video Demonstrations

BUILI	DING CONSTRUCTION & TE	CHNOLOGY Cou	rse 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	TLO 4.1 State all advanced machinery used in construction industry. TLO 4.2 State all advanced plants and equipments used in construction. TLO 4.3 Differentiate between the Earth moving and hauling equipments TLO 4.4 Explain with sketch all advanced plants and equipments used in construction.	<ul> <li>Unit - IV Advanced Machinery, Plants and Equipments.</li> <li>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.</li> <li>4.2 List factors affecting the selection of equipments depending on the various parameters.</li> <li>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</li> <li>4.4 Conveying equipments like Belt conveyors, Buckets, Chutes</li> <li>4.5 Pumping equipments like Water pumps and concrete pumps.</li> <li>4.6 Vibrators for concrete consolidation like Internal, Surface, Platform and form vibrators.</li> </ul>	Case Study, Site/Industry Visit
5	TLO 5.1 Choose the flooring material for the given type of building with justification. TLO 5.2 Explain the procedure for laying and construction of given type of door. TLO 5.3 Describe the procedure of Plastering and pointing for Use given type of construction. 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. TLO 5.5 Describe safe practices to be used during the construction of the given type of building.	<ul> <li>Unit - V Building Maintainance</li> <li>5.1 Cracks : Causes and Types of Cracks.</li> <li>Identification and Repair of Cracks. Grouting and Guniting.</li> <li>5.2 Settlement of Foundation: Types, Causes and Remedial measures.</li> <li>5.3 Demolition: Necessity, Method of Demolition-Hand Demolition, Machine Demolition, Controlled Blasting. Demolition Implosion, Precautions During Demolition</li> <li>5.4 Water Proofing: Necessity and importance.</li> <li>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.</li> </ul>	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

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<b>BUILDING CONSTRUCTION &amp; TECHNOLO</b>	ourse Cod	e : 324302		
Practical / Tutorial / Laboratory Learning	Sr	Laboratory Experiment / Practical	Number	Relevant
Outcome (LLO)	No	<b>Titles / Tutorial Titles</b>	of hrs.	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 -				

- '\*' 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**

### 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 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	Measuring Tape, Drawing Board, Drafting Tolls, 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	Ι	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			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 & TECHNOLOGYCourse Code : 324302												
	Programme Outcomes (POs)											
Course Outcomes (COs)	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	CO6         2         3         2         2         2         2         3         1											
Legends : *PSOs ar	- High:03, N e to be form	/ledium:02 ulated at i	2,Low:01, No 2 nstitute level	Mapping: -								

## 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: 978-93259-6079-41
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/modigua rd	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
TAT 4		

Note :

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

FUNDAMENTALS C	F ICT Course Code : 311001
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 & 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/ Printing Technology/ Polymer 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/ 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	: First
<b>Course Title</b>	: FUNDAMENTALS OF ICT
<b>Course Code</b>	: 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

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#### IV. TEACHING-LEARNING & ASSESSMENT SCHEME

				L	ear	ning	g Sch	eme					A	ssess	ment	Sche	eme				
Course Code	Course Title	Abbr	br Course Category/s	Actual Contact Hrs./Week		SLH	NLH	H <sup>Credits</sup>	Paper	Theory		Based on LL & TL Practical		&	Based on SL		Total				
			5.	CL	TL	LL				Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SL	A	Marks
											Max	Max	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

#### 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

SnN	Theory Learning Outcomes	Learning content mapped with Theory Learning	Suggested
51.110	(TLO's)aligned to CO's.	Outcomes (TLO's) and CO's.	Pedagogies.

FUND	AMENTALS OF ICT	Cou	rse Code : 311001
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
2	TLO 2.1 Write steps to create the given text document. TLO 2.2 Explain the given feature for document editing. TLO 2.3 Explain the given page setup features of a document. TLO 2.4 Write the given table formatting feature. TLO 2.5 Write the steps to set the given type of document layout	<b>Unit - II Word Processing</b> 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. 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 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 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 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 2.6 Working with Columned Layouts and Section Breaks: a Columns, Changing part of a document layout or formatting, Remove section break, Add columns to remainder of a document, Column widths, Adjust	Hands-on Demonstration Presentations

FUNE	<b>FUNDAMENTALS OF ICT Cour</b>							
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 Write steps to create the given spreadsheet. TLO 3.2 Explain the given formatting feature of a worksheet. TLO 3.3 Write steps to insert formula and functions in the given worksheet. TLO 3.4 Write steps to create charts for the given data set. TLO 3.5 Explain steps to perform data filter, sort and validation operations on the given data set. TLO 3.6 Write steps to setup and print a spreadsheet.	<ul> <li>Unit - III Spreadsheets</li> <li>3.1 Working with Spreadsheets: Overview of workbook and worksheet, Create Worksheet Entering sample data, Save, Copy Worksheet, Delete Worksheet, Close and open Workbook.</li> <li>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</li> <li>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</li> <li>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.</li> <li>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.</li> <li>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.</li> </ul>	Hands-on Demonstration Presentations					
4	TLO 4.1 Write the steps to create the given slide presentation. TLO 4.2 Write the steps to insert multiple media in the given presentation. TLO 4.3 Explain the method of including animation, transition effects in slide show. TLO 4.4 Write steps to apply table features in the given presentation TLO 4.5 Write steps to manage charts in the given presentation	<ul> <li>Unit - IV Presentation Tool</li> <li>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</li> <li>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</li> <li>4.3 Working with Tables: Insert a Table in a Slide, Format Tables, and Import Tables from Other Office Applications.</li> <li>4.4 Working with Charts: Insert Charts in a Slide, Modify a Chart, Import Charts from Other Office Applications.</li> </ul>	Hands-on Demonstration Presentations					

## **FUNDAMENTALS OF ICT**

FUND	rse Code : 311001		
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 use of the given setting option in browsers. TLO 5.2 Explain the given option used for effective searching in search engine TLO 5.3 Explain features of the given web service. TLO 5.4 Explain concepts and applications of emerging technologies TLO 5.5 Use various elementary cloud-based tools.	<ul> <li>Unit - V Basics of Internet and Emerging Technologies</li> <li>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</li> <li>5.2 Web Services: e-Mail, Chat, Video Conferencing, e- learning, e-shopping, e-Reservation, e-Groups, Social Networking</li> <li>5.3 Emerging Technologies: IOT, AI and ML, Drone Technologies, 3D Printing.</li> <li>5.4 Tools: Docs, Drive, forms, quiz, Translate and other Apps</li> </ul>	Hands-on Demonstration Presentations

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

Practical / Tutorial / Laboratory Learning		Laboratory Experiment / Practical	Number	Relevant
Outcome (LLO)	No	<b>Titles / Tutorial Titles</b>	of hrs.	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

FUNDAMENTALS OF ICT	FUNDAMENTALS OF ICT Course Code : 31100							
Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs				
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				
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				
Note : Out of above suggestive LLOs -								
• '*' Marked Practicals (LLOs) Are manda	atory	<i>.</i>						

• 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)

#### 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.

#### Micro project

• The microproject has to be industry application based, internet-based, workshop-based, laboratory-based or fieldbased 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.

#### **FUNDAMENTALS OF ICT**

## 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
	a) Computer System with all necessary Peripherals and Internet connectivity. b) Any	
1	Office Software c) Any Browser (Any General Purpose Computer available in the Institute	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	Ι	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

FUNDAMENTALS OF ICT     Course Code : 311001										
		Programme Specific Outcomes* (PSOs)								
Course Outcomes (COs)	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 : *PSOs ar	- High:03, M e to be formu	/ledium:02 ulated at i	2,Low:01, No Institute level	Mapping: -						

### XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
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.asp x	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/compu ter_fundamental.pdf	Computer Fundamental
5	http://www.tutorialsforopenoffice.org/	Open Office
6	https://www.tutorialspoint.com/computer_fundamentals/index.h tm	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-7bcd85e6-2c3d-4c3c-a2a5-5ed8847	Word Processing
10	https://www.javatpoint.com/excel-tutorial	Spreadsheet

FUNDA	AMENTALS OF ICT	Course Code : 311001
Sr.No	Link / Portal	Description
11	https://support.microsoft.com/en-au/office/excel-video-train ing-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
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	ΙοΤ
18	https://www.geeksforgeeks.org/introduction-to-internet-of-th ings-iot-set-1/	ΙοΤ
19	https://www.javatpoint.com/machine-learning	AI & Machine Learning
20	https://www.skillrary.com/blogs/read/introduction-to-drone-t echnology	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
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 - 1, K Scheme

	07-01-2025 10:55:46 AM
YOGA AND MEDITA	TIONCourse Code : 311003
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/ 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 & Environmenta Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Computer 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	: First
<b>Course Title</b>	: YOGA AND MEDITATION
<b>Course Code</b>	: 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 : 311003

#### YOGA AND MEDITATION

		Abbr		Learning Scheme				eme			Assessment Scheme																					
Course	Course Title		Course Category/s	A Co Hrs	Actual Contact Hrs./Week				-	Theory			Based on LL & TL		&	Based on SL																
Code							SLH	HNLH	Creans	Paper Duration				Practical					Total Morks													
								1									CL	TL	LL				Duration	FA- TH	SA- TH	Tot	al	FA-	PR	SA-	PR	SL
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min												
311003	YOGA AND MEDITATION	YAM	VEC	-	-	1	1	2	1	-	-	-	-	-	25	10	-	-	25	10	50											

#### 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

SuNo	Theory Learning Outcomes	Learning content mapped with Theory	Suggested Learning
5ľ.INO	(TLO's)aligned to CO's.	Learning Outcomes (TLO's) and CO's.	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 Sarvangasna,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

YOGA AND MEDITATIONCourse Code : 311003						
Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs		
LLO 4.1 Practice basic pranayama	4	Lab Exp: 8 Perform Bhastrika, Anulom Vilom Pranayam Kriya Lab Exp: 9 Practice Kapalbhati Pranayam Kriya Lab Exp:10 Practice Bhramary Pranayam.	5	CO3		
LLO 5.1 Practice meditation	5	Lab Exp: 11 Perform sitting in Dhyan 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 : Out of above suggestive LLOs -						
<ul> <li>'*' Marked Pract</li> <li>Minimum 80%</li> <li>Judicial mix of I</li> </ul>	icals of at LLO	s (LLOs) Are mandatory. pove list of lab experiment are to be performed. s are to be performed to achieve desired outcomes.				

## 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.

#### 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	Yoga and Meditation kits : Yoga Mats, Yoga Rollers, Yoga Blocks, Aero Yoga Clothing Blankets, Cloth Straps, Bolsters, Wheels	All

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

## **YOGA AND MEDITATION**

## 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

			Progra	amme Outco	mes (POs)			Pro S Ou (	ogram Specifi Itcom PSOs	me c es* )
Course Outcomes (COs)	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 with ISBN Number
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
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

#### **YOGA AND MEDITATION** Course Code : 311003 Sr.No Link / Portal Description 4 https://onlinecourses.swayam2.ac.in/aic23 ge06/preview yoga for memory development Psychology of Stress, Health and 5 https://onlinecourses.nptel.ac.in/noc21 hs29/preview Well-being Food Nutrition for Healthy Living -6 https://onlinecourses.swayam2.ac.in/nce19\_sc04/preview Course - Swayam https://www.classcentral.com/course/swayam-fitness-managemen 7 Fitness Management from Swayam t-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 - 1, K Scheme

	07-01-2025 10:54:08 AM
BASIC MATHEMAT	TICSCourse Code : 311302
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 & 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/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Computer Science/ 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/ EK/ EP/ ET/ EX/ FC/ HA/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ MU/ PG/ PN/ PO/ SE/ TC/ TE/ TX
Semester	: First
<b>Course Title</b>	: BASIC MATHEMATICS
<b>Course Code</b>	: 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

				Learning Scheme					Assessment Scheme																
Course Code	Course Title		Course	Actual Contact Hrs./Week				Condito		Theory		Based on LL & TL		Based on SL											
	Course Title	Abbr	Category/s				SLH	NLH	Credits	Paper					Prac		ctical		Tota Mort	Total Morks					
								CL	TL	LL				Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SL	A	IVIAI KS
											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	125				

## 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	<ul> <li>TLO 1.1 Solve the given simple problem based on laws of logarithm.</li> <li>TLO 1.2 Solve given system of linear equations using matrix inversion method.</li> <li>TLO 1.3 Obtain the proper and improper partial fraction for the given simple rational function.</li> <li>TLO 1.4 Solve simultaneous equations by using concept given in Ancient Indian Mathematics.</li> </ul>	<ul> <li>Unit - I Algebra</li> <li>1.1 Logarithm: Concept and laws of logarithm.</li> <li>1.2 Matrices: Matrices, algebra of matrices, transpose, value of determinant of matrix of order 3x3, adjoint and inverse of matrices.</li> <li>1.3 Matrices: Solution of simultaneous equations by matrix inversion method.</li> <li>1.4 Partial Fractions: Types of partial fraction based on nature of factors and related Problems.</li> <li>1.5 Algebra in Indian Knowledge System: Solution of simultaneous equations (Indian Mathematics)</li> </ul>	Improved Lecture Tutorial Assignment Demonstration Simulation

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	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.	<ul> <li>Unit - II Trigonometry</li> <li>2.1 Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), submultiples angles. (without proof)</li> <li>2.2 Factorization and De factorization formulae. (without proof).</li> <li>2.3 Inverse Trigonometric Ratios and related problems.</li> <li>2.4 Principle values and relation between trigonometric and inverse trigonometric ratios.</li> <li>2.5 Trigonometry in Indian Knowledge System: The Evolution of Sine Function in India.</li> <li>2.6 Indian Trigonometry: Basic Indian Trigonometry- Introduction and Terminology (From Ancient Beginnings to Nilakantha).</li> <li>2.7 Trigonometry in Indian Knowledge System: Pythagorean triples in Sulabasutras.</li> </ul>	Improved Lecture Tutorial Assignment Demonstration Simulation Flipped Classroom approach
3	<ul> <li>TLO 3.1 Calculate angle between given two straight lines.</li> <li>TLO 3.2 Formulate equation of straight lines related to given engineering problems.</li> <li>TLO 3.3 Identify perpendicular distance from the given point to the line.</li> <li>TLO 3.4 Calculate perpendicular distance between the given two parallel lines.</li> <li>TLO 3.5 Use geometry given in Sulabasutras to solve the given problems.</li> </ul>	<ul> <li>Unit - III Straight Line</li> <li>3.1 Straight line and slope of straight line: Angle between two lines, Condition of parallel and perpendicular lines.</li> <li>3.2 Various forms of straight lines: Slope point form, two-point form, Double intercept form, General form.</li> <li>3.3 Perpendicular distance from a point on the line.</li> <li>3.4 Perpendicular distance between two parallel lines.</li> <li>3.5 Geometry in Sulabasutras in Indian Knowledge System (construction of square, circling the square), (Indian Mathematics).</li> </ul>	Improved Lecture Tutorial Assignment Demonstration Simulation
4	<ul> <li>TLO 4.1 Solve the given simple problems based on functions.</li> <li>TLO 4.2 Solve the given simple problems based on rules of differentiation.</li> <li>TLO 4.3 Obtain the derivatives of composite, implicit, parametric, inverse, logarithmic, exponential functions.</li> <li>TLO 4.4 Apply the concept of differentiation to find given equation of tangent and normal.</li> <li>TLO 4.5 Apply the concept of differentiation to calculate maxima, minima and radius of curvature for given function.</li> <li>TLO 4.6 Familiar with concept of calculus given in Indian Mathematics.</li> </ul>	<ul> <li>Unit - IV Differential Calculus</li> <li>4.1 Functions and Limits: Concept of function and simple examples.</li> <li>4.2 Functions and Limits: Concept of limits without examples.</li> <li>4.3 Derivatives: Rules of derivatives such as sum, Product, Quotient of functions.</li> <li>4.4 Derivatives: Derivative of composite functions (chain Rule), implicit and parametric functions.</li> <li>4.5 Derivatives: Derivatives of inverse, logarithmic and exponential functions.</li> <li>4.6 Applications of derivative: Second order derivative without examples, Equation of tangent and normal, Maxima and minima, Radius of curvature.</li> <li>4.7 Calculus in Indian Knowledge System: The Discovery of Calculus by Indian Astronomers.(Indian Mathematics).</li> </ul>	Improved Lecture Tutorial Assignment Demonstration Simulation

BASI	C MATHEMATICS	Co	urse Code : 311302
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 Obtain the range and coefficient of range of the given grouped and ungrouped data. TLO 5.2 Calculate mean and standard deviation of ungrouped and grouped data related to the given simple engineering problem(s). TLO 5.3 Determine the variance and coefficient of variance of given grouped and ungrouped data. TLO 5.4 Justify the consistency of given simple sets of data.	<ul> <li>Unit - V Statistics</li> <li>5.1 Range, coefficient of range of discrete and grouped data.</li> <li>5.2 Mean deviation and standard deviation from mean of grouped and ungrouped data.</li> <li>5.3 Variance and coefficient of variance.</li> <li>5.4 Comparison of two sets of observation.</li> </ul>	Improved Lecture Tutorial Assignment Demonstration Simulation Flipped Classroom approach

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

Practical / Tutorial / Laboratory		Laboratory Experiment / Practical Titles /	Number	Relevant
Learning Outcome (LLO)	No	<b>Tutorial Titles</b>	of hrs.	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
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

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

- 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.

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- 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  $y=x^sinx$  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.

## 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

Course Code : 311302

#### **BASIC MATHEMATICS**

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

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

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	<b>R-Level</b>	<b>U-Level</b>	A-Level	<b>Total Marks</b>
1	Ι	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
		<b>Grand Total</b>		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

		Programme Outcomes (POs)										
Course Outcomes (COs)	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 : *PSOs are	Legends :- High:03, Medium:02,Low:01, No Mapping: - *PSOs are to be formulated at institute level											

#### XII. SUGGESTED LEARNING MATERIALS / BOOKS

## **BASIC MATHEMATICS**

07-01-2025 10:54:08 AM

BASIC MATHEMATICS Course Code :									
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						
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	Marvin L. Bittinger David J. Ellenbogen Scott A. Surgent	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.
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=CNqHuabCys4CFdOJaddHo Pig	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=mat h&type=html,prototype	Phet Simulation for Mathematics.
10	https://libguides.cmich.edu/OER/mathematics	Mathematics with OER.

# BASIC MATHEMATICSCourse Code : 311302Sr.NoLink / PortalDescription

#### 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 - 1, K Scheme
	07-01-2025 10:54:42 AM
COMMUNICATION	SKILLS (ENGLISH)Course Code : 311303
Programme Name/s	<ul> <li>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 &amp; Rural Engineering/ Construction Technology/ Computer Science &amp; Engineering/ Fashion &amp; Clothing Technology/ Dress Designing &amp; Garment Manufacturing/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electrical Engineering/ Electronics &amp; Tele-communication Engg./ Electrical and Electronics Engineering/ Electronics Engineering/ Food Technology/ Computer Hardware &amp; Maintenance/ Instrumentation &amp; Control/ Industrial Electronics/ Information Technology/ Computer Science &amp; Information Technology/ Instrumentation/ Interior Design &amp; Decoration/ Interior Design/ Civil &amp; Environmental Engineering/ Mechanical Engineering/ Mechanical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Computer Science/ Textile Technology/ Electronics &amp; Computer Engg./ Travel and Tourism/ Textile Manufactures/</li> </ul>
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/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ ML/ MU/ PG/ PN/ PO/ SC/ SE/ TC/ TE/ TR/ TX
Semester	: First
<b>Course Title</b>	: 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 Compose paragraphs and dialogues on given situations
- CO3 Comprehend passages correctly.
- CO4 Use contextual words in English appropriately
- CO5 Deliver effective presentations in English using appropriate body language

#### IV. TEACHING-LEARNING & ASSESSMENT SCHEME

#### **COMMUNICATION SKILLS (ENGLISH)**

Course Code : 311303

				L	lear	ning	g Sch	eme					A	ssess	ment	t Sch	eme				
Course	Course Title		, Course	Actual Contact Hrs./Week				Credito		Theory			Based on LL & TL		&	Based on SL					
Code	Course Title	Abbr	Category/s				SLH	NLH	Credits	Paper Duration						Prac	tical				Total Marks
				CL	TL	LL				Duration	FA- TH	SA- TH	То	tal	FA-	-PR	SA-	PR	SL	A	iviai Ko
											Max	Max	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

# 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 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

COM	MUNICATION SKILLS (ENGLIS	SH) Course	e Code : 311303
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 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	<ul> <li>Unit - IV Communicative Language</li> <li>4.1 Technical objects : i. Heading ii. Description of technical objects</li> <li>4.2 Picture Description : i. Situational picture ii. Describe in your own words</li> <li>4.3 Diary Entry : i. Date ii. Content iii. Name of the writer</li> <li>4.4 Translation of paragraph from English to Marathi/Hindi-Vice versa (Question not to be asked on Translation in Theory Examination)</li> </ul>	Language Lab Pictures on situations Classroom learning
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	CO2
LLO 6.1 Add depth to narratives LLO 6.2 Form grammatically correct sentences	6	*Compose situational dialogues (Any Two)	2	CO2

MSBTE Approval Dt. 01/10/2024

Semester - 1, K Scheme

COMMUNICATION SKILLS (ENGLISH	Course Cod	le : 311303		
Practical / Tutorial / Laboratory	Sr	Laboratory Experiment / Practical	Number of	Relevant
Learning Outcome (LLO)	No	<b>Titles / Tutorial Titles</b>	hrs.	COs
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	CO4
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	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 paragraphEnglish to Marathi/Hindi (vice -Versa) (Any4)	2	CO4
LLO 14.1 Reflect on thoughts, feelings, and experiences	14	*Write your experience in 50 words on ( Four) given situations (Diary Entry)	2	CO4
LLO 15.1 Develop language acquisition	15	*Respond to the questions based on the given passages	2	CO3
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 : 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**

- 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 •

# COMMUNICATION SKILLS (ENGLISH)

- Prepare a questionnaire & conduct the interview of Industry Personnel, social worker, entrepreneur
- Prepare and participate in debates and extempore speeches

### 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	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 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	Ι	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 Code : 311303

COMMUN	COMMUNICATION SKILLS (ENGLISH) Course								e : 311	303
			Progra	amme Outco	mes (POs)			Pro S Ou	ogram Specifi Itcom (PSOs	me c es* )
Course Outcomes (COs)	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 : *PSOs are	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	Author Title		
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
Mate	•	

Note :

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

Semester - 1, K Scheme

	07-01-2025 11:05:38 AM
PROFESSIONAL CO	MMUNICATIONCourse Code : 312002
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/ 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/ Printing Technology/ Polymer Technology/ Surface Coating Technology/ Computer Science/ Textile 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/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ ML/ MU/ PG/ PN/ PO/ SC/ SE/ TC/ TE/ TR/ TX
Semester	: Second
<b>Course Title</b>	: 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

#### PROFESSIONAL COMMUNICATION

INOI	ESSIONALCO		UNICAL		. •											CUU	11 50		it	120	04
			. Course Category/s	L	lear	ning	g Sch	eme					Α	ssess	ment	Sch	eme				
Course Code	Course Title	Abbr		Actual Contact Hrs./Weel			SLH	NLH	Credits	s Paper	Theory			Based on LL & TL Practical			Based on SL		Total		
				CL	TL	LL				Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	SL	A	Marks
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
312002	PROFESSIONAL COMMUNICATION	PCO	SEC	-	-	2	-	2	1	-	-	-	-	-	25	10	25@	10	-	-	50
Tota	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
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

MSBTE Approval Dt. 01/10/2024

Semester - 2, K Scheme

PROF	<b>TESSIONAL COMMUNICATION</b>	Cou	ourse 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.				
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
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

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 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 maybe 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
4	Printer	All

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

# X. ASSESSMENT METHODOLOGIES/TOOLS

#### **PROFESSIONAL COMMUNICATION**

### 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

			Progra	amme Outco	mes (POs)			Programme Specific Outcomes* (PSOs)			
Course Outcomes (COs)	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 : *PSOs are	- High:03, M e to be form	/ledium:02 ulated at i	2,Low:01, No 2 nstitute level	Mapping: -							

# 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
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

Semester - 2, K Scheme

# PROFESSIONAL COMMUNICATION

PROFESS	SIONAL COMMUNICATION	Course Code : 312002
Sr.No	Link / Portal	Description

### 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

SOCIAL AND LIFE S	KILLS Course Code : 312003
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/ Selectrical Engineering/ Construction Technology/ Dress Designing & Garment Manufacturing/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical and Electronics Engineering/ Electronics & Tele-communication Engg./ Electrical and Electronics Engineering/ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Hote Management & Catering Technology/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmenta 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	: Second
<b>Course Title</b>	: 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.

#### II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

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#### SOCIAL AND LIFE SKILLS

#### Course Code : 312003

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 Title	Abbr	Course Category/s	Learning Scheme						Assessment Scheme											
Course Code				Actual Contact Hrs./Week				Guadita	5	Theory			Based on LL & TL				Based on SL				
		ADDr		CL			SLH	NLH		Paper Duration				Practical						Iotal Marks	
					TL	LL					FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SL	A	19141 K5
											Max	Max	Max	Min	Max	Min	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	Learning content mapped with Theory	Suggested Learning				
	(TLO's)aligned to CO's.	Learning Outcomes (TLO's) and CO's.	Pedagogies.				

SOCL	AL 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.
1	TLO 1.1 Explain developmental needs and connection of various stakeholders TLO 1.2 Enlist the local problems TLO 1.3 Design a methodology for fieldwork TLO 1.4 Select the attributes of engineering and social system for measurement, quantification, and documentation TLO 1.5 Measure & quantify the quantities / systems parameters TLO 1.6 Write a report using information collected tStudy the data collected from fieldwork and conclude the observations	MODULE 1: Activities Under Unnat Maharashtra Abhiyan (UMA) 1.1 Introduction to Societal Needs and respective stakeholders : Regional societal issues that need engineering intervention 1.2 Multidisciplinary approach-linkages of academia, society and technology 1.3 Stakeholders' involvement 1.4 Introduction to Important secondary data sets available such as census, district economic surveys, cropping pattern, rainfall data, road network data etc 1.5 Problem Outline and stakeholders : Importance of activity and connection with Mapping of system components and stakeholders (engineering / societal) 1.6 Key attributes of measurement 1.7 Various instruments used for data collection - survey templates, simple measuring equipments 1.8 Format for measurement of identified attributes/ survey form and piloting of the same 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 1.10 Analysis and Report writing Report writing containing- 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.	<ul> <li>i) Group discussion <ul> <li>ii) Role play</li> <li>iii) Case study</li> <li>iv) Seminar and presentation</li> </ul> </li> <li>Implementation guidelines <ul> <li>suggested</li> </ul> </li> <li>The course will be <ul> <li>implemented in eight sessions</li> <li>and fieldwork: <ul> <li>a) Session I - Introduction to</li> <li>development paradigm,</li> <li>fieldwork and case study as</li> <li>pedagogy</li> <li>b) Session II - VII - Society,</li> <li>stakeholders and value</li> <li>creation, measurements,</li> <li>rudimentary analysis and</li> <li>reporting</li> <li>c) Session VIII - Final closure</li> <li>session feedback and</li> <li>assessment</li> <li>d) Field work - <ol> <li>Pilot Visit - Pilot of survey</li> <li>instrument</li> <li>Survey Visit 1 - Data</li> <li>gathering / Information</li> <li>Collection</li> <li>Survey Visit 2 - Data</li> <li>gathering</li> <li>Survey Visit - Closure</li> <li>after analysis</li> </ol> </li> <li>Methodology: <ul> <li>Considering the nature of the</li> <li>course designed, following</li> <li>points shall be considered</li> <li>while implementing the course.</li> <li>i) Regroup in the batches of 5-6</li> <li>students for conducting the</li> <li>fieldwork from the bigger</li> <li>group.</li> <li>ii) A sroup of course teachers</li> <li>will visit local governance</li> <li>bodies such as Municipal</li> <li>Corporations, Village</li> <li>Panchayats, Zilla Parishads,</li> <li>Panchayat Samitis to assess the</li> <li>small technological /</li> <li>engineering needs in their area</li> <li>of work</li> </ul> </li> </ul></li></ul></li></ul>

SOCIAL AND LIFE SKILLS Course Code : 31200									
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.						
			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	TLO 2.1 Adopt a Village or Slum for providing needed services to the community TLO 2.2 Carry out Survey to identify the problems of village community TLO 2.3 Unsertake Special camping about developmental programs TLO 2.4 Establish the liaisons between government and other developmental agencies for the implementations of various development schemes of Government	<ul> <li>MODULE II : National Service Scheme (NSS)</li> <li>2.1 Contacting Village/Area Leaders</li> <li>2.2 Primary socio economic survey of few villages in the vicinity of the institute.</li> <li>2.3 Selection of the village for adoption - conduct of activities</li> <li>2.4 Comprehensive Socio Economic Survey of the Village/Area</li> <li>2.5 Identification of Problem(s)</li> <li>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.</li> <li>2.7 A liaison between government and other development agencies for the implementation of various development schemes in the selected village / slum.</li> </ul>	<ul> <li>(i) The teachers should visit the village / slum before adopting it for NSS activities.</li> <li>(ii) The selected area should be compact.</li> <li>(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.</li> <li>(iv) The areas where political conflicts are likely to arise should be avoided by the NSS units.</li> <li>(v) The area should be easily accessible to the NSS volunteers to undertake frequent visits to slums.</li> </ul>						
3	TLO 3.1 Demonstrate Love and Compassion (Prem and Karuna) in the society TLO 3.2 Follow the path of Truth (Satya) TLO 3.3 Practice Non- Violence (Ahimsa) TLO 3.4 Follow the Righteousness (Dharma) TLO 3.5 Attain Peace (Shanti) in Life TLO 3.6 Provide Service (Seva) to the needy person/community. TLO 3.7 Demonstrate Renunciation (Sacrifice) Tyaga TLO 3.8 Practice Gender Equality and Sensitivity	MODULE-III : Universal Human Values 3.1 Love and Compassion (Prem and Karuna): Introduction, Practicing Love and Compassion (Prem and Karuna) 3.2 Truth (Satya) : Introduction, Practicing Truth (Satya) 3.3 Non-Violence (Ahimsa) : Introduction, Practicing Non-Violence (Ahimsa) 3.4 Righteousness (Dharma) : Introduction, Practicing Righteousness (Dharma) 3.5 Peace (Shanti) : Introduction, Practicing Peace (Shanti) 3.6 Service (Seva) : Introduction, Practicing Service (Seva) 3.7 Renunciation (Sacrifice) Tyaga : Introduction, Practicing Renunciation (Sacrifice) Tyaga 3.8 Gender Equality and Sensitivity: Introduction, Practicing Gender Equality and Sensitivity	i) Lectures ii) Demonstration iii) Case Study iv) Role Play v) Observations vi) Portfolio Writing vii) Simulation viii) Motivational talks by Practitioners ix) Site/Industry Visit						

SOCL	AL 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	TLO 4.1 Demonstrate	<b>MODULE-IV: Value Education (Unnati</b>	i) Video Demonstrations
	Puntuality appropriately	Foundation)	
		4.1 Punctuality, Icebreaker and Simple	ii) Flipped Classroom
		Greeting, Understanding & Managing	
		Emotions, Introducing Self, The power of	iii) Case Study
	TLO 4.2 Prosting Cleanlings	a Positive Attitude, Talking about one's	iv) Dala Dlav
	Hygiene and Orderliness for	Making a Positive Impression Give word	iv) Kole Play
	self and others	list for a Word based	y) Collaborative learning
		4.2 Cleanliness . Hygiene and Orderliness	() Condoctari e realining
		, Likes and Dislikes, Developing	vi) Cooperative Learning
		Confidence in Self and Others, Strengths	
	TLO 4.3 Take Responsibility	and Weaknesses, Listening Skills,	vii) Chalk-Board
	and Calculated Risks	Greeting gestures, Gender Equality and	
		Sensitivity	
		4.3 Responsibility, OCSEM- Visual	
	TLO 4 4 Demonstrate	Comprehension and word Based Learning,	
	Gratitude and Appreciations	Like & Share Unnati Social Media -	
	Granude and Appreciations	Facebook / Instagram/ Twitter Introducing	
		Others, Time Management, Talking about	
	TLO 4.5 Show Determination	the daily routine, Money Management	
	& Persistence about work	4.4 Gratitude and Appreciation, Asking	
		Simple Questions & Asking for the price,	
		Stress Management, Student Referral	
	ILO 4.6 Give Respect as per	process, Comprehending & Paraphrasing	
	the social norms and practice	of Labour, Topics for Public Speaking	
		Placement Process, OCSEM-E-	
		Newspaper, Critical Thinking to overcome	
		challenges	
	TLO 4.7 Respect Team Spirit	4.5 Determination and Persistence,	
	to the acceptable level	Guiding and Giving Directions, Language	
		Etiquette & Mannerism, . Unnati	
	TLO 4.8 Prestice Caring &	Philosophy, b. Unnati Branding - Follow,	
	Sharing among fellow	Eike & Share Ullhan Social Media -	
	citizens/community	instructions to follow procedures	
	••••••	Assertiveness, Give topics for Debate,	
		Describing a person/Objects, Refusal	
	TLO 4.9 Demonstrate	Skills, Word List for Word based Learning	
	Honesty	4.6 Respect, Comparing, OCSEM - Public	
		Speaking, Student referral process,	
	TLO $4.10$ Prostice for	Attending a phone call, Being a Good	
	Forgive and Forget	Restaurant Workplace ethics	
	r orgive and r orget	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	
		Importance of Self Learning and	
		unskilling	
		-FB	

SOCIAL AND LIFE SKILLS Course Code : 31200									
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.						
		<ul> <li>4.8 Caring and Sharing , Handling Customer queries, Flexibility &amp; Adaptibility, Student referral process, Writing a Resume, OCSEM-Public Speaking, Placement Process, Meditation/ Affirmation &amp; OCSEM-Debate, Introduce Certif-ID, how to create Certif-ID Project , 4.9 Honesty, Email etiquette &amp; Official Email communication, Alcohol &amp; Substance use &amp; abuse, Describing a known place , Leadership Skills, Describing an event, OSCEM-Picture Reading &amp; Visual Comprehension 4.10 Forgive and Forget, Facing and Interview, OSCEM-Public Speaking , Attending a telephonic/Video interview &amp; Mock Interview , Affirmation , Pat-a-Back &amp; Closure (Valediction , Unnati Branding, Student Testimonials), Meditation/ Affirmation &amp; Sponsor connect (Speak to UNXT HO)</li> </ul>							
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

# SOCIAL AND LIFE SKILLS

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:

# SOCIAL AND LIFE SKILLS

(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 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	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

SOCIAL A	AND LIFE S	SKILLS					Course	Code	: 312(	)03
		Programme Specific Outcomes* (PSOs)								
Course Outcomes (COs)	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 : *PSOs ar	- High:03, M e to be formu	/ledium:02 ulated at i	2,Low:01, No nstitute level	Mapping: -						

#### 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	Central Public Health and Environmental Engineering Organisation	Manual on Water Supply and Treatment	Ministry of Urban Development, New Delhi
3	Specifications And Standards Committee	Indian Standards (IS) Codes and Indian Roads Congress (IRC) Codes	Bureau of Indian Standards and The Indian Road Congress
4	Prepared by each district administration	Districts Economic survey reports	Govt. of Maharashtra
5	Local college students, UMA staffs	Sample Case Studies on UMA website	IITB-UMA team
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

Link / Portal

Semester - 2, K Scheme

Description

SOCL	OCIAL AND LIFE SKILLS Course Code : 31200								
Sr.No	Link / Portal	Description							
1	https://gr.maharashtra.gov.in/Site/Upload/Government%20Resol utions/English/201601131501523808.pdf	Government Resolution of Government of Maharashtra regarding Unnat Maharashtra Abhiyan							
2	https://gr.maharashtra.gov.in/Site/Upload/Government%20Resol utions/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_JeevanKaush al_2023.pdf	UHV: UGC Course on life skils. 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/FinancialEnterpre nure.aspx	Reference for Module V							
16	https://www.rbi.org.in/FinancialEducation/content/I%20Can%20 Do_RBI.pdf	Reference for Module V							
17	https://www.rbi.org.in/FinancialEducation/content/ Financ ing%20needs%20of%20Micro%20and%20small%20Enterprises%20- %20A %20guide.pdf	Reference for Module V							
18	https://www.rbi.org.in/FinancialEducation/content/GUIDE31011 3 F.pdf	Reference for Module V							

# SOCIAL AND LIFE SKILLSCourse Code : 312003Sr.NoLink / PortalDescription

#### 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

APPLIED MATHEM	IATICS	Course Code : 312301
Programme Name/s	: Architecture Assistantship/ Automobile Engineering./ A Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automatic Cloud Computing and Big Data/ Civil Engineering/ Chemical Engineering/ Computer Tec Engineering/ Civil & Rural Engineering/ Construction Technology/ C Engineering/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tel Electrical and Electronics Engineering/ Electrical Power System/ Electronics & Communication Engineering/ Computer Hardware & Maintenance/ Instrumentation & Control/ Industrial Electronics/ Infor Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Engineering/ Mechanical Engineering/ Mechatronics/ Medical Electronics Computer Science/ Electronics & Computer Engg.	Artificial Intelligence/ on and Robotics/ Architecture/ chnology/ Computer omputer Science & e-communication Engg./ Engg./ Electronics rmation Technology/ Computer c Design/ Civil & Environmental onics/ Production Engineering/
Programme Code	: AA/ AE/ AI/ AL/ AN/ AO/ AT/ BD/ CE/ CH/ CM/ CO/ C EJ/ EK/ EP/ ET/ EX/ HA/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ SE/ TE	CR/ CS/ CW/ DE/ DS/ EE/ / ME/ MK/ MU/ PG/
Semester	: Second	
<b>Course Title</b>	: APPLIED MATHEMATICS	
<b>Course Code</b>	: 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 decisionmaking, 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 Title	Abbr	Course Category/s	Learning Scheme				eme			Assessment Scheme										
Course Code				Actual Contact Hrs./Week				Conditor	D	Theory			Based on LL & TL				Based on SL				
							SLH	NLH	Credits	Paper Duration					Practical						Total Marks
				CL	TL	LL				Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	SL	A	11141 K5
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
312301	APPLIED MATHEMATICS	AMS	AEC	3	1	-	-	4	2	3	30	70	100	40	-	1	-	-	-	-	100

07-01-2025 11:00:20 AM

Course Code: 312301

# APPLIED MATHEMATICS

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	<ul> <li>TLO 1.1 Solve the given simple problem(s) based on rules of integration.</li> <li>TLO 1.2 Evaluate the given simple integral(s) using substitution method.</li> <li>TLO 1.3 Integrate given simple functions using the integration by parts.</li> <li>TLO 1.4 Solve the given simple integral by partial fractions.</li> </ul>	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.	<ul> <li>Unit - II Definite Integration</li> <li>2.1 Definite Integration: Definition, rules of definite integration with simple examples.</li> <li>2.2 Properties of definite integral (without proof) and simple examples.</li> </ul>	Video Simulation Chalk-Board Improved Lecture Presentations
3	<ul> <li>TLO 3.1 Find the order and degree of given differential equations.</li> <li>TLO 3.2 Form simple differential equation for given elementary engineering problems.</li> <li>TLO 3.3 Solve given differential equations using the methods of Variable separable and Exact Differential Equation(Introduce the concept of partial differential equation).</li> <li>TLO 3.4 Solve given Linear Differential Equation.</li> </ul>	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

APPL	<b>JED MATHEMATICS</b>	Co	urse Code : 312301
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.	<b>Unit - V Probability Distribution</b> 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		Co	ourse Code	e : 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	. –			

- '\*' 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

#### **APPLIED MATHEMATICS**

# 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.	All
	Calculus, Trigonometry and Statistics respectively.	

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

Sr.No	Unit	Unit Title	Aligned COs	<b>Learning Hours</b>	<b>R-Level</b>	<b>U-Level</b>	A-Level	<b>Total Marks</b>
1	Ι	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
		<b>Grand Total</b>	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

	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
Course Outcomes (COs)	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			

APPLIED MATHEMATICS Course							Code	: 3123	301	
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
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 and Tibshirani	An Introduction to StatisticalLearning with Applications in R	Springer New York Heidelberg Dordrecht LondonISBN 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=CNqHuabCys4CFdOJaddHo Pig	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.

APPL	IED MATHEMATICS	Course Code : 312301
Sr.No	Link / Portal	Description
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

MSBTE Approval Dt. 01/10/2024

Semester - 2, K Scheme

07-01-2025 10:56:04 AM Course Code : 321006

Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code	: AA/ AT/ IX/ IZ
Semester	: First
<b>Course Title</b>	: ARCHITECTURAL GRAPHICS & DRAWING
<b>Course Code</b>	: 321006

#### I. RATIONALE

This course will help the students to develop drafting and sketching skills and will provide the knowledge and application of drawing instruments to build proficiency in drawing and reading various architectural curves, projections, and dimensioning styles.

#### II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

ARCHITECTURAL CRAPHICS & DRAWING

Prepare architectural 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, drafting techniques and symbols.
- CO2 Mastering Architectural Lettering and Architectural Scales.
- CO3 Introduction to orthographic projections and its applications.
- CO4 Apply the fundamentals of Isometric projections in Architectural graphics and drawing.

# IV. TEACHING-LEARNING & ASSESSMENT SCHEME

				L	ear	ning	g Scho	eme		Assessment Scheme											
Course Code	Course Title	Abbr	bbr Course Category/		Actual Contact Hrs./Week		SLH	NLH	Credits	Paper Practical		LL & Based SI		d on L	Total						
				CL	TL	LL				Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	SL	'A	IVIALKS
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	l
321006	ARCHITECTURAL GRAPHICS & DRAWING	AGD	DSC	2	-	4	-	6	3	-	-	-	-	-	50	20	50@	20	-	-	100

#### 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

ARCH	ARCHITECTURAL GRAPHICS & DRAWING Cov							
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 Prepare drawing using drawing instruments. TLO 1.2 Draw using different types of lines. TLO 1.3 Draw regular geometrical figures. TLO 1.4 Draw Architectural Symbols and Conventions.	<ul> <li>Unit - I Basics of Architectural drafting techniques,geometrical figures and symbols.</li> <li>1.1 Overview of traditional drafting tools (e.g., T- squares, compasses, drafting pencils)., Standard sizes of drawing sheets.</li> <li>1.2 Drawing and understanding basic shapes: lines, circles, squares, triangles, and polygons, Convention of lines and their applications.</li> <li>1.3 Overview of standard symbols used in architectural drawings.</li> <li>1.4 Applications of geometric figures in architectural elements (e.g., arches, vaults).</li> </ul>	Lecture using chalk-board Presentations Hands-on					
2	TLO 2.1 Architectural Lettering Styles. TLO 2.2 Understanding Architectural scales Scale.	<ul> <li>Unit - II Mastering Architectural Lettering and Scales</li> <li>2.1 Introduction to Different types of lettering styles.</li> <li>2.2 Master Lettering Techniques.</li> <li>2.3 Apply Lettering Standards.</li> </ul>	Lecture Using Chalk-Board Presentations Hands-on					
3	TLO 3.1 Understanding Orthographic Projections. TLO 3.2 Application of Projection Principles. TLO 3.3 Drawing Techniques. TLO 3.4 Problem Solving and Accuracy.	<ul> <li>Unit - III Introduction to Orthpographics Projections</li> <li>&amp; its Applications</li> <li>3.1 Introduction to orthographic projection and understand its purpose in technical drawing and architectural design.</li> <li>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.</li> <li>3.3 Students will demonstrate the ability to draft precise orthographic views using appropriate drawing tools and techniques.</li> <li>3.4 Students will implement strategies to verify the accuracy of their orthographic projections against the given pictorial views.</li> </ul>	Lecture Using Chalk-Board Model Demonstration Video Demonstrations Hands-on					
4	TLO 4.1 Fundamentals of Isometric Projections in Architecture. TLO 4.2 Creating Architectural Isometric Drawings in 2D Projections. TLO 4.3 Applications and Advanced Techniques of Isometric projections used in Architectureal Drawings. TLO 4.4 Drawing Isometric views from given orthographic views.	<ul> <li>Unit - IV Introduction to Isometric Projections</li> <li>4.1 Explaining what isometric projections are and their role in architectural visualization.</li> <li>4.2 Illustrative problems related to simple objects having plain, slanting, cylindrical surfaces and slots on slanting surfaces.</li> <li>4.3 Learn advanced techniques for enhancing isometric drawings, including the use of color, shading, and texture to create more realistic and detailed representations.</li> <li>4.4 Conversion of orthographic views into isometric View/projection showing Architectural Objects.</li> </ul>	Lecture Using Chalk-Board Video Demonstrations Presentations 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
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ARCHITECTURAL GRAPHICS & DRAWING Course Code : 32							
Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs			
LLO 1.1 *Draw horizontal, vertical, 30 degree, 45 degree, 60 & 75 degrees lines freehand as well using T-Square, Set square and different architectural drafting tools.	1	Introduction to different types of Architectural Instruments.	4	CO1			
LLO 2.1 *Demonstrate the different types of lines used in architectural drawings and explain their applications.	2	Introduction to Line Conventions.	4	CO1			
LLO 3.1 Draw freehand sketches of different types of geometrical shapes like - triangle, circle rectangle and polygon etc.	3	Draft basic shapes.	4	CO1			
LLO 4.1 Draw various geometrical figures showing different dimension styles with measurements.	4	Introduction to dimensioning techniques & its applications.	4	CO2			
LLO 5.1 *Draft different architectural lettering styles and create a reference sheet.	5	Drafting Lettering Styles.	4	CO2			
LLO 6.1 *Write a detailed paragraph about a famous architectural structure using various lettering techniques.	6	Writing using lettering techniques.	4	CO2			
LLO 7.1 Integrate architectural lettering into a simple floor plan, ensuring consistency and legibility.	7	Lettering in Architectural Drawings.	6	CO2			
LLO 8.1 Draft converting measurements to different scales and create scale drawings of simple objects.	8	Drafting objects on different Scales.	6	CO2			
LLO 9.1 *Draw simple objects using orthographic projection and explain the purpose of each view.	9	Draw basics of orthographic projections.	6	CO3			
LLO 10.1 Convert pictorial views of objects with plain surfaces into orthographic views.	10	Draw conversion of pictorial views.	6	CO3			
LLO 11.1 *Draft orthographic views of objects containing slanting and cylindrical surfaces and slits.	11	Draft slanting and cylindrical surfaces in orthographic projections.	4	CO3			
LLO 12.1 *Drafting isometric projections of basic volumetric shapes.	12	Drafting basics of isometric projections.	4	CO4			
LLO 13.1 *Draft by converting orthographic views of an architectural object into isometric views.	13	Draft conversion to isometric views.	6	CO4			
LLO 14.1 Draft a detailed isometric drawing of a building component, incorporating advanced techniques.	14	Draft detailed isometric of building component.	4	CO4			
LLO 15.1 Draft a complete set of drawings for a simple structure, including orthographic and isometric views, with proper lettering and scale.	15	Draft an architectural project.	6	CO1 CO2 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

• Not applicable

#### Assignment

• Draw freehand sketches of various architectural components of buildings in your nearby vicinity.

#### **ARCHITECTURAL GRAPHICS & DRAWING**

Course Code : 321006

#### 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					
1	Models of objects for orthographic/isometric projection					
2	Drawing table and Drawing board of full imperial/A1 size					
3	Set of various Architectural drawings being used by Architects.	All				
4	Drawing equipment and instruments for class room teaching-large size: a. T-square or drafter (Drafting Machine). b. Set squires (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				
5	Sketchbook of A4 Size.	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	Ι	Basics of Architectural drafting techniques, geometrical figures and symbols.	CO1	8	0	0	12	12
2	II	Mastering Architectural Lettering and Scales	CO2	6	0	0	12	12
3	III	Introduction to Orthpographics Projections & its Applications	CO3	8	0	0	14	14
4	IV	Introduction to Isometric Projections	CO4	8	0	0	12	12
		Grand Total		30	0	0	50	50

# X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

• Term work

#### Summative Assessment (Assessment of Learning)

Practicals

#### XI. SUGGESTED COS - POS MATRIX FORM

ARCHITECTURAL GRAPHICS & DRAWING Course Code : 321006										)06
		Programme Specific Outcomes* (PSOs)								
Course Outcomes (COs)	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			
CO2	3	-	-	2	-	-	1			
CO3	3	-	-	2	-	-	1			
CO4	3	-	-	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 with ISBN Number		
1	Francis D.K. Ching	Architectural Graphics	Wiley 978-1119035664		
2	Francis D.K. Ching, Steven P. Juroszek	Design Drawing	Wiley 978-0470533697		
3	Julia McMorrough	Drawing for Architects: How to Explore Concepts, Define Elements, and Create Effective Built Design Through Illustration	Rockport Publishers 978-1592538973		
4	Paul Lewis, Marc Tsurumaki, David J. Lewis	Manual of Section	Princeton Architectural Press 978-1616892555		
5	The American Institute of Architects, Keith E. Hedges	Architectural Graphics Standards	Wiley 978-1118880524		

# XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://nptel.ac.in/	Offers a variety of courses related to architecture and design, including architectural graphics.
2	https://www.coursera.org/	Offers courses from top universities that you can audit for free. Look for courses on architectural graphics, design, and drawing.
3	https://www.edx.org/	Provides free access to course materials from universities like Harvard and MIT. Courses on architecture and design can be found here.
4	https://www.youtube.com/c/TheModmin	These channel offer tutorials and tips on architectural graphics, drawing, and 3D modeling.
5	https://www.youtube.com/c/SketchUpSchool	These channel offer tutorials and tips on architectural graphics, drawing, and 3D modeling.
6	https://swayam.gov.in/	A Government of India initiative offering free online courses, including some on architecture and design.

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 GRAPHICS & DRAWING**

MSBTE Approval Dt. 01/10/2024

Semester - 1, K Scheme
ARCHITECTURAL	Course Code : 321007	
Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design Design/	& Decoration/ Interior
Programme Code	: AA/ AT/ IX/ IZ	
Semester	: First	
<b>Course Title</b>	: ARCHITECTURAL WORKSHOP	
Course Code	: 321007	

#### I. RATIONALE

The course of architectural workshop will provide students hands-on experience in constructing accurate and detailed architectural models essential for visualizing and communicating design concepts with surface development techniques, joinery methods, material applications, and scale model construction,

# II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Apply model making techniques to create different architectural building models.

# **III. COURSE LEVEL LEARNING OUTCOMES (COS)**

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

- CO1 Create different surface developments of different geometric forms by using relevant tools.
- CO2 Create model using various materials and applying various techniques.
- CO3 Develop different joinery techniques in model making.
- CO4 Prepare scaled model of a small Structure / building or Interior Design / furniture.

# **IV. TEACHING-LEARNING & ASSESSMENT SCHEME**

				L	ear	ning	g Scho	eme		Assessment Scheme											
Course	Course Title	Abbr	Course	Actual Contact Hrs./Week		ζ.	Credits	Donor	Theory				Based on LL & TL				Based or SL		Tatal		
Code	Course Thie	ADDI	Category/s				SLH	NLH	Creuits	Paper Practical					10ta Mar		10tai Marks				
				CL	TL	LL	,			Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	SL	A	1 <b>11</b> 11 K5
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
321007	ARCHITECTURAL WORKSHOP	ARW	SEC	-	-	4	-	4	2	-	-	-	-	-	50	20	50@	20	-	-	100

#### 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

ARCH	RCHITECTURAL WORKSHOPCourse Code : 321007									
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 surface development TLO 1.2 Discuss techniques used for surface development. TLO 1.3 Identify tools used for surface development. TLO 1.4 Create surfaces for different geometric blocks.	<ul> <li>Unit - I Introduction to surface development techniques and tools</li> <li>1.1 Introduction to Surface Development : Importance of surface development in architectural models.</li> <li>1.2 Techniques used for model making: Parallel Line, Radial Line, Triangulation method for surface development.</li> <li>1.3 Tools for Surface Development: Overview of essential tools (cutting tools, scoring tools, measuring instruments).</li> <li>1.4 Practical Application : Developing surfaces of basic geometric shapes.</li> </ul>	Video Demonstrations Presentations Hands-on Lecture Using Chalk-Board							
2	TLO 2.1 Discuss different model making materials. TLO 2.2 Explain different materials and techniques. TLO 2.3 Identify appropriate material for model making. TLO 2.4 Discuss application of material for Model making.	Image: PerformUnit - II Model making materials and their applicationsPerent ials. Perent jues.2.1 Introduction to Model Making Materials: Overview of common materials used in model making (e.g., paper, mount board, cardboard) and Properties and applications of basic materials.for2.2 Specialized Materials and Techniques: Use of clay and Plaster of Paris (POP) in model making and Use of glass fiber, metals, and other specialized materialsal for2.3 Material Selection and Experimentation: Criteria for selecting materials based on project requirements 2.4 Practical Application: Creating a model using multiple materials								
3	TLO 3.1 Explain importance of joinery techniques. TLO 3.2 Discuss and carry different joinery techniques. TLO 3.3 Explain difference between simple and advance joinery techniques. TLO 3.4 Explain wood joinery techniques.	<ul> <li>LO 3.1 Explain aportance of joinery chniques.</li> <li>LO 3.2 Discuss and carry fferent joinery techniques.</li> <li>LO 3.3 Explain difference tween simple and vance joinery techniques.</li> <li>LO 3.4 Explain wood inerv techniques</li> <li>LO 3.4 Explain wood inerv techniques</li> </ul>								
4	TLO 4.1 Explain the Role of Scale Models. TLO 4.2 Explain techniques for maintaining proportion. TLO 4.3 Explain the technique used for making scale model . TLO 4.4 Construct Accurate and Detailed Scale Models.	<ul> <li>Unit - IV Techniques and Principles for Scale Model Construction</li> <li>4.1 Introduction to Scale Model Making: the importance of scale models in architectural/interior design and presentation.</li> <li>4.2 Principles of Scale and proportion in architectural/Interior design and techniques for ensuring accuracy in proportional relationships within models.</li> <li>4.3 Techniques for achieving precision, maintaining detail and accuracy in scale models.</li> <li>4.4 Model Construction Techniques: step-by-step methods for constructing scale models, including cutting, assembling, and detailing.</li> </ul>	Video Demonstrations Model Demonstration Presentations Hands-on							

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

ARCHITECTURAL WORKSHOP Course Code : 32100										
Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs						
LLO 1.1 Develop a surface for different geometrical forms - Cube, Cuboid, prism, pyramid etc. using the parallel line method by focusing on accuracy in cutting and assembling.	1	Surface development using Parallel Line Method.	4	CO1						
LLO 2.1 Create a surface for a cylindrical shape using the radial line method ensuring precision in measurement and cutting.	2	Surface development using radial line method.	4	CO1						
LLO 3.1 Develop surfaces for a pyramid by using triangulation method.	3	*Triangulation method for surface development.	4	CO1						
LLO 4.1 Develop surfaces for basic geometric shapes (cube, cylinder) and assemble them into a simple model.	4	*Surface developement of basic geometric shapes.	4	CO1						
LLO 5.1 Create a model by using clay or Plaster of Paris (POP),	5	*Exploring Clay and POP for modeling	4	CO2						
LLO 6.1 Create a project brief by selecting appropriate materials and justify the choices based on their properties and project requirements.	6	Material selection report.	4	CO2						
LLO 7.1 Build a model incorporating multiple materials (paper, clay, wood).	7	Multi-Material Model Construction.	6	CO2						
LLO 8.1 Experiment with unconventional materials and document their applications and effectiveness in model making.	8	*Documenting unconventional material in model making.	6	CO2						
LLO 9.1 Perform joinery exercises using paper and cardboard by applying tabs, slots, and simple joints.	9	Basic Joinery Techniques.	6	CO3						
LLO 10.1 Construct a small wooden model using basic wood joinery techniques (butt joints, lap joints).	10	*Wood Joinery Basics.	6	CO3						
LLO 11.1 Create a model using paper joinery techniques (folding, gluing).	11	Simple Paper Joinery Model.	4	CO3						
LLO 12.1 Document and sketch different joinery techniques in detail used for model making	12	*Documenting joinery techniques	6	CO3						
LLO 13.1 Prepare detailed scale drawings for a small architectural design. Include measurements, annotations, and scale conversion.	13	*Scale Drawing Preparation.	6	CO4						
LLO 14.1 Construct a small-scale architectural/ interior space model using appropriate materials and tools focusing on precision and accuracy.	14	Model Construction Techniques.	4	CO4						
LLO 15.1 Create a scale model that demonstrates proper use of scale and proportion.	15	*Creating proportional model making.	6	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

- Document advanced techniques (e.g., laser cutting, 3D printing) to construct a detailed scale model.
- Prepare small model justifying the technique to use material
- Explore metal joinery techniques such as welding, nut, and bolt joints.
- Prepare a sectional model of superstructure demonstrating components of building.

#### **ARCHITECTURAL WORKSHOP**

Course Code: 321007

#### 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	Clay, Plaster of Paris (POP), sculpting tools, mixing containers, drying racks, precision knives.	5,6,8,7
2	Wood pieces, saw, sandpaper, wood glue, clamps, ruler, measuring tools.	9,10,11,12
3	Metal sheets, welding equipment, soldering iron, clamps, protective gear (gloves, goggles).	9,10,11,12
4	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
5	Projector Screen: 116" Diagonal viewing screen, Manual pull down Screen for both ceiling and wall usage OR Latest specification at time of procurement.	All
6	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
7	Computer : Multi core 64-bit processor, 4 GB Boot Drive, 4 GB RAM minimum 200 GB Hard Disk. OR Latest specification at time of procurement.	All
8	Safety Glasses, Cut-resistant Gloves, First Aid Kit.	All
9	Drafting Tables, Work Benches, Work Benches, Tool Cabinets, Safety Equipment.	All
10	Various cutting tools (e.g., X-Acto knives, utility knives), scoring tools, measuring instruments (e.g., calipers, rulers), cutting mat, scrap materials.	All
11	Triangular scale, cutting mat, precision knife, ruler, graph paper, pencil.	All

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

#### X. ASSESSMENT METHODOLOGIES/TOOLS

#### Formative assessment (Assessment for Learning)

• Studio Performance and Assignments

#### Summative Assessment (Assessment of Learning)

• Practicals

#### XI. SUGGESTED COS - POS MATRIX FORM

ARCHITECTURAL WORKSHOP Course Code : 3210														
		Programme Outcomes (POs)												
Course Outcomes (COs)	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	-	-	1							
CO2	3	1	1	2	-	-	1							
CO3	3	1	3	2	-	-	1							
CO4	2	1	3	2	-	-	1							
Legends : *PSOs are	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	Frank DeLuca	Architectural Models: Construction and Design Manual	Rizzoli 978-0847827405
2	David Neat	The Art of Model Making	Laurence King Publishing 978-1780670874
3	Mike Stone	ke Stone Architectural Woodwork: A Practical Guide for Designers and Builders	
4	Albert Jackson, David Day, Simon Jennings	The Complete Manual of Woodworking	Knopf 978-0679776005
5	P. L. S. Smith	Architectural Modelmaking	Architectural Press 978- 0750643163
6	Alan M. Beckett	Scale Modeling of Buildings	David & Charles 978- 0715308924
7	Lisa Iwamoto	Digital Fabrications: Architectural and Material Techniques	Wiley 978-0470171735

# XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.craftsvilla.com/	CraftsVilla offers a range of art and craft supplies, including materials used in model making. The site includes information on materials, tools, and techniques suitable for architectural modeling.
2	https://www.designcafe.com/	Design Cafe focuses on interior design and architectural innovations in India. It often includes information on architectural models and their application in design projects.
3	https://modelmakinghub.com/	Resource for model-making techniques, tools, and materials.
4	https://www.instructables.com/	Instructables provides a range of tutorials and DIY guides for various model making techniques. Users can find step-by-step instructions on using different materials and tools in model making.
5	https://www.materialconnexion.com/brands	Offers comprehensive databases of materials and their properties for architectural use.

		07-01-2025 10:56:19 AM
ARCHITEC	CTURAL WORKSHOP	Course Code : 321007
Sr.No	Link / Portal	Description
Note ·	·	

# 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 - 1, K Scheme

I UNDAMENTALS C	ARCHITECTURE	
Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Des Design/	sign & Decoration/ Interior
Programme Code	: AA/ AT/ IX/ IZ	
Semester	: First	
<b>Course Title</b>	: FUNDAMENTALS OF ARCHITECTURE	
Course Code	: 321317	

# I. RATIONALE

To introduce to the students the fundamentals of design and development of design vocabulary, to nurture design thinking and to enable them to apply the same thought process in developing compositions of various forms and spaces.

# II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

FUNDAMENTALS OF ADCHITECTUDE

To inculcate design sensitivity and ability, as well as knowledge in the field of architecture profession and impart skills so as to equip the student to undertake work of an architects / interior designers firm.

# **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 Architectural profession and its characteristics.
- CO2 Apply Aesthetic components in Architectural Design
- CO3 Describe the fundamentals of architecture design and aesthetics..
- CO4 Enlist different types of materials used for low cost building construction.
- CO5 Describe organization of spaces, fenestration, and character of façade, enclosure, internal spaces of low cost and sustainable building structure.

# IV. TEACHING-LEARNING & ASSESSMENT SCHEME

		Learning Scheme						Assessment Scheme													
Course Code	e Course Title	Abbr	Course Category/s	Actual Contact Hrs./Week		SLH	NLH	Credits	Paper	Theory		Based on LL & TL Practical		&	Based on SL		Total				
				01	CLTLL		LL				Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SL	A
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	l.
321317	FUNDAMENTALS OF ARCHITECTURE	FAR	DSC	4	-	4	2	10	5	3	30	70	100	40	50	20	50@	20	50	20	250

# 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.

# **FUNDAMENTALS OF ARCHITECTURE**

# 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 scope of architecture as profession. TLO 1.2 Explain fundamentals of architecture.	Unit - I Introduction to Profession of Architecture 1.1 Define scope of Architecture in society as profession. 1.2 Introduction and overview of fundamentals of architecture. 1.3 Study and compare the architectural characteristics with respect to other professions.	Collaborative learning Lecture Using Chalk-Board Presentations Demonstration		
2	<ul> <li>TLO 2.1 Explain &amp; prepare a report on space composition such as Massing, Space, Proportion &amp; Symmetry, etc with examples.</li> <li>TLO 2.2 Explain &amp; prepare a report on space composition such as Balance, Contrast, Pattern &amp; Decoration with examples.</li> <li>TLO 2.3 Define physical factors for various types of building by understanding its form, orientation &amp; climate.</li> </ul>	<ul> <li>Unit - II Aesthetic Component</li> <li>2.1 Mass, Space, Proportion &amp;</li> <li>Symmetry.</li> <li>2.2 Balance, Contrast, Pattern &amp;</li> <li>Decoration.</li> <li>2.3 Importance of physical factors in Architectural design in terms of Form, Orientation &amp; Climate.</li> </ul>	Presentations Collaborative learning Case Study Lecture Using Chalk-Board		
3	TLO 3.1 Describe the primary functions of architecture & their significance in design. TLO 3.2 Analyze how functional requirements influence architectural form and space. TLO 3.3 Explain the role of cultural context in the development of architectural styles & practices. TLO 3.4 Define sustainable architecture and three R's (Reduce, Reuse & Recycle) & its principles. TLO 3.5 Describe building features and components in development of architectural form based on functional requirements, cultural context, and environmental sustainability.	Unit - III Fundamentals of architecture 3.1 Function, culture and environment 3.2 Integration into the architectural form.	Presentations Case Study Collaborative learning Lecture Using Chalk-Board		
4	TLO 4.1 Enlist different types of materials used for low cost building construction with due to sustainability & aesthetics. TLO 4.2 Explain a site plan of a nearby vicinity building addressing various factors affecting built form. (Site, context, function, circulation, orientation, climatic aspects)	<ul> <li>Unit - IV Factors affecting architectural design</li> <li>4.1 Site, context, function, circulation</li> <li>4.2 Materials, sustainability and aesthetics.</li> <li>4.3 Importance of physical factors in Architectural design - orientation, ventilation, climatic aspects</li> </ul>	Lecture Using Chalk-Board Presentations Site/Industry Visit Collaborative learning		

FUNI	DAMENTALS OF ARCHITECTURE	Co	urse Code : 321317
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 various types of shelter/typology. TLO 5.2 Explain on Low cost materials such as Mud, bamboo, reinforced bamboo concrete in designing & constructing building. TLO 5.3 Enlist and describe on organization of spaces, fenestration, and character of façade, enclosure and internal spaces / indoor outdoor space relationship. TLO 5.4 Explain features of vernacular architecture.	Unit - V Concept of Shelter & design concerns. 5.1 Introduction to various building typologies 5.2 Low cost materials design concerns 5.3 Organization of spaces, fenestration, and character of facade, enclosure and internal spaces. 5.4 Documentation of vernacular architecture of selected building typologies.	Lecture Using Chalk-Board Presentations Case Study 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 Architectural profession. LLO 1.2 Prepare a report on scope of architecture and its characteristics with respect to other professions.	1	Architectural profession.	4	CO1
LLO 2.1 *Prepare a PPT with 2D/3D models of space composition demonstrating Massing, Space type, Proportion & Symmetry. LLO 2.2 *Prepare 2D/3D on A3 sheet models on Balance, Contrast, Pattern & Decoration. LLO 2.3 Prepare a plan, elevation & section of own house with analysis to orientation and climatic conditions.	2	Importance of Aesthetical Components.	6	CO2
LLO 3.1 Prepare live case study report of primary functions of architecture & its significance in design with respect to a given site conditions. LLO 3.2 *Prepare live case study report on functional requirements influencing architectural form and space for a given building. LLO 3.3 For a given site plan condition prepare a drawings for mapping activities such as Transportation, Landmark, Node & Built form etc., with due cultural context in the development of architectural style LLO 3.4 *Prepare a report on reduce, reuse and recycle / sustainable materials used in builidings. LLO 3.5 *Prepare mapping / layering of a given site plan and prepare mapping, layering, sketching, depicting environmental sustainability (Renewable energy, limiting waste, conserving water, energy efficient,	3	Fundamentals of architecture.	20	CO3
LLO 4.1 *Prepare a report / PPT on types of materials for energy efficient building & aesthetics with examples. LLO 4.2 *Prepare a report / PPT on various factors affecting built form. (Site, context, function, circulation, orientation, climatic aspects)	4	Site Components & Importance of physical factors.	10	CO4

FUNDAMENTALS OF ARCHITECTURE	Course Code : 32						
Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs			
LLO 5.1 Draw sketches of various types of shelter/typology illustrating building construction system & building sciences. LLO 5.2 *Draw sketches / report / PPT on Low cost materials such as Mud, bamboo, Eco bricks, reclamed wood, reinforced bamboo concrete etc. LLO 5.3 Draw sketches on organization of spaces, fenestration and character of façade, enclosure and internal spaces. LLO 5.4 *Prepare a measure drawing based on study of vernacular architecture practices and sustainable materials for a given building & its site context / conditions	5	Materials for Shelter.	20	CO5			
Note : Out of above suggestive LLOs -							
<ul> <li>'*' Marked Practicals (LLOs) Are mandatory.</li> <li>Minimum 80% of above list of lab experiment are</li> <li>Judicial mix of LLOs are to be performed to achiev</li> </ul>	to b ve d	e performed.					

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

#### **Micro project**

- Prepare a measure drawing of a building having vernacular architecture characteristics in a group of 5 students.
- Prepare a report on climatic responsive architecture in a group of 5 students.

#### Audio & Video Documentation

• Documentation of prescient in video clip (minimum 5 minutes) with voice over analyzing & explaining physical factors in Architectural design in terms of Form, Orientation, Climate, culture with reference to urban context, rural context, etc.

#### Assignment

• Visit to a Architect's office and prepare a drawing/sketches of office layout

#### 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.

#### FUNDAMENTALS OF ARCHITECTURE

#### Course Code : 321317

#### 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, mobile (videography)) LCD projector, drafting board.	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	Ι	Introduction to Profession of Architecture	CO1	4	2	4	2	8
2	II	Aesthetic Component	CO2	6	2	4	6	12
3	III	Fundamentals of architecture	CO3	20	4	4	10	18
4	IV	Factors affecting architectural design	CO4	10	2	4	8	14
5	V	Concept of Shelter & design concerns.	CO5	20	4	4	10	18
		Grand Total	60	14	20	36	70	

#### X. ASSESSMENT METHODOLOGIES/TOOLS

#### 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

			Progra	amme Outco	mes (POs)			Pro S Ou	ogram Specifi Itcom PSOs	me c es* )
Course Outcomes (COs)	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			
CO2	2	2	3	1	1	-	1			
CO3	2	2	3	1	1	-	1			
CO4	2	1	-	-	3	-	2			
CO5	2	2								
Legends : *PSOs are	Legends :- High:03, Medium:02,Low:01, No Mapping: - *PSOs are to be formulated at institute level									

### XII. SUGGESTED LEARNING MATERIALS / BOOKS

r.No Author Title	Publisher with ISBN Number
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Semester - 1, K Scheme

# FUNDAMENTALS OF ARCHITECTURE

FUND	AMENTALS OF ARC	HITECTURE	Course Code : 321317
Sr.No	Author	Title	Publisher with ISBN Number
1	Pramar	Design Fundamentals in Architecture	Somaiya Publication P Ltd ISBN-13: 978-8170391708 ISBN-10: 8170391709
2	Francis D. K.Ching	Architecture : Form, Space and order	ISBN-10. 9781118745083, ISBN-13. 978-1118745083, Publisher: John Wiley & Sons Inc
3	Heller Robert and Salvadori Mario	Structure in Architecture	Publisher, Pearson. ISBN: 0132803208

# XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	Ching, F. D. K. (2012). Architecture: Form, Space and Order, 3rd Ed. Hoboken : John Wiley & Sons.	Architecture: Form, Space and Order
2	Roth, L. M. (2013). Understanding Architecture: Its Experience History and Meaning, 3rd Ed. Philadelphia : West-view press.	Understanding Architecture: Its Experience History and Meaning
3	Rudolf, A. (1977). The dynamics of architectural form. Berkeley and Los Angeles: University of California Press.	The dynamics of architectural form
4	Pandya, Y. (2007). Elements of Space making. Ahmedabad : Mapin	Elements of Space making. Ahmedabad
5	Unwin, S. (2003). Analyzing Architecture. London : Rouledge.	Analyzing Architecture. London
6	Paul, A. J. (1994). The Theory of Architecture– Concepts & themes. New York : Van Nostrand Reinhold. New York.	The Theory of Architecture–Concepts & themes. New York.
Note	: Feachers are requested to check the creative common l	icense status/financial implications of the suggested

online educational resources before use by the students

MSBTE Approval Dt. 01/10/2024

Semester - 1, K Scheme

BASIC DESIGN	Course Code : 3220
Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code	: AA/ AT/ IX/ IZ
Semester	: Second
<b>Course Title</b>	: 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, Ergonometrics & 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 Ergonometrics 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.

		Course		Learning Scheme				me			Assessment Scheme										
Course			A C Hrs	onta s./W	al ict 'eek						The	ory		Ba	sed o T	on LL L	&	Based on SL		<b>T</b> ( <b>1</b>	
Code	Course little	Abbr	Category/s				SLH	NLH	Credits	Paper Duration						Prac	ctical				lotal Marks
				CL	TL	LL				Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	SL	A	IVIAI KS
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
322010	BASIC DESIGN	BAD	DSC	2	-	6	2	10	5	-	-	-	-	-	50	20	50@	20	50	20	150

# IV. TEACHING-LEARNING & ASSESSMENT SCHEME

#### 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	<ul> <li>TLO 1.1 Explain - Elements of Architectural/Interior Design.</li> <li>TLO 1.2 Explain - Point, Line, Plane, volume.</li> <li>TLO 1.3 Explain- Texture, Colour, Value and Space.</li> <li>TLO 1.4 Application and Interpretation of Elements Of Architectural/ Interior design.</li> <li>TLO 1.5 Explain - Elements of Architectural Design with the context of IKS &amp; its importance.</li> </ul>	Unit - I Elements of Architectural/Interior design 1.1 Explain the term - Elements of design. 1.2 Study of different Elements of design. 1.3 Application of Elements of Design. 1.4 Study of Elements of Design in the Indian context (IKS).	Chalk-Board Presentations IKS examples
	2	TLO 2.1 Explain - Principles of Architectural/Interior Design. TLO 2.2 Explain - Balance, Contrast, Emphasis, Movement. TLO 2.3 Explain - Rhythm, Hierarchy, White Space, Unity. TLO 2.4 Application and Interpretation of Principles Of Architectural/ Interior design. TLO 2.5 Study the Principles of Architectural / Interior Design in context to IKS.	Unit - II Principles Of Architectural / Interior Design 2.1 Explain the term - Principles of design. 2.2 Study of different Principles of design. 2.3 Application of Principles of Design. 2.4 Study of Principles of Design - IKS context.	Chalk-Board Presentations IKS examples
	3	TLO 3.1 Explain Colour theory. TLO 3.2 Explain Colour Wheel. TLO 3.3 Explain Warm & Cool colours. TLO 3.4 Explain Colour scheme.	<ul> <li>Unit - III Colour Theory</li> <li>3.1 Study different components of colour theory.</li> <li>3.2 Understand the colour wheel with Primary , Secondary and Tertiary Colour Schemes.</li> <li>3.3 Apply different colour schemes in the field of Architectural / Interior Design.</li> </ul>	Demonstration Presentations Hands-on
	4	<ul> <li>TLO 4.1 Explain Ergonometric and its need in Architectural / Interior Design.</li> <li>TLO 4.2 Understand different human activities to related spaces.</li> <li>TLO 4.3 Study &amp; Apply Ergonometric for living room spaces.</li> <li>TLO 4.4 Study &amp; Apply Ergonometric for Bed room space.</li> <li>TLO 4.5 Study &amp; Apply Ergonometric for Kitchen spaces.</li> <li>TLO 4.6 Study &amp; Apply Ergonometric for Toilets.</li> <li>TLO 4.7 Apply Ergonometric in Interior Design.</li> <li>TLO 4.8 Apply Ergonometric in different Public Spaces.</li> <li>TLO 4.9 Study &amp; Application of Ergonometric in the Indian context and usage type (IKS context).</li> </ul>	<ul> <li>Unit - IV Ergonometrics</li> <li>4.1 Study human body and its movements.</li> <li>4.2 Importance, Need and application of Ergonometric in the field of Architecture / Interior Design.</li> <li>4.3 Study different activities and application of Ergonometric for various residential spaces.</li> <li>4.4 Study Ergonometric applicable for different commercial and Institutional spaces.</li> <li>4.5 Study of IKS examples of Ergonometric (IKS system).</li> </ul>	Demonstration Presentations Case Studies (with & without IKS content)

BASIC	C DESIGN	Course Code : 3220				
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.	<ul> <li>Unit - V Design of Single Use Space</li> <li>5.1 Explain the Design Process for different spaces.</li> <li>5.2 Living room design basics with furniture.</li> <li>5.3 Kitchen/Dining room design basics with furniture.</li> <li>5.4 Bed room design basics with furniture.</li> <li>5.5 Toilet design basics with Interior.</li> </ul>	Case Study Presentations Site/Industry Visit			

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

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	r Laboratory Experiment / Practical Titles / Tutorial I o Titles		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 encorporating 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 encorporating & 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 encorporating all the elements of design using any media.	2	CO1
LLO 6.1 Prepare sketches & models		*Prepare Sketches / models to demonstrate the balance & contrast using different media (Balance 1 No & Contrast 1 No minimum).		CO2
LLO 7.1 Prepare sketches & models	etchesPrepare Sketches / models to demonstrate the Emphasis & Movement using different media (Emphasis1 No & Movement 1 No minimum).			CO2
LLO 8.1 Prepare sketches 8 & models		Prepare Sketches / models to demonstrate the Rhythm & Hierarchy using different media (Rhythm 1 No & Heirarchy 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 encorpoarting 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 explianing the different human activities in kitchen / dining	6	CO4				
LLO 16.1 Draw the anthropometric sketches	16	*Draw the anthropometric sketches / drawings explianing the different human activities in bedroom / toilet.	6	CO4				
LLO 17.1 Measurement & Drawing plan		*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 -								
• '*' 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

Su No	Equipment Name with Dread Specifications	<b>Relevant LLO</b>
51.110	Equipment Name with Broad Specifications	Number

BASI	BASIC DESIGN Course						
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

			Progra	amme Outco	mes (POs)			Pro S Ou	ogram pecifi itcom PSOs	me c es* )
Course Outcomes (COs)	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 : *PSOs ar	- High:03, N e to be form	/ledium:02 ulated at i	2,Low:01, No 2 nstitute level	Mapping: -						

# 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 ergonometric
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

MSBTE Approval Dt. 01/10/2024

Semester - 2, K Scheme

CONSTRUCTION MATERIALS

construction		
Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design Design/	& Decoration/ Interior
Programme Code	: AA/ AT/ IX/ IZ	
Semester	: Second	
<b>Course Title</b>	: CONSTRUCTION MATERIALS	
<b>Course Code</b>	: 322328	

# I. RATIONALE

The course is designed to expose students to traditional and contemporary materials and processes of elementary construction experienced in routine construction technique. The course shall broadly emphasize on the concepts of sustainability in terms of eco-friendly materials and sustainable construction practices. The course shall discuss the properties of material and its effective concepts used in the construction systems.

# II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Select the relevant type of construction material for the given building structure.

# **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 construction materials on given construction projects/site.
- CO2 Understand the variety of Material and their prices
- CO3 Undertake the relevant masonry construction in the given building /project
- CO4 Apply appropriate opening for given construction project.
- CO5 Apply proper hardware and fittings in building as per latest trends.

# IV. TEACHING-LEARNING & ASSESSMENT SCHEME

			Course Category/s	Learning Scheme				eme			Assessment Scheme										
Course Code	e Course Title	Abbr		Actual Contact Hrs./Week		ual tact Week SLHNLH Credits Paper Practical		Theory		&	Based on SL		Total								
			CLTLLL								Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SL	A
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
322328	CONSTRUCTION MATERIALS	CMT	DSC	4	-	5	1	10	5	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

CONS	urse Code : 322328		
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 construction material applications in the field of Building Industry TLO 1.2 Classify the given construction material according to sources with examples. TLO 1.3 Describe the criteria to select the construction materials for the given situation. TLO 1.4 Suggest the construction material in the given situation.	<ul> <li>Unit - I Overview of Construction Materials</li> <li>1.1 Application of the construction materials in building industry</li> <li>1.2 Identification of given construction material and its sources.</li> <li>1.3 Check the feasibility of the construction material for given situation.</li> <li>1.4 Justify material selection for given situation.</li> </ul>	Demonstration Model Demonstration Chalk-Board Collaborative learning Presentations
2	TLO 2.1 Describe the properties and structure of the given natural construction material. TLO 2.2 Explain the given type of defect(s) in natural construction material TLO 2.3 Explain the procedure of preservation of timber in the given situation. TLO 2.4 Select the natural construction material for the given situation. TLO 2.5 Choose the relevant type of integrated material for the given type of construction work.	<ul> <li>Unit - II Natural Construction and Sustainable Constructional Materials</li> <li>2.1 Explain the properties and structure of the given natural construction material.</li> <li>2.2 Criteria to Identify defect(s) in natural construction material</li> <li>2.3 Procedure of preservation of timber</li> <li>2.4 Justification of natural construction material for the given situation.</li> <li>2.5 Justify relevant type of integrated material for the given type of construction work.</li> </ul>	Demonstration Case Study Presentations Hands-on Collaborative learning Site/Industry Visit
3	<ul> <li>TLO 3.1 Explain significance of masonry in construction industry.</li> <li>TLO 3.2 Explain the difference between brick and stone masonry</li> <li>TLO 3.3 Introduce special types of bricks.</li> <li>TLO 3.4 Apply different sizes and bonds for brick masonry.</li> <li>TLO 3.5 Analyze the material and application for given situation.</li> </ul>	<ul> <li>Unit - III Construction techniques of building components Masonry &amp; Installations</li> <li>3.1 Masonry in different material like brick, stone, mud block, etc.</li> <li>3.2 Brick &amp; Stone masonry-Types of masonry; random rubble, polygonal, &amp; dry rubble works.</li> <li>3.3 Special type bricks like King closer, Queen Closer, Bull Nose, Etc.</li> <li>3.4 Types of Bricks; bonds in½ brick &amp;1brick; header, stretcher English &amp;Flemish bonds.</li> <li>3.5 Justification of material used for given situation.</li> </ul>	Model Demonstration Demonstration Site/Industry Visit Presentations Cooperative Learning Hands-on
4	TLO 4.1 Explain openings and its types and the difference between various types of openings. TLO 4.2 Limitations and scope with respect to size of opening. TLO 4.3 Explain arches with different styles and applications TLO 4.4 Explains projections like weather sheds & awnings; lofts in rooms.	<ul> <li>Unit - IV Openings. Lintels, Projections and Arches</li> <li>4.1 Openings-Doors, windows, ventilators, and other openings focusing on different modes of operation and their effects on the jambs.</li> <li>4.2 Doors, Windows, Lintels, Arches, Etc.</li> <li>4.3 Arches-Types of arches, classification according to center, shape.(No theory questions for the topic Arches)</li> <li>4.4 Projections-Different types of weather sheds &amp; awnings; lofts in rooms;</li> </ul>	Model Demonstration Demonstration Case Study Collaborative learning Hands-on

CONS	TRUCTION MATERIALS	Course Code : 32232				
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 significance of joinery in doors, windows. TLO 5.2 Explain the different types of joinery. TLO 5.3 Introduce special types fixing, material and hardware. TLO 5.4 Apply different shutters such as framed, paneled, flush, glazed, and composite TLO 5.5 Explain wood derivatives and adhesives, hardware, sealants used for various furniture's in residential building.	<ul> <li>Unit - V Doors, Windows &amp; Ventilators with Jambs, Frames, Casings and Joinery</li> <li>5.1 Types of Doors and Windows with various joinery detailing and fixing.</li> <li>5.2 Joinery used in furniture making and in modular furniture used in residential building.</li> <li>5.3 Basis of modes of operation, positioning, placing of hardware; detailed study of modes of operation (Horizontal, vertical &amp; inclined movement)</li> <li>5.4 study of types of shutters such as framed, panelled, flush, glazed, and composite focusing on different materials wood, metal, glass, &amp; plastics</li> <li>5.5 Residential furniture/modular furniture, wood derivatives and adhesives, hardware, sealants used for various furniture's in residential building.</li> </ul>	Model Demonstration Demonstration Hands-on Collaborative learning Chalk-Board			

# 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 Students will be able to understand the basic properties of construction materials and their applications in the construction industry.	1	*Introduction to basic properties of construction materials.	2	CO1
LLO 2.1 Students will be able to differentiate between types of materials used in construction.	2	*Study of different types of materials used in construction.	2	CO1
LLO 3.1 Students will be able to apply different techniques used to install and use various materials.	3	*Ongoing residential building site visit for material used, techniques and execution.	2	CO1
LLO 4.1 Students will be able to understand natural properties of construction materials	4	*Conduct a site visit at the green building for natural and sustainable materials.	2	CO2
LLO 5.1 Students will be able to select the natural and sustainable materials.	5	*Introduction to various natural and sustainable materials.	2	CO2
LLO 6.1 Students will be able to evaluate the natural and sustainable materials.	6	*Conduct a market survey for natural and sustainable materials.	2	CO2
LLO 7.1 Student will bale to understand the concept of Different types of Bonds in Brick Masonry.	7	*Conduct a site visit at brick masonry work.	2	CO3
LLO 8.1 Student will bale to understand the concept of stone Masonry.	8	*Conduct a site visit at stone masonry work.	2	CO3
LLO 9.1 Student will bale to understand the concept of Special type of Bricks in various combination.	9	*Study the Special type of Bricks in various combinations.	2	CO3
LLO 10.1 Students will be able to understand the types of Doors, Windows and ventilators.	10	*Study the different types of doors, windows and ventilators.	2	CO4
LLO 11.1 Students will be able to finalize the positions of doors, windows, ventilators.	11	*Conduct a site visit at ongoing execution work of doors, windows and ventilators.	2	CO4

CONSTRUCTION MATERIALS	Course Code : 322				
Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs	
LLO 12.1 Students will be able to understand the concept of Arches, Lintels, Projections.	12	*Conduct a site visit at the ongoing execution work of Arches, Lintels, and Projections.	2	CO4	
LLO 13.1 Students will be able to understand the properties of hardware and fitting material.	13	Study of Hardware and fitting materials.	2	CO5	
LLO 14.1 Students will be able to evaluate the hardware and fitting material.	14	Conduct a market survey for hardware and fitting material.	2	CO5	
LLO 15.1 Students will be able to understand the concept of fittings and hardware materials.	15	Conduct a site visit at the execution of hardware and fitting material.	2	CO5	
Note : Out of above suggestive LLOs -					
<ul> <li>'*' Marked Practicals (LLOs) Are mandatory.</li> <li>Minimum 80% of above list of lab experimen</li> <li>Judicial mix of LLOs are to be performed to a</li> </ul>	t are achie	to be performed. ve desired outcomes.			

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

#### Assignment

- Construction Techniques of Building Components, Masonry and Installation
- Opening Lintels, Projections and Arches
- Joinery
- Openings : Jambs, Frames & Castings

#### 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	Drawing Board, drafting table and stool and drafting materials like metric scale box, T square, pair of Setsquare	All
2	stationary : A1 Size Drawing Papers, various grades of pencils and allied stationary	All
3	Scientific Calculator, Measuring Tape	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	Ι	Overview of Construction Materials	CO1	12	4	4	5	13

CONS	STRU	JCTION MATERIALS		Course Code : 322328						
Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R- Level	U- Level	A- Level	Total Marks		
2	II	Natural Construction and Sustainable Constructional Materials	CO2	10	4	4	5	13		
3	III	Construction techniques of building components Masonry & Installations	CO3	10	4	5	5	14		
4	IV	Openings. Lintels, Projections and Arches	CO4	14	5	5	5	15		
5	V	Doors, Windows &Ventilators with Jambs, Frames, Casings and Joinery	CO5 14		4	5	6	15		
	Grand Total         60         21         23         26         70									

# X. ASSESSMENT METHODOLOGIES/TOOLS

# Formative assessment (Assessment for Learning)

• Term Work, Self learning (Assignments)

# Summative Assessment (Assessment of Learning)

• Term Work, Self learning (Assignments)

# XI. SUGGESTED COS - POS MATRIX FORM

			Progra	amme Outco	mes (POs)			Programme Specific Outcomes* (PSOs)			
Course Outcomes (COs)	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	2	3				
CO2	3	2	1	2	2	3	3				
CO3	2	2	1	1	2	3	3				
CO4	3	3	3	3	3	2	3				
CO5	3	3 2 2 1 3 3									
Legends : *PSOs ar	- High:03, N e to be form	/ledium:02 ulated at i	2,Low:01, No 2 nstitute level	Mapping: -							

#### XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number			
1	F D K CHING	Building Construction Illustred	Van Nortrand			
2	V.N. Chanapattan	Materials of Civil and Interior Construction	SAIRAJ GRAPIC			
3	W. B. Mc Kay	Building Construction vol-1	W. B. Mc Kay Collection buildingtechnologyheritagelibrary;			
4	Rangwala	Engineering materials	Charoter Publication			
5 R.Berry		Barry Construction of Buildings Volume - 1	Blackwell Science			
6	6 Mario dal Fabro How to Build Modern Furniture		McGraw Hill Book Company ,New York			

# CONSTRUCTION MATERIALSCourse Code : 322328Sr.NoAuthorTitlePublisher with ISBN Number7Christopher<br/>NataleFurniture Design and Construction for<br/>Interior DesignerBloomsbury

# XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description				
1	www.basicconstructionco.com	Basic Construction				
2	Understand construction techniques					
3	www.basiccarpentrytechniques.com	basic carpentry techniques				
4	understandconstruction.com	Concrete Frame Structures				
Note :						
• Tea onl	chers are requested to check the creative common license s ine educational resources before use by the students	status/financial implications of the suggested				

MSBTE Approval Dt. 01/10/2024

Semester - 2, K Scheme

HISTORY OF ARCH	Course Code : 322329	
Programme Name/s	: Architecture Assistantship/ Architecture/ Interi Design/	or Design & Decoration/ Interior
Programme Code	: AA/ AT/ IX/ IZ	
Semester	: Second	
<b>Course Title</b>	: HISTORY OF ARCHITECTURE & CULTUR	E
<b>Course Code</b>	: 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

		<sup>Abbr</sup> (		Learning			g Scho	eme		Assessment Scheme													
Course Code	Course Title		Abbr	Abbr	Abbr	Abbr	Abbr	Abbr	Course Category/s	Actual Contact Hrs./Week		SLH	NLH	Credits	Paper	Theory		Based on LL & TL Practical		&	Based on SL		Total Morks
				CL	TL	LL				Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	SL	A	19121 85		
											Max	Max	Max	Min	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		

# IV. TEACHING-LEARNING & ASSESSMENT SCHEME

07-01-2025 11:03:57 AM

### Course Code : 322329

# 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 Explain the importance history of Architecture TLO 1.2 Explain the examples of stone age and early shelters with case study and site visit the same TLO 1.3 Explain the geo physical societal early caves and shelters. TLO 1.4 Explain the role and importance of archeological survey of India ,Explain history of Indian and world architecture early stages	<ul> <li>Unit - I Pre-Historical Architecture and Introduction to History of Architecture</li> <li>1.1 Importance of history to understand the Architecture.</li> <li>1.2 Examples of Early shelters, Stone Age, Tumuli, etc.</li> <li>1.3 Determinants of built form – geo physical, societal, technological etc. (Early caves, timber huts, stone houses etc).</li> <li>1.4 Understanding people of India and Culture</li> </ul>	Video Demonstrations Case Study Site/Industry Visit Collaborative learning	

HIST	ORY OF ARCHITECTURE & CU	LTURE Cou	rse Code : 322329	
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	TLO 2.1 Explain the civilization of Egyptian, Indus valley ,Mesopotamian , Greek, roman etc. TLO 2.2 explain the Materials, construction systems, system of proportioning used in heritage buildings TLO 2.3 sketch building plans and explain the characteristic's of architectural buildings TLO 2.4 Explain Greek civilization ,Greek towns, location and characteristics of typical civic spaces TLO 2.5 Explain Significant characteristics of Greek Architecture such as Materials, construction systems TLO 2.6 Explain Significant characteristics of Roman Architecture.	<ul> <li>Unit - II River Valley Civilizations</li> <li>2.1 Egyptian Civilization Concept of the Royal Necropolis, locational context and architectural characteristics of public buildings.</li> <li>2.2 Mesopotamian Civilization the urban context and architecture of public buildings (Ziggurats and palaces) - one example of each.</li> <li>2.3 Indus Valley Civilization: Grid Iron System</li> <li>2.4 Greek civilization ,Greek towns, location and characteristics of typical civic spaces such as Agora, Acropolis, Theatres etc</li> <li>2.5 Significant characteristics of Greek Architecture such as Materials, construction systems, system of proportioning, Greek orders, architecture of Greek temples – Parthenon at Athens.</li> <li>2.6 Significant characteristics of Roman Architecture. Concept of monumentality, materials and construction systems, Roman orders and the Roman Basilica, Pantheon Rome</li> </ul>	Case Study Collaborative learning Demonstration Presentations	
3	TLO 3.1 Explain the theory and design principles of Indian temple architecture TLO 3.2 Explain the methodology of construction technics and material used for temple architecture. TLO 3.3 Study of documentation of local heritage site TLO 3.4 research methods of temple architecture and document as per the requirements	<ul> <li>Unit - III Temple Architecture in India</li> <li>3.1 Evolution of temple and its various parts</li> <li>3.2 Dravidian style (Southern) General characteristics, planning (e.g. shore temple at Mahabalipuram, Madurai Temple. Indo Aryan Temple</li> <li>3.3 Lingaraja Temple at Bhubhaneshwar, Kandariya Mahadeo at Khajuraho, Sun Temple at Modhera .</li> <li>3.4 Mughal architecture Indian context.</li> </ul>	Model Demonstration Case Study Collaborative learning	
4	TLO 4.1 Explain the Early Christian Architecture TLO 4.2 Explain and prepare sketches of Byzantine Architecture TLO 4.3 Explain and prepare sketches of Gothic architecture. TLO 4.4 Explain the Renaissance Architecture through sketches. TLO 4.5 Explain the Byzantine Architecture through the Model/ Sketches	<ul> <li>Unit - IV Western Architecture</li> <li>4.1 Early Christian Architecture - Development of church plan (Basilica )</li> <li>4.2 Byzantine Architecture -Centralized plans and construction methods for dome of St. Sophia Church)</li> <li>4.3 Gothic Architecture -Main visual and construction vocabulary of Gothic Arch at Notre Dame Paris, and Reims Cathedral</li> <li>4.4 Renaissance Architecture -Early Renaissance Architecture. General architectural characteristics (Florence cathedral)</li> <li>4.5 Late Renaissance architecture. General characteristics and Role of Michael Anglo &amp; Palladio (eg. St. Peter's Rome. The capital Rome &amp; Villa Capra)</li> </ul>	Case Study Presentations Video Demonstrations Collaborative learning	

#### **HISTORY OF ARCHITECTURE & CULTURE** Course Code : 322329 Suggested **Theory Learning Outcomes** Learning content mapped with Theory Learning Sr.No Learning (TLO's)aligned to CO's. Outcomes (TLO's) and CO's. Pedagogies. Unit - V History of Furniture- timeline and **Evolution** 5.1 Introduction to furniture history. Evolution of TLO 5.1 Explain the furniture of furniture over a period based on climate, social heritage building through edges factors, life style, technical and stylistic TLO 5.2 explain the materials development availability of materials and various used in furniture design movements in design. TLO 5.3 Explain and analyze the 5.2 Introduction to furniture terminology based on Video types of furniture used in the methods of joinery techniques such as parquetry, Demonstrations heritage building as case study marquetry gilding, turning, pierced and chip Case Study 5 TLO 5.4 Explain methods of carving, ormolu mounts Site/Industry Visit joinery techniques such as 5.3 Study of occidental furniture style - Classical, Collaborative parquetry, marquetry gilding, Medieval, 19th Century AD ,Modern, Post Modern learning turning, pierced , Contemporary. TLO 5.5 Explain occidental 5.4 Study of architectural elements in interiors in furniture style - Classical, India from Mughal period onwards such as doors, Medieval, 19th Century AD windows, pillars, columns, staircases, fireplaces, ,Modern paneling, dado, frieze, architectural decoration, study sketches and creative designs. 5.5 Oriental Furniture and Style -Chinese and Japanese interior and furniture.

# 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 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. Prsentation 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) Documention 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

HISTORY OF ARCHITECTURE & CUI	LTU	IRE Cou	rse Code	: 322329
Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
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	<ul> <li>'*' a) Draw the plan/section/elevation/views of the important buildings of the civilisations (Greek, roman etc.).</li> <li>b) Understand the scale and prortion , materials etc. make a report .</li> </ul>	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
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 - • '*' Marked Practicals (LLOs) Are man • Minimum 80% of above list of lab ex	ndat peri	ory. ment 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)

# Course Code : 322329

# 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
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	Ι	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

			Progra	amme Outco	mes (POs)			Pro S Ou	ogram opecifi itcom PSOs	me c es* )
Course Outcomes (COs)	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	rogram Specifi Jutcomo (PSOs) )- 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 : *PSOs are	- High:03, M e to be form	/ledium:02 ulated at i	2,Low:01, No	Mapping: -						

# XII. SUGGESTED LEARNING MATERIALS / BOOKS

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/illustratedhisto00litcrich	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

Informed and a provide the second sec	
Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code	: AA/ AT/ IX/ IZ
Semester	: Second
<b>Course Title</b>	: THEORY OF DESIGN
<b>Course Code</b>	: 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

				L	eari	ning	Sche	me		Assessment Scheme											
Course Code		Course Title Abbr Course Hrs./Week Credite Poper		Theory		Based on LL & TL		Based on SL		Tedal											
	Course Title	ADDr	Category/s				SLH	NLH	Creatts	Paper Duration						Prac	tical				Total –Marks
				CL	TL	LL				Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SI	— Marks A	
											Max	Max	Max	Min	Max	Min	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

THEC	DRY OF DESIGN	Co	urse 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	TLO 1.1 Explain scope of History of Architecture and Contemporary Design, TLO 1.2 Analyse types of organised architectural spaces. TLO 1.3 Explain Principles of Functionality and Aesthetics. TLO 1.4 Apply Design Principles in Projects.	Unit - I History of Architecture and Design theory 1.1 Define the historical evolution of design theories and their relevance to contemporary architectural practice. 1.2 Define architectural space types : space and organizational pattern, space relationship, hierarchy of space, experienced through movement in space - time, 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. 1.4 Apply design principles through hands-on exercises and projects to develop and refine design ideas.	Lecture Using Chalk-Board Presentations Case Study
2	TLO 2.1 Discuss Essence and composition in Architecture TLO 2.2 Discuss theories in Architecture TLO 2.3 Explain different types of Elements & principles of Design	<ul> <li>Unit - II Architectural theories as socially useful discipline.</li> <li>2.1 Introduction to the core principles and fundamental ideas that define different architectural styles and movements.</li> <li>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.</li> <li>2.3 Introduction to innovative and creative approaches to architectural expression by applying design elements and principles .</li> </ul>	Presentations Case Study Site/Industry Visit Lecture Using Chalk-Board
3	TLO 3.1 Explore social relevance in Architecture. TLO 3.2 Explore different types of theories of design. TLO 3.3 Explore visual properties of design. TLO 3.4 Apply the visual principles in design.	<ul> <li>Unit - III Elements and principles of architectural design.</li> <li>3.1 Identify and describe the properties of fundamental geometric shapes such as circles, squares, triangles, and polygons, including their symmetry, angles, and relationships.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ul>	Lecture Using Chalk-Board Presentations Case Study
4	TLO 4.1 Explore Architectural Biography and Impact. TLO 4.2 Study Philosophical Frameworks. TLO 4.3 Compare & analyze the work of different Architects.	<ul> <li>Unit - IV Architects and their Philosophies.</li> <li>4.1 Identify key architects from various historical periods and contemporary contexts &amp; their major works, influences, and contributions to architecture.</li> <li>4.2 Understand and articulate the core philosophies and design principles of different architects.</li> <li>4.3 Compare the philosophies and design approaches of different architects to identify similarities, differences, and the evolution of architectural thought.</li> </ul>	Lecture Using Chalk-Board Collaborative learning Presentations Case Study Video Demonstrations

# THEODY OF DESIGN

THEC	ORY OF DESIGN	Course Code : 3223						
Sr.No	Theory Learning Outcomes (TLO's)aligned to 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 .	<ul> <li>Unit - V Architectural Styles and movements</li> <li>5.1 Identify and describe the characteristics of pre-historic architectural building structures.</li> <li>5.2 Identify and describe the characteristics of building structures having the classical style of architecture.</li> <li>5.3 Identify and describe the characteristics of building structures during the renaissance architecture period.</li> </ul>	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	Developement 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 Co				e: 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 -				
'*' 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.
#### THEORY 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

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	Ι	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	3 III Elements and principles of architectural design.			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	<b>CHEORY OF DESIGNCourse Code : 322330</b>										
			Progra	amme Outco	mes (POs)			Programme Specific Outcomes* (PSOs)			
Course Outcomes (COs)	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 : *PSOs ar	- High:03, M e to be form	fedium:02 ulated at i	2,Low:01, No I nstitute level	Mapping: -							

#### 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 Univers (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.
<b>N</b> T 4		

Note :

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

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

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## ESSENCE OF INDIAN CONSTITUTION

#### IV. TEACHING-LEARNING & ASSESSMENT SCHEME

	Course Title		Course Category/s	Learning Scheme					Assessment Scheme												
Course Code		Abbr		Actual Contact Hrs./Week s S		SLH	NLH	Credits	Paper	Theory		Based on LL & TL Practical		&	Based on SL		Total				
				CL	TL	LL	,			Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	SI	A	Marks
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
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.	<ul> <li>Unit - I Constitution and Preamble</li> <li>1.1 Meaning of the constitution of India.</li> <li>1.2 Historical perspectives of the Constitution of India.</li> <li>1.3 Salient features and characteristics of the Constitution of India.</li> <li>1.4 Preamble of the Constitution of India.</li> </ul>	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		

ESSE	NCE OF INDIAN CONSTI-	ΓUTION	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.	<ul> <li>Unit - III Governance and Amendments</li> <li>3.1 3.1 Amendment procedure of the Constitution and their types - simple and special procedures.</li> <li>3.2 The Principle of Federalism and its contemporary significance along with special committees that were setup.</li> <li>3.3 Major Constitutional Amendment procedure - 1st, 7th, 42nd, 44th, 73rd &amp; 74th, 76th, 86th, 52nd &amp; 91st, 102nd</li> </ul>	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 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**

• 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 Resrvation 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 contented 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 pattiarchies. 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 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 : 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	Ι	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	ESSENCE OF INDIAN CONSTITUTION Course Code : 313002											
			Progra	amme Outco	mes (POs)			Programme Specific Outcomes* (PSOs)				
Course Outcomes (COs)	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 : *PSOs are	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, 6thedition, 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/	Fundamental rights and
4	the-constitution-of-india/	duties
5	https://main.sci.gov.in/constitution	Directive principles
6	https://legalaffairs.gov.in/sites/default/files/chapter%203.	Parts of constitution
Ū	pdf	

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ESSEN	CE OF INDIAN CONSTITUTION	Course Code : 313002						
Sr.No	Link / Portal	Description						
7	https://www.concourt.am/armenian/legal_resources/world_const itutions/constit/india/india-e.htm	Parts of constitution						
8	https://constitutionnet.org/vl/item/basic-structure-indian-c onstitution Parts of constitution							
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

ENVIRONMENTAL	EDUCATION AND SUSTAINABILITY	<b>Course Code : 314301</b>
Programme Name/s	: Architecture Assistantship/ Automobile Engineering./ A Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automatio Cloud Computing and Big Data/ Civil Engineering/ Chemical Engineering/ Computer Tec Engineering/ Civil & Rural Engineering/ Construction Technology/ Co Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Digital Elec Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical and Electrical Power System/ Electronics & Communication Electronics Engineering/ Food Technology/ Computer Ha Instrumentation & Control/ Industrial Electronics/ Information Technology/ Comput Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & E Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Engineering/ Printing Technology/ Polymer Technology/ Surface Coatt Science/ Textile Technology/ Electronics & Computer Engg./ Trav Manufactures/	Artificial Intelligence/ on and Robotics/ Architecture/ chnology/ Computer omputer Science & Engineering/ ctronics/ Data Sciences/ Electronics Engineering/ Engg./ ardware & Maintenance/ ter Science & Information Cnvironmental Engineering/ Electronics/ Production ing Technology/ Computer /el and Tourism/ Textile
Programme Code	: AA/ AE/ AI/ AL/ AN/ AO/ AT/ BD/ CE/ CH/ CM/ CO/ C DS/ EE/ EJ/ EK/ EP/ ET/ EX/ FC/ HA/ IC/ IE/ IF/ IH/ IS MK/ ML/ MU/ PG/ PN/ PO/ SC/ SE/ TC/ TE/ TR/ TX	CR/ CS/ CW/ DC/ DD/ DE/ S/ IX/ IZ/ LE/ ME/
Semester	: Fourth	
<b>Course Title</b>	: ENVIRONMENTAL EDUCATION AND SUSTAINAB	BILITY
<b>Course Code</b>	: 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

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Course Code : 314301

			L	ear	ning	g Sch	eme					As	sess	ment	Sche	eme				
Course Title	Abbr	Course Category/s	A C Hrs	ctu onta s./W	al 1ct /eek	SLH	NLH	Credits	Paper		The	ory		Bas	sed o Ti Prac	n LL L tical	&	Base Sl	<b>d on</b> L	Total
		<b>g</b> . j	CL	TL	LL	~			Duration	FA- TH	SA- TH	Tot	al	FA-	PR	SA-	PR	SL	A	Marks
										Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	i.
ENVIRONMENTAL EDUCATION AND SUSTAINABILITY	EES	VEC	3	-	-	1	4	2	1.5	30	70*#	100	40	-	-	-	-	25	10	125
	Course Title ENVIRONMENTAL EDUCATION AND SUSTAINABILITY	Course Title Abbr ENVIRONMENTAL EDUCATION AND SUSTAINABILITY	Course Title Abbr Course Category/s ENVIRONMENTAL EDUCATION AND SUSTAINABILITY	Course Title Abbr Course Course Title Abbr Course Title Environmental Education and Ees VEC 3	Course Title Abbr Course Course Title Abbr Course Title ENVIRONMENTAL EDUCATION AND SUSTAINABILITY	Course Title Abbr Course Course Title Abbr Course Title ENVIRONMENTAL EDUCATION AND SUSTAINABILITY EAUCOURSE VEC 3	Course Title     Abbr     Course Course Category/s     Learning School       ENVIRONMENTAL EDUCATION AND SUSTAINABILITY     EES     VEC     3     -     1	Course Title     Abbr     Course Course Category/s     Learning Scheme       Course Title     Abbr     Course Course Course     Actual Contact Hrs./Week       ENVIRONMENTAL EDUCATION AND SUSTAINABILITY     EES     VEC     3     -     -     1     4	Course Title     Abbr     Course Course Category/s     Learning Scheme       Course Title     Abbr     Course Course Course Course     Actual Contact Hrs./Week       ENVIRONMENTAL EDUCATION AND SUSTAINABILITY     EES     VEC     3     -     -     1     4     2	Course Title     Abbr     Course Course Course Category/s     Learning Scheme       Course Title     Abbr     Course Course Course Hrs./Week     SLH     NLH     Credits     Paper Duration       ENVIRONMENTAL EDUCATION AND SUSTAINABILITY     EES     VEC     3     -     -     1     4     2     1.5	Course Title Abbr Course Category/s Learning Scheme Actual Contact Hrs./Week Category/s CL TL LL SLH NLH Credits Paper Duration FA- TH Max ENVIRONMENTAL EES VEC 3 - 1 4 2 1.5 30	Course Title Abbr Course Category/s Learning Scheme Actual Contact Hrs./Week Category/s CL TL LL CL TL LL EDUCATION AND SUSTAINABILITY EES VEC 3 - 1 1 4 2 1.5 30 70*#	Course Title       Abbr       Course Course Category/s       Learning Scheme       Actual Contact Hrs./Week       SLH       NLH       Credits       Paper Duration       Theory         ENVIRONMENTAL EDUCATION AND SUSTAINABILITY       EES       VEC       3       -       -       1       4       2       1.5       30       70*#       100	Learning SchemeCourse TitleAbbrCourse Course Category/sLearning Scheme Actual Contact Hrs./Week CLNLHCreditsPaper Paper DurationTheoryFA- DurationAbbrCLTLLLSLHNLHFA- DurationFA- THSA- TOtalENVIRONMENTAL EDUCATION AND SUSTAINABILITYVEC31421.53070*#10040	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $

#### 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 Explain the need of studying environment and its components. TLO 1.2 Investigate the impact of population growth and industrialization on the relevant environmental issues and suggest remedial solutions TLO 1.3 Explain the Concept of 5 R w.r.t. the given situation TLO 1.4 Elaborate the relevance of Sustainable Development Goals in managing the climate change TLO 1.5 Explain the concept of zero carbon-footprint with carbon credit	Unit - I Environment and climate change 1.1 Environment and its components, Types of Environments, Need of environmental studies 1.2 Environmental Issues- Climate change, Global warming, Acid rain, Ozone layer depletion, nuclear accidents. Effect of population growth and industrialization 1.3 Concept of 5R, Individuals' participation in i) 5R policy, ii) segregation of waste, and iii) creating manure from domestic waste 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 1.5 Zero Carbon footprint for sustainable development, (IKS-Enviornment conservation in vedic and pre-vedic India)	Lecture Using Chalk-Board Presentations

ENVI	RONMENTAL EDUCATION AND S	GUSTAINABILITY Cou	rse 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	TLO 2.1 Justify the importance of natural resources in sustainable development TLO 2.2 Explain the need of optimum use of natural resources to maintain the sustainability TLO 2.3 Differentiate between renewable and non-renewable sources of energy TLO 2.4 Suggest the relevant type of energy source as a green solution to environmental issues	Unit - II Sustainability and Renewable Resources 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) 2.2 Impact of overexploitation of natural resources on the environment, optimum use of natural resources 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 2.4 Green Solutions in the form of New Energy Sources such as Hydrogen energy, Ocean energy & Tidal energy	Lecture Using Chalk-Board Presentations
3	TLO 3.1 Explain the characteristics and functions of ecosystem TLO 3.2 Relate the importance of biodiversity and its loss in the environmental sustainability TLO 3.3 Describe biodiversity assessment initiatives in India TLO 3.4 Conduct the SWOT analysis of the biodiversity hot spot in India TLO 3.5 Explain the need of conservation of biodiversity in the given situation	Unit - III Ecosystem and Biodiversity 3.1 Ecosystem - Definition, Aspects of ecosystem, Division of ecosystem, General characteristics of ecosystem, Functions of ecosystem 3.2 Biodiversity - Definitions, Levels, Value, and loss of biodiversity 3.3 Biodiversity Assessment Initiatives in India 3.4 SWOT analysis of biodiversity hot spot in India 3.5 Conservations of biodiversity - objects, and laws for conservation of biodiversity	Lecture Using Chalk-Board Presentations Video Demonstrations
4	TLO 4.1 Classify the pollution based on the given criteria TLO 4.2 Justify the need of preserving soil as a resource along with the preservation techniques TLO 4.3 Maintain the quality of water in the given location using relevant preventive measures TLO 4.4 State the significance of controlling the air pollution to maintain its ambient quality norms TLO 4.5 Compare the noise level from different zones of city with justification TLO 4.6 Describe the roles and responsibilities of central and state pollution control board	Unit - IV Environmental Pollution 4.1 Definition of pollution, types- Natural & Artificial (Man- made) 4.2 Soil / Land Pollution – Need of preservation of soil resource, Causes and effects on environment and lives, preventive measures, Soil conservation 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 4.4 Air pollution - Causes, effects, prevention, CPCB norms of ambient air quality in residential area 4.5 Noise pollution - Sources, effects, prevention, noise levels at various zones of the city 4.6 Pollution Control Boards at Central and State Government level: Norms, Roles and Responsibilities	Lecture Using Chalk-Board Presentations

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	ourse Coue - 514501		
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 Constitutional provisions related to environmental protection TLO 5.2 Explain importance of public participation (PPP) in enacting the relevant laws TLO 5.3 Use the relevant green technologies to provide sustainable solutions of an environmental problem TLO 5.4 Explain the role of information technology in environment protection	Unit - V Enviornmental legislation and sustainable practices 5.1 Article (48-A) and (51-A (g)) of Indian Constitution regarding environment, Environmental protection and prevention acts 5.2 Public awareness about environment. Need of public awareness and individuals' participation. Role of NGOs 5.3 Green technologies like solar desalination, green architecture, vertical farming and hydroponics, electric vehicles, plant-based packaging 5.4 Role of information technology in environment protection and human health	Lecture Using Chalk-Board Presentations Video Demonstrations

# 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

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 relavance 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 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	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	Ι	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	Enviornmental 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)

• Online MCQ type Exam

### XI. SUGGESTED COS - POS MATRIX FORM

		Programme Outcomes (POs)										
Course Outcomes (COs)	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	1 - 2 - 3 2 3										
Legends : *PSOs are	- High:03, M e to be formu	fedium:02 alated at i	2,Low:01, No 2 nstitute level	Mapping: -								

### 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 Enviornmental 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- fo r-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 Intiative for youth leadership for climate action

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Code		21	1	20	1

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ENVI	RONMENTAL 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 enviornmetal issues
7	https://egyankosh.ac.in/handle/123456789/61136	IGNOU's Intiative for online study material on Enviornmental studies
8	https://egyankosh.ac.in/handle/123456789/50898	IGNOU's Intiative for online study material on sustainability
9	https://sustainabledevelopment.un.org/content/documents/1180 3Official-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/sust ainable-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 Enviornmetal studies (Natural Resources, Biodiversity and other topics)
14	https://onlinecourses.nptel.ac.in/noc23_hs155/preview	NPTEL course on enviornmental studies which encomopasses SDGs, Pollution, Cliamate issues, Energy, Policies and legal framework
15	https://www.cbd.int/development/meetings/egmbped/SWOT- analys is-en.pdf	SWOT analysis of Biodiversity
16	https://www.sanskrit.nic.in/SVimarsha/V2/c17.pdf	Central sanskrkit university publication on Vedic and pre vedic enviornmetal 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

MSBTE Approval Dt. 21/11/2024

Semester - 4, K Scheme

ARCHITECTURAL DESIGN - I

ARCHITECTURAL		
Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/	
Programme Code	: AA/ AT/ IX/ IZ	
Semester	: Third	
<b>Course Title</b>	: 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 Or Category/s	Learning Scheme							Assessm						ent Scheme				
Course Code	Course Title	Abbr		Actual Contact Hrs./Week		k SI H NI I		- Credits	s Paper	Theory			Based on LL & TL Practical		&	Based on SL		Total			
				CL					Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SL	A	Marks	
											Max	Max	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

ARCH	HITECTURAL DESIGN - I	Co	ourse 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	<ul> <li>Unit - I Basics of Architectural Design</li> <li>1.1 Principles of Design - Pattern, Contrast, Emphasis, Balance, Scale, Harmony, Rhythm Movement and Unity</li> <li>1.2 Elements of Design - Line, Volume, Form Shape, Texture, Colour, Value, Space and Light</li> <li>1.3 Scale for the architectural design - Different types of scale, Criteria for proper selection for scale to be adopted for a drawing</li> <li>1.4 Read and interpretation of Architectural Drawings, visualization of Architectural Drawings in three dimensions along with scale and proportion.</li> <li>1.5 Human Scale and proportion and their relationship with space.</li> </ul>	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	<ul> <li>Unit - II Sketching , Drafting and Rendering Techniques</li> <li>2.1 Free Hand drawings of various objects by using appropriate grids and graph papers .</li> <li>2.2 2D Scaled drafted architectural drawings.</li> <li>2.3 Mediums and Techniques required for rendering drawings</li> <li>2.4 Horizonal-vertical and intersecting planes to quantify space.</li> </ul>	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	<ul> <li>Unit - III Case Study and Site Visit</li> <li>3.1 Importance of Site Visit and Case Project in education</li> <li>3.2 Live Sketching during site visit and case study associated with design project</li> <li>3.3 Preparation of report of site visit and case study</li> <li>3.4 Preparation of measured drawings associated with the design project</li> </ul>	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	<ul> <li>Unit - IV Architectural Drawings by using CAD Software.</li> <li>4.1 Initial settings to start CAD based drawings.</li> <li>4.2 Basic commands such as line, fillet, trim, offset, copy, paste associated with CAD Software</li> <li>4.3 Use of layers in the CAD software for making drawings.</li> <li>4.4 Incorporation of Texts and dimensions in CAD Drawings</li> </ul>	Role Play Hands-on Demonstration Video Demonstrations

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

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

		Lourse Cod	de : 323001	
Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs	
2	Preparation a report, presentation or sheets based on topics of Principles of Design	4	CO1 CO2 CO3	
3	Drafting of objects to various scale Drafting of objects at a scale to decide the size of paper	3	CO1 CO2 CO4	
4	Preparing a report and preliminary sketches of Design	3	CO1	
5	Drawing conceptual preliminary design at a scale of 1:50 of Arch. Design project	3	CO1	
6	*Drafting of Design proposal at a scale of 1:50 of the Arch. Design project	3	CO1 CO2 CO4	
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	
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	
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	
10	Rendering drafted Plan, Section Elevation at scale 1:50	3	CO1 CO2	
11	Preparation of report for the case study conducted for the Arch. Design Project.	3	CO1 CO3	
12	Preparation of report for the site visit conducted for the Arch. Design Project.	3	CO1 CO3	
13	Preparation of site plan at scale 1: 50 for the design project using CAD	4	CO2 CO4	
14	Preparation of ground floor plan at scale 1: 50 for the design project using CAD	4	CO2 CO4	
15	Preparation of elevations at scale 1: 50 for the design project using CAD	4	CO2 CO4	
16	Preparation of sections at scale 1: 50 for the design project using CAD	4	CO2 CO4	
	Sr         2         3         4         5         6         7         8         9         10         11         12         13         14         15         16	Sr NoLaboratory Experiment / Practical Titles / Tutorial Titles2Preparation a report, presentation or sheets based on topics of Principles of Design3Drafting of objects to various scale Drafting of objects at a scale to decide the size of paper4Preparing a report and preliminary sketches of Design5Drawing conceptual preliminary design at a scale of 1:50 of Arch. Design project6*Drafting of Design proposal at a scale of 1:50 of the Arch. Design project7Free hand sketches of various objects using grids and graph papers. Free hand sketches of small objects.7Free hand sketches of small objects.8Rendering sketches using Pencil and Pen as medium to make sketches.8Rendering sketches using Color Pencils and Watercolors as medium to make sketches.9Drafting Dlans at scale 1:50 Drafting Elevation at Scale at scale 1:5010Rendering drafted Plan, Section Elevation at scale 1:5011Preparation of report for the case study conducted for the Arch. Design Project.12Preparation of site plan at scale 1: 50 for the design project using CAD14Preparation of ground floor plan at scale 1: 50 for the design project using CAD16Preparation of sections at scale 1: 50 for the design project using CAD	Sr NoLaboratory Experiment / Practical TitlesNumber of hrs.2Preparation a report, presentation or sheets based on topics of Principles of Design43Drafting of objects to various scale size of paper34Preparing a report and preliminary sketches of Design proposal at a scale to decide the size of paper35Drawing conceptual preliminary design at a scale of 1:50 of Arch. Design project36*Drafting of Design proposal at a scale of 1:50 of the Arch. Design project37Free hand sketches of various objects using grids and graph papers. Free hand sketches of small objects.27Free hand sketches of small objects.48Rendering sketches using Pencil and Pen as medium to make sketches.48Rendering sketches using Color Pencils and Watercolors as medium to make sketches.49Drafting Plans at scale 1:50 Drafting Elevation at Scale at scale 1:50910Rendering drafted Plan, Section Elevation at scale 1:50311Preparation of report for the case study conducted for the Arch. Design Project.312Preparation of site plan at scale 1: 50 for the design project using CAD414Preparation of ground floor plan at scale 1: 50 for the design project using CAD4	

#### 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.

### **ARCHITECTURAL DESIGN - I**

# 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 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, 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	Ι	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**

### 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

		Programme Outcomes (POs)											
Course Outcomes (COs)	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 : *PSOs are	- High:03, N e to be form	/ledium:02 ulated at i	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

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

				L	ear	ning	Sche	eme					As	ssess	ment	Sche	eme				
Course Code	Course Title	urse Title Abbr Co Cate	r Category/s	Actual Contact Hrs./Week CL TL LL		SLHNLH		Credits	Paper	Theory			Based on LL & TL Practical		&	Based on SL		Total			
									Duration	FA- TH	SA- TH	Tot	tal	FA-	PR	SA-	PR	SL	A	Marks	
											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

COM	PUTER AIDED DRAWING - I		<b>Course Code : 323002</b>
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	<ul> <li>TLO 1.1 Explain the necessity of the CAD software for preparation of architectural drawing.</li> <li>TLO 1.2 Use line command for creation of architectural drawings.</li> <li>TLO 1.3 Use CAD commands for architectural drafting.</li> <li>TLO 1.4 Modify architectural drawings using CAD command.</li> </ul>	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	<ul> <li>TLO 2.1 Use CAD drafting command for architectural drawing.</li> <li>TLO 2.2 Apply various tools &amp; commands for architectural drawing.</li> <li>TLO 2.3 Apply appropriate annotations &amp; material indications in architectural drawing.</li> </ul>	<ul> <li>Unit - II Use of Designed Plans for drafting</li> <li>2.1 Drawing of a designed plan in computer aided drawing software.</li> <li>2.2 Use of various CAD commands.</li> <li>2.3 Properties of CAD tools &amp; command.</li> <li>2.4 Application of various tools &amp; commands.</li> </ul>	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.	<ul> <li>Unit - III Architectural 2D drawing using computer aided drawing software.</li> <li>3.1 Drafting plan in computer aided drawing software.</li> <li>3.2 Application of line weight, hatching in architectural drawings.</li> <li>3.3 Preparation of door, window &amp; opening schedule in computer aided software.</li> </ul>	Presentations Video Demonstrations Presentations

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

Practical / Tutorial / Laboratory Learning	Sr	Laboratory Experiment / Practical	Number of	Relevant
Outcome (LLO)	No	Titles / Tutorial Titles	hrs.	COs
LLO 1.1 Draw an introduction sheet using	1	Introduction to computer aided	2	CO1
computer aided drawing software.	1	drawing software.*	2	CO2
LLO 2.1 Prepare a sheet for basic commands	2	Introduction to commands of	2	CO1
of computer aided drawing software.	2	computer aided drawing software.*	Z	CO2
LLO 3.1 Prepare a sheet of basic tools of	2	Draw & modify tools in computer	2	CO1
computer aided drawing software.	3	aided drawing software.*	2	CO2
LLO 4.1 Prepare a sheet of 2D objects using	4	Basics of 2D objects using computer	2	CO1
computer aided drawing software.	4	aided drawing software.	2	CO2
LLO 5.1 Create a 2D architectural drawing	5	Basing of 2D drawing to shairway *	2	CO1
using computer aided software.	5	Basics of 2D drawing techniques.	2	CO2
LLO 6.1 Apply the dimensions & labels in	6	Dimensioning & Labelling in	2	CO2
architectural drafted drawing.	0	architectural drawings.*	Z	CO3
LLO 7.1 Prepare a sheet for layers &		I avons management in commuter		cor
modifications of layers in architectural	7	Layers management in computer	2	$CO_2$
drawing.		alded drawing software.*		COS
LLO 8.1 Prepare a sheet for snap tool &	0	Snap tool & precision in drawing	2	CO2
precision setting in computer aided software.	0	techniques.*	2	CO3

COMPUTER AIDED DRAWING - ICourse Code : 3					
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 -					
<ul> <li>'*' Marked Practicals (LLOs) Are mandate</li> <li>Minimum 80% of above list of lab experimental statements</li> </ul>	ory. ment	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**

#### 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 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

		Programme Outcomes (POs)									
Course Outcomes (COs)	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 : *PSOs are	- High:03, M e to be form	fedium:02 ulated at i	2,Low:01, No 2 nstitute level	Mapping: -							

#### **COMPUTER AIDED DRAWING - I**

### 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

https://www.autodesk.in/products/autocad/included- toolsets/a utocad-architectureThe Architecture toolset gives students all the to students need to complete their projects faster an scale project pipeline.2https://cad-academy.com/how-to-learn- autocad/#Understanding_ AutoCAD_BasicsThe tool boosts architectural design and drafting productivity with time-saving features and task automation. This article provides a comprehensi guide to learn AutoCAD step-by-step.3https://www.youtube.com/@autocad/featuredSoftware unlock insights and automations in 2D design workflows. Save time as student collabor with drawing files using the latest machine learn feature and specialized industry toolsets.4https://www.autodesk.in/campaigns/autocad-tutorials?AutoCAD Product Experts to help use learn AutoCAD and create innovative 2D design through interactive live webinars or on-demand	Sr.No	Link / Portal	Description
2https://cad-academy.com/how-to-learn- autocad/#Understanding_ AutoCAD_BasicsThe tool boosts architectural design and drafting productivity with time-saving features and task automation. This article provides a comprehensiv guide to learn AutoCAD step-by-step.3https://www.youtube.com/@autocad/featuredSoftware unlock insights and automations in 2D design workflows. Save time as student collabor with drawing files using the latest machine learn feature and specialized industry toolsets.4https://www.autodesk.in/campaigns/autocad-tutorials? wchannel id=lbxfle7xmq&wmediaid=cf2wf8zv6dAutoCAD Knowledge webinar is hosted by the AutoCAD and create innovative 2D design through interactive live webinars or on-demand	1	https://www.autodesk.in/products/autocad/included- toolsets/a utocad-architecture	The Architecture toolset gives students all the tools students need to complete their projects faster and scale project pipeline.
3       https://www.youtube.com/@autocad/featured       Software unlock insights and automations in 2D design workflows. Save time as student collabor with drawing files using the latest machine learn feature and specialized industry toolsets.         4       https://www.autodesk.in/campaigns/autocad-tutorials?       AutoCAD Knowledge webinar is hosted by the AutoCAD Product Experts to help use learn AutoCAD and create innovative 2D design through interactive live webinars or on-demand	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.
4AutoCAD Knowledge webinar is hosted by the Autodesk.in/campaigns/autocad-tutorials? wchannel id=lbxfle7xmq&wmediaid=cf2wf8zv6dAutoCAD Knowledge webinar is hosted by the Autodesk AutoCAD Product Experts to help use learn AutoCAD and create innovative 2D design through interactive live webinars or on-demand	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.
tutorials.	4	https://www.autodesk.in/campaigns/autocad-tutorials? wchannel id=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

Semester - 3, K Scheme

#### BUILDING SERVICES

Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code	: AA/ AT/ IX/ IZ
Semester	: Third
<b>Course Title</b>	: 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

				L	ear	ning	g Sche	me					A	ssess	ment	Sche	eme				
Course Code	Course Title	Abbr	Course Category/s	Actual Contact Hrs./Week		SLH	NLH	H Credits	Paper	Theory		Based on LL o TL Practical		&	Based on SL		Total				
				CL	TL	LL				Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SL	A	IVIAI KS
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
323301	BUILDING SERVICES	BSE	DSC	3	I	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**

### V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.N	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	<ul> <li>TLO 1.1 Justify the roles &amp; responsibilities of an architect &amp; interior decorator to accomplish building services</li> <li>TLO 1.2 List the relevant type of services required for the given building</li> <li>TLO 1.3 Explain planning aspects related to kitchen &amp; toilet blocks in various types of buildings as per UDCPR .and NBC</li> </ul>	<ul> <li>Unit - I Overview of building services and classification of buildings as per National Building Code.</li> <li>1.1 Role and Responsibilities of an architect and interior designer to accomplish building services.</li> <li>1.2 Functional requirements of building and different types .of services.</li> <li>1.3 Planning of kitchen and toilet of various types of buildings-Residential, Commercial, Public, institutional etc. w.r.t. NBC and UDCPR.</li> </ul>	Presentations Lecture Using Chalk-Board
2	<ul> <li>TLO 2.1 Explain the importance of Indian standards, byelaws &amp; UDCPR approval in laying the plumbing system in the given type of building project.</li> <li>TLO 2.2 Select suitable pipes &amp; fixtures for a given type of building project.</li> <li>TLO 2.3 Describe different types of water sources.</li> <li>TLO 2.4 Explain water treatment process required for drinking purpose.</li> <li>TLO 2.5 Describe different types of water distribution system for a residential building.</li> <li>TLO 2.6 Enlist toilet fixtures &amp; accessories required for designing a typical toilet block.</li> <li>TLO 2.7 Explain importance of Rain water harvesting systems</li> </ul>	<ul> <li>Unit - II Building Water Supply and Rainwater Harvesting Systems .</li> <li>2.1 Importance of water supply system and services, Indian standards &amp; bylaws for water supply and distribution, approval from local authorities as per UDCPR.</li> <li>2.2 Terminology used in water supply &amp; sanitary system, different types of pipes, fittings &amp; fixtures</li> <li>2.3 Types of water sources, pumping &amp; transportation of water</li> <li>2.4 Treatment of water, qualities of potable water</li> <li>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.</li> <li>2.6 Cold and hot water distribution: mixing systems using loft tanks, geysers, boilers, mixers, different types of taps, faucets.</li> <li>2.7 Introduction to Rain water Harvesting System, various types and its advantages</li> </ul>	Model Demonstration Case Study Presentations Lecture Using Chalk-Board Site/Industry Visit

BUIL	UILDING SERVICES Course Code : 32						
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 the importance of building and sanitation services for a given building project. TLO 3.2 Identify various sanitary wares required for a building project . TLO 3.3 Describe elements of external drainage system of a given building project. TLO 3.4 suggest the relevant plumbing system (drainage) for the given type of building and site condition with justification. TLO 3.5 Describe the process of sewage disposal for a given building project. TLO 3.6 Calculate capacity of a septic tank for a given building project.	<ul> <li>Unit - III Building Sanitation Services.</li> <li>3.1 Principles &amp; importance of building &amp; sanitation services, collection and disposal of various kinds of refuse from deferent types of buildings.</li> <li>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.</li> <li>3.3 External drainage systems, one &amp; two pipe system, different types of traps, Inspection chambers, manhole, disconnecting chamber, soak pit, municipal sewer.</li> <li>3.4 Disposal of sewage from various types of buildings, gradients used in laying of pipes for sewage disposal, septic tank details &amp; capacity calculation.</li> </ul>	Model Demonstration Case Study Presentations Lecture Using Chalk-Board Site/Industry Visit				
4	TLO 4.1 Describe sources of electricity and principles of distribution system for the given building project. TLO 4.2 Select suitable type of cables for the given building project. TLO 4.3 Explain different types of wiring for a given building project. TLO 4.4 Describe factors affecting the lighting design of a given building project.	<ul> <li>Unit - IV Electricity and Lighting.</li> <li>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).</li> <li>4.2 Importance of wiring, wiring standards, specification, sizes and their, types of cables, sheathing, shielding, cross section area, colour coding.</li> <li>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.</li> <li>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 factorsan</li> </ul>	Video Demonstrations Case Study Presentations Lecture Using Chalk-Board Site/Industry Visit				
5	TLO 5.1 Explain importance of natural and mechanical ventilation, HVAC, fire safety and firefighting system. TLO 5.2 .Explain importance of vertical transportation system, acoustics and building management systems.	<ul> <li>Unit - V Advanced Building Services.</li> <li>5.1 Introduction to natural and mechanical ventilation, HVAC ,fire safety and fire fighting system.</li> <li>5.2 Importance of vertical transportation system, acoustics and building management systems.</li> </ul>	Video Demonstrations Case Study Presentations Lecture Using Chalk-Board Site/Industry Visit				

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

BUILDING SERVICES	ourse Code	e : 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	
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BUILDING SERVICES		C	ourse Code	e : 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		
<ul> <li>Note : Out of above suggestive LLOs -</li> <li> '*' Marked Practicals (LLOs) Are mandatory.</li> <li>Minimum 80% of above list of lab experiment are to be performed.</li> <li>Judicial mix of LLOs are to be performed to achieve desired outcomes.</li> </ul>						

#### 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	<b>Equipment Name with Broad Specifications</b>	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

Course Code : 323301

#### **BUILDING SERVICES**

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	Overview of building services andIclassification of buildings as per NationalBuilding 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

		Programme Outcomes (POs)									
Course Outcomes (COs)	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 : *PSOs are	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

Semester - 3, K Scheme

#### **BUILDING SERVICES**

BUIL	DING SERVIC	CES	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

Incomi of since	
Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code	: AA/ AT/ IX/ IZ
Semester	: Third
<b>Course Title</b>	: THEORY OF STRUCTURE
<b>Course Code</b>	: 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 Category/s	Learning Scheme				eme		Assessment Scheme											
	Course Title	Abbr		Actual Contact Hrs./Week		SLH	NLH	Credits	Paper	Theory			Based on LL TL Practical		&	Base Si	ed on L	Total			
				CL T	TL	ГL LL				Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SI	.A	Marks
											Max	Max	Max	Min	Max	Min	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**

### 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 the relevant units of various quantities in a given situations. TLO 1.2 Explain effect of a force on the given object TLO 1.3 Calculate the resultant of the given force system analytically. TLO 1.4 Find the resultant of the given force system using law of triangle and law of parallelogram	<ul> <li>Unit - I Mechanics and Forces</li> <li>1.1 Significance and relevance: Mechanics, Applied Mechanics, Statics, Dynamics.</li> <li>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</li> <li>1.3 Resolution of a force- orthogonal and nonorthogonal component of a force, moment of a force, Varignon's theorem,</li> <li>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.</li> </ul>	Lecture Using Chalk-Board Demonstration Presentations
2	TLO 2.1 Draw the free body diagram for the given system. TLO 2.2 Determine unknown force in the given situation using Lami's theorem. TLO 2.3 Identify the types of beam required for the given situation. TLO 2.4 Determine the reactions in the given type of beam Analytically	<ul> <li>Unit - II Equilibrium of Force System</li> <li>2.1 Equilibrium and Equilibrant, free body and free body diagram, analytical and graphical condition of equilibrium</li> <li>2.2 Equilibrium of force systems by analytically</li> <li>2.3 Lami's Theorem</li> <li>2.4 Types of beam, support (simple, hinged, roller and fixed) and loads acting on beam (vertical point load and UD load)</li> <li>2.5 Beam reaction for simply supported beam with or without overhang, cantilever- subject to combination of point load and UD load</li> </ul>	Lecture Using Chalk-Board Video Demonstrations Presentations
3	TLO 3.1 Explain the concept of C.G and M.I. TLO 3.2 Explain Parallel Axis Theorem and Radius of Gyration of the given system.	Unit - III Centre of Gravity and Moment of Inertia 3.1 Concept of C.G and M.I. 3.2 Formula only of C.G and M.I for rectangular, Triangular, Circular and Semi Circular Shapes. 3.3 Parallel Axis Theorem and Radius of Gyration, Formula for Radius of Gyration of a Rectangular Shape	Lecture Using Chalk-Board Model Demonstration Presentations
4	<ul> <li>TLO 4.1 Describe the concept of truss and frame.</li> <li>TLO 4.2 Explain the concept of different geometry of truss.</li> <li>TLO 4.3 Identify the concept of frames and truss.</li> <li>TLO 4.4 Determine the forces in a member of given frames and truss.</li> </ul>	<ul> <li>Unit - IV Frame and Truss</li> <li>4.1 Introduction to plane lattice construction, application of frames and truss with building construction terminology of Rafters, Purlins.</li> <li>4.2 Different geometry of trusses up to 15 m. span.</li> <li>4.3 Perfect frames, imperfect frames, redundant and deficient frames</li> <li>4.4 Assumptions in the solution of frames: effect of horizontal and vertical forces on frames</li> </ul>	Lecture Using Chalk-Board Video Demonstrations Collaborative learning

THEC	urse 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.	<ul> <li>Unit - V Shear Force and Bending Moment</li> <li>5.1 Definitions of Shear Force and Shear Force</li> <li>diagram, Bending Moment and Bending Moment</li> <li>diagram</li> <li>5.2 Point of Zero Shear, S.F max and B.M max,</li> <li>relationship between S.F.D and B.M.D</li> <li>5.3 S.F.D and B.M.D of Simple Supported Beam</li> <li>with full U.D.L, Simple Supported Beam with</li> <li>Central Point Load, Simple Supported Beam with</li> <li>Eccentric point Load.</li> </ul>	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	<ul> <li>Unit - VI Analysis of Column</li> <li>6.1 Compression Members Subjected to eccentricity of loading about one and both axis, Middle third Rule for eccentricity about one axis</li> <li>6.2 Concept of Core or Kernel of a column for eccentricity about both axes. Applying the Middle Third Rule to Brick Pier Foundation.</li> <li>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.</li> </ul>	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 Laboratory Experiment / Practical Titles / Number Relevant Sr Learning Outcome (LLO) **Tutorial Titles** of hrs. No COs LLO 12.1 Draw of S.F.D and B.M.D Draw S.F.D and B.M.D of Simple Supported of a Simple supported beam with full 12 2 CO5 Beam with full U.D.L UDL \* Draw S.F.D. and B.M.D. of Simple LLO 13.1 Draw of S.F.D and B.M.D Supported Beam with Central Point Load, of a Simple supported beam with 13 2 CO5 Simple Supported Beam with Eccentric point central point load Load. LLO 14.1 Explain the middle third Concept of Core or Kernel of a column for rule and core or kernel of rectangular 14 2 CO6 eccentricity about both axes section LLO 15.1 Explain the Euler's theory, Euler's Theory, Rankine's Theory, Long and assumption and end condition of 15 2 CO6 Short Columns, Various End Conditions column, Rankine's Theory 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

• 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	<b>Relevant LLO Number</b>
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	Ι	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

THE	HEORY OF STRUCTURECourse 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

		Programme Specific Outcomes* (PSOs)								
Course Outcomes (COs)	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 : *PSOs are	- High:03, N e to be form	/ledium:02 ulated at i	2,Low:01, No nstitute level	Mapping: -						

# 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

THEC	DRY 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/10.1002/97834336026 38	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

	07-01	-2025 11:12:40 A
Course	Code :	: 323303

11:12:40 AM

Disio Selli Billio	
Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interio Design/
Programme Code	: AA/ AT/ IX/ IZ
Semester	: Third
<b>Course Title</b>	: 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**

**BASIC SURVEYING (ARCHITECTURE)** 

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**

				Learning Scheme				eme			Assessment Scheme										
Course Code	Course Title	Course Title Abbr Course Title		ctu onta s./W	ual tact Week SLHNLH		Credits	Paper	Theory		Based on LL & TL Practical		<i>.</i> &	Based on SL		Total					
				CL	TL	LL				FA- SA- TH TH Total		FA-	PR SA-PR		PR	SLA		1v1a1 K5			
											Max	Max	Max	Min	Max	Min	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)**

# V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Suggested Learning Pedagogies.	
1	TLO 1.1 Classify given type of survey based on purpose, instruments used and nature of field and place. TLO 1.2 Select the type of survey for the given situation. TLO 1.3 Explain scales of existing maps and propose scales for proposed maps / plans. TLO 1.4 Represent landforms graphically using appropriate scale.	<ul> <li>Unit - I Overview and classification of survey</li> <li>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.</li> <li>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.</li> <li>1.3 Scales: Engineers scale, RF and diagonal scale.</li> <li>1.4 Study of landforms, topography and contours, slope analysis, grading process; graphic representations of landforms.</li> </ul>	Presentations Demonstration Lecture Using Chalk-Board Video Demonstrations Hands-on Collaborative learning
2	TLO 2.1 Explain the process of chain surveying as a stepping stone for advanced surveying technology. TLO 2.2 Explain and adopt appropriate techniques for linear measurements. TLO 2.3 Compute horizontal angle using magnetic compass. TLO 2.4 Set out buildings using theodolite. TLO 2.5 Compute height of building using theodolite.	<ul> <li>Unit - II Conventional Methods of Surveying</li> <li>2.1 Concise introduction to linear measurements.</li> <li>2.2 Measurement of distance using chain and tape through ranging and traversing to measure a plot.</li> <li>2.3 Concise introduction to angular measurements using magnetic compass.</li> <li>2.4 Angular measurement (both horizontal and vertical) using theodolite.</li> <li>2.5 Application of theodolite in setting out buildings and land surveying.</li> </ul>	Presentations Hands-on Video Demonstrations Lecture Using Chalk-Board Collaborative learning Demonstration
3	TLO 3.1 Explain various terminologies related to leveling. TLO 3.2 Classify leveling instruments. TLO 3.3 Classify leveling staffs. TLO 3.4 Compute reduced levels using HI and Rise and Fall Method. TLO 3.5 Explain contour maps / plans as applicable for landscaping, culverts, road projects etc. TLO 3.6 Plot contour maps / plan as per the necessity of an architectural project from reduced level data.	<ul> <li>Unit - III Levelling</li> <li>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.</li> <li>3.2 Types of levels: Dumpy, tilting, auto level, digital level. Components of dumpy level and its fundamental axes. Temporary adjustment of levels.</li> <li>3.3 Types of leveling staff, self-reading staff and target staff.</li> <li>3.4 Calculation of levels using Height of Instrument, Rise and Fall Method.</li> <li>3.5 Introduction to contour plan of hills, valleys and sloping terrain.</li> <li>3.6 Plotting of contours using appropriate contour intervals as required for an architectural project on sloping ground.</li> </ul>	Presentations Hands-on Video Demonstrations Lecture Using Chalk-Board Collaborative learning Demonstration

BASIC	C SURVEYING (ARCHITEO	CTURE) Cou	rse 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	TLO 4.1 Compute distances using Electronic Distance Measurement Devices. TLO 4.2 Explain types and principles of total stations. TLO 4.3 Prepare land surveying map/ plan as required for an architectural project using total station. TLO 4.4 Prepare contour map / plan as required for an architectural project using total station. TLO 4.5 Set out a building with levels as per the foundation plan of building using total station. TLO 4.6 Explain the DGPS survey for architectural and planning projects.	<ul> <li>Unit - IV Modern Methods of Surveying</li> <li>4.1 Electronic Distance Measurement Devices.</li> <li>4.2 Total Stations: Types, Working principle and application in surveying.</li> <li>4.3 Traversing using total station, preparation of land surveying maps / plans.</li> <li>4.4 Contouring using total station, data analysis for preparation of plan (import and export to and from total station).</li> <li>4.5 Setting out building, check levels in building construction using total station.</li> <li>4.6 Introduction to Differential Global Positioning Systems (DGPS) for architectural and planning projects.</li> </ul>	Presentations Hands-on Video Demonstrations Demonstration Collaborative learning Lecture Using Chalk-Board
5	TLO 5.1 Explain applications of remote sensing in architecture and planning projects. TLO 5.2 Explain applications of GIS in architecture and planning projects. TLO 5.3 Apply open-source GIS computational tools for architecture and planning projects. TLO 5.4 Explain drone surveying and its applications in architectural and planning projects. TLO 5.5 Use official websites for accessing the land maps for architectural and planning projects.	<ul> <li>Unit - V Remote Sensing and GIS</li> <li>5.1 Introduction and applications of remote sensing systems in architecture.</li> <li>5.2 Introduction and applications of GIS in architecture.</li> <li>5.3 Use of open-source GIS computer programs for architectural applications.</li> <li>5.4 Introduction to drone surveying and its applications in architecture.</li> <li>5.5 Introduction to official websites for Land Maps like BhuNaksha, Bhuvan, Google Earth, Google Earth Pro etc.</li> </ul>	Presentations Hands-on Video Demonstrations Lecture Using Chalk-Board Case Study 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 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	Measurent of horizontal angles using Prismatic compass and distances using tape to plot the land with non-orthogonal shape.	6	CO2

BASIC SURVEYING (ARCHITECTU	RE)	C	ourse Cod	e : 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	Measurent 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	Plottting 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 -	_			

- '\*' 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)**

# **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 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	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 confirming 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 confirming to IS 2976 with least count of 20 seconds	3,4
8	Dumpy level and automatic levels confirming 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	Ι	Overview and classification of survey	CO1	4	4	4	2	10
2	Π	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

## 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

			Progra	amme Outco	mes (POs)			Pro S Ou	ogram Specifi Itcom (PSOs	me c es* )	
Course Outcomes (COs)	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	2									
Legends : *PSOs are	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_2iUCG87DwNVc3Mz1yYIRA 42jSQ1tB&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=ygUUZ2VvbWF4I HRvdGFsIHN0YXRpb24%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

Semester - 3, K Scheme

# BASIC SURVEYING (ARCHITECTURE)Course Code : 323303Sr.NoLink / PortalDescription

# 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

**BUILDING CONSTRUCTION** 

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

				L	ear	ning	g Sche	eme		Assessment Scheme											
Course Code	e Course Title	Course Title Abbr Course Title Abbr Course SL	SLH	NLH	Credits	Paper	Theory			Based on LL & TL Practical		&	Based on SL		Total						
				CL	TL	LL				Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	R SLA	Α	Marks
											Max	Max	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**

# V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Classify the given building on the basis of the nature of construction. TLO 1.2 Identify various components of a given building structure.	<ul> <li>Unit - I Overview of Building components</li> <li>1.1 Classification of Buildings As per National Building Code-2016. Load Bearing Structure, Framed Structure, Composite Structure.</li> <li>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,&amp; Parapet.</li> </ul>	Case Study Model Demonstration
2	TLO 2.1 Perform Layout of a given building plan. TLO 2.2 Demonstrate suitable safety measures required in excavation for the given type of foundation. TLO 2.3 Identify type of foundation suitable for the given building structure. TLO 2.4 Identify suitable pumping method of dewatering for given excavation pit.	<ul> <li>Unit - II Construction of Substructure</li> <li>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.</li> <li>2.2 Earthwork: Excavation For Foundation, Timbering and Strutting, Earthwork for Embankment, Material For Plinth Filling. Tools and Plants Used for Earthwork.</li> <li>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.&amp; coffer dams.</li> </ul>	Case Study Site/Industry Visit

BUIL	DING CONSTRUCTION	N Cours	se 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	TLO 3.1 Explain various terminologies used in stone masonry work. TLO 3.2 Identify the type of a given stone masonry structure. TLO 3.3 Explain the joints used in stone masonry with sketches. TLO 3.4 Identify the type of stone masonry of a given structure. TLO 3.5 Illustrate the process of erection and dismantling of scaffolding for a given building structure considering safety aspects. TLO 3.6 Identify the type of roof for a given building structure.	<ul> <li>Unit - III Construction of Superstructure</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ul>	Demonstration Site/Industry Visit
4	TLO 4.1 Select suitable type of Doors and windows for a given building structure. TLO 4.2 Select suitaible type of fixtures find fasteners for given type of doors and windows. TLO 4.3 Select suitable type of staircase for a given building structure.	<ul> <li>Unit - IV Building Communication and Ventilation</li> <li>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.</li> <li>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 o1 Windows recommended by HIS.</li> <li>Ventilators. Cement grills.</li> <li>4.3 Fixtures and fastenings for doors and windows.</li> <li>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.</li> </ul>	Model Demonstration Case Study Site/Industry Visit

#### **BUILDING CONSTRUCTION** Course Code : 323304 **Theory Learning** Suggested Outcomes Learning content mapped with Theory Learning Outcomes Learning Sr.No (TLO's)aligned to (TLO's) and CO's. Pedagogies. CO's. TLO 5.1 Explain the methodology involved in painting work. **Unit - V Building Finishes** TLO 5.2 Identify the 5.1 Wall Finishes: Plastering — Necessity of Plastering, type of plaster used in a Procedure of Plastering, Single Coat Plaster, Double Coat given wall surface. Plaster, rough finish, Neeru Finishing and POP. Special TLO 5.3 Explain the Plasters- Stucco Plaster, sponge finish, pebble finish. Plaster procedure of plastering Board And Wall Claddings. Precaution to be taken While work for a given wall Plastering. Defects in Plaster. Pointing - Necessity, Types of surface. Case Study pointing and Procedure of Pointing, Painting —Necessity, 5 TLO 5.4 Identify Site/Industry Staircase Preparation for painting, Methods of Application, suitable type of flooring Visit Selecting Suitable Painting Material. for a given building 5.2 .Floors finishes : Types of Floor Finishes and its suitabilitystructure. Shahabad, Kota, Marble, Granite, Kadappa, Ceramic Tiles, TLO 5.5 Explain the Vitrified, Chequered Tiles, Pavement Blocks, Concrete Floors, procedure involved in wooden Flooring, Skirting And Dado. Process of Layinglaying of floor tiles. Process of laying And Construction, Finishing and Polishing of TLO 5.6 Select the Floors. relevant type of paint for a given building surface.

# 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 Preparate of a Model of staircase using suitable scale.	10	Preparation of model of dog legged staircase using suitable material,	2	CO6

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Semester - 3, K Scheme

<b>BUILDING CONSTRUCTION</b>	
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<b>BUILDING CONSTRUCTION</b>	ourse Cod	e : 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 explaing 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 Preparate 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	Demonstratation of Painting work on a given surface of wall.	2	CO6
Note : Out of above suggestive	LLC	)s -		

- '\*' 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)

BUIL	BUILDING CONSTRUCTION Course Code : 323304										
Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R- Level	U- Level	A- Level	Total Marks			
1	Ι	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

		Programme Outcomes (POs)											
Course Outcomes (COs)	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 : *PSOs are	- High:03, M e to be form	fedium:02 alated at i	2,Low:01, No nstitute level	Mapping: -									

# 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	<b>Building Construction</b>	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:978-81 -219-0479-7				

			07-01-2025 11:12:59 AM
BUIL	DING CONSTRUCTIO	<b>N</b>	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 masonary
3	https://www.oreilly.com/library/view/building-construction-m aterials	building finishes
Note : • Te	eachers are requested to check the creative common license status/financial in a status/financial in the students	plications of the suggested

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Semester - 3, K Scheme

ARCHITECTURAL DESIGN - II

Programme Name/s	: Architecture Assistantship/ Architecture/ Interior Design & Decoration/ Interior Design/
Programme Code	: AA/ AT/ IX/ IZ
Semester	: Fourth
<b>Course Title</b>	: ARCHITECTURAL DESIGN - II
<b>Course Code</b>	: 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 Title			Learning Scheme				Assessment Scheme													
Course Code		Course Title Abbr Course Course Hrs./Week Category/s	Credits	Paper	Theory		Based on LL & TL Practical			&	Based on SL		ı Total								
			C	CL	CLTLLL				Duration	FA- TH	SA- TH	То	tal	FA-	PR	SA-	PR	SL	Α	Marks	
											Max	Max	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.

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 List various types of commercial space in chart form with its requirements of area and document / explain anthropometry data TLO 1.2 Develop & prepare mind maps to understand predesign and conceptual requirements. TLO 1.3 Prepare case studies (one shall be online and one bookcase). TLO 1.4 Develop a concept / theme of design for the space exploration.	<ul> <li>Unit - I Pre-design concept in context</li> <li>with anthropometry and ergonomics.</li> <li>1.1 Human scaling with basic</li> <li>anthropometry data assembling for</li> <li>commercial / institutional architecture /</li> <li>interior spaces.</li> <li>1.2 Predesign concept, check lists and list of</li> <li>space requirements.</li> <li>1.3 Case studies in context of the project</li> <li>1.4 Concept discussions for its correctness</li> <li>of the designated project</li> </ul>	Demonstration, Hands-on, Cooperative Learning, Lecture Using Chalk-Board, Presentations, Video Demonstrations, Case Study
2	TLO 2.1 Prepare site plan, bubble diagram & zoning TLO 2.2 Prepare site drawing as per scales provided TLO 2.3 Provide alternative layouts to explore design possibilities TLO 2.4 Produce schematic layout and working model with material board	<ul> <li>Unit - II Zoning, planning and area statements</li> <li>2.1 Predesign area statements for zoning &amp; planning.</li> <li>2.2 Site documentation with site plan / measurement plans.</li> <li>2.3 Planning &amp; preparing alternatives plans for understanding of best possible layout / planning.</li> <li>2.4 Schematic layout &amp; working Models with material board.</li> </ul>	Demonstration, Presentations, Lecture Using Chalk-Board, Video Demonstrations, Model Demonstration, Collaborative learning
3	TLO 3.1 Draw layout plans as designed to the scale. TLO 3.2 Draw sections as designed to the scale. TLO 3.3 Prepare Proposed Civil Layout (AA/AT) / Existing & Proposed civil Layout (IX/IZ) TLO 3.4 Develop 3D views & sketches & perspective drawings.	<ul> <li>Unit - III Planning &amp; designing &amp; 3D modelling.</li> <li>3.1 Scaled layout and sections to understand and demonstrate design</li> <li>3.2 Sections with all structural indications and levels</li> <li>3.3 3D sketches and views, concepts and design related drawing and their solutions</li> <li>3.4 Revision &amp; discussions with mentors in regards of designed project for its corrective measures.</li> </ul>	Model Demonstration, Demonstration, Video Demonstrations, Lecture Using Chalk-Board, Hands-on, Collaborative learning, Presentations

#### V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Semester - 4, K Scheme

ARCH	HTECTURAL DESIGN - H	Co	urse 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	TLO 4.1 Draw structural elements for designed project(AA/AT) TLO 4.2 Develop center line drawings for designed project (AA/AT) TLO 4.3 Organize site visits for services (AA/AT/IX/IZ) TLO 4.4 Draw structural layouts electrical, Plumbing, Rainwater Harvesting and Fire fighting layouts. (AA/AT) TLO 4.5 Draft all services drawing as per layout like flooring, reflected ceiling, Electrical with lighting, HVAC and networking layouts. (IX / IZ) TLO 4.6 Draw coordination layout showing all overlapping services (IX / IZ)	<ul> <li>Unit - IV Structural design development / Service Layouts &amp; Technical drawings</li> <li>4.1 Study model and understand structural requirements. (AA/AT).</li> <li>4.2 Structural issues and solving the problems (AA/AT).</li> <li>4.3 Services its important points to be noted while designing(AA/AT/IX/IZ).</li> <li>4.4 Structural &amp; service drawings for electrical, Plumbing, Rainwater Harvesting and Fire fighting layouts. (AA/AT).</li> <li>4.5 Flooring, reflected ceiling, Electrical with lighting, HVAC and networking layouts.(IX / IZ).</li> <li>4.6 Overlay drawings / coordination layout to understand all services to be provided within space. (IX / IZ).</li> </ul>	Demonstration, Video Demonstrations, Presentations, Collaborative learning, Hands-on, Site/Industry Visit, Model Demonstration
5	TLO 5.1 Transfer the manual designed drawings in computer software TLO 5.2 Prepare different layouts & sections TLO 5.3 Produce & Print portfolio on A3 size drawing sheets to evaluate TLO 5.4 Conduct Internal / cross jury for given project TLO 5.5 Assess Final portfolio	Unit - V Project development - Computer skill based. 5.1 Transfer prepared manual drawings to software driven outcomes 5.2 Print drawings and presentation methodologies 5.3 Prefinal portfolio printing 5.4 Prefinal drawings prepared and suggestions 5.5 Final portfolio submission of the given project	Flipped Classroom, Demonstration, Video Demonstrations, Presentations, Collaborative learning

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

Practical / Tutorial / Laboratory		Laboratory Experiment / Practical Titles / Tutorial	Number	Relevant
Learning Outcome (LLO)	No	Titles	of hrs.	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 - I	ırse Code	: 324001		
Practical / Tutorial / Laboratory	Sr	Laboratory Experiment / Practical Titles / Tutorial	Number	Relevant
Learning Outcome (LLO)	No	Titles	of hrs.	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 I	LO	)s -		

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

# ARCHITECTURAL DESIGN - II

# SKILLS DEVELOPMENT (SELF LEARNING)

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# **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	Ι	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

#### Formative assessment (Assessment for Learning)

# **ARCHITECTURAL DESIGN - II**

• 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)			Progra	amme Outco	mes (POs)			Pro S Ou	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 : *PSOs are	- High:03, M e to be formu	fedium:02 alated at i	2,Low:01, No 2 nstitute level	Mapping: -							

# 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: 156898054XISBN 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: 0442009704ISBN 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: 0070162999ISBN 13: 9780070162990
7	Francis.D. Ching & Corky Bingelli	Interior Design Illustrated	Published by Wiley, 2004 ISBN 10: 0471473766ISBN 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: 0823072711ISBN 13: 9780823072712
9	Karlen Mark, Kate Ruggeri & Peter Hahn	Space Planning Basics	Published by Van Nostrand Reinhold, 1992 ISBN 10: 0442009704ISBN 13: 9780442009700

ARCI	HITECTURAL DESIG	N - II	Course Code : 324001
Sr.No	Author	Title	Publisher with ISBN Number
10	Maureen Mitton	Interior Design Visual Presentation: A Guide to Graphics, Models, and Presentation Techniques	Published by Wiley, 1999 ISBN 10: 0471292591ISBN 13: 9780471292593
11	Robert Rengel,	Shaping Interior Space	Published by Fairchild Books, 2003 ISBN 10: 1563672219ISBN 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 :		
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• 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

COMPLITED AIDED DDAWINC II

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

				L	ear	ning	Sche	eme					A	ssess	ment	Sche	eme				
Course Code	Course Title	Abbr	Course Category/s	A Co Hrs	onta s./W	al ict 'eek	SLH	NLH	Credits	Paper	Theory		Theory		Based on LL & B		Base S	d on L	Total Marks		
				CL	TL	LL				Duration	FA- TH	SA- TH	Tot	tal	FA-	PR	SA-	PR	SLA		-IVIALKS
											Max	Max	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**

# 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	<ul> <li>TLO 3.1 Elaborate the concept of surfaces &amp; modelling techniques.</li> <li>TLO 3.2 Describe the material applications, modifications &amp; grouping in 3D modelling software.</li> <li>TLO 3.3 Define the concept of 3D warehouse &amp; integration of objects and models.</li> <li>TLO 3.4 Discuss the concepts &amp; importance of plugins in 3D modelling software.</li> </ul>	<ul> <li>Unit - III Surfaces, materials, 3D</li> <li>Warehouse &amp; Plugins.</li> <li>3.1 Concept of surfaces &amp; surface modelling techniques.</li> <li>3.2 Material applications to objects &amp; models in 3D modelling software.</li> <li>3.3 Introduction of 3D Warehouse &amp; their integration with 3D models.</li> <li>3.4 Concepts &amp; applications of plugins in 3D modelling software.</li> </ul>	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.	<ul> <li>Unit - IV Computer aided rendering, presentation &amp; walkthrough.</li> <li>4.1 Introduction to rendering &amp; rendering principals.</li> <li>4.2 Overview of rendering set up, optimization techniques in software's like V-Ray &amp; Lumion.</li> <li>4.3 Real-time rendering technologies &amp; rendering plugins.</li> <li>4.4 Presentation &amp; walkthrough creation in computer aided 3D modelling software.</li> </ul>	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	
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COMPUTER AIDED DRAWING-II			Course Cod	e : 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
<ul> <li>LLO 7.1 Demonstrate the model creation of basic chosen project like residential unit/commercial building/ space formation in interiors.</li> <li>LLO 7.2 Draft a 3D model of a chosen project like residential unit/commercial building/ space formation in interiors.</li> <li>LLO 7.3 Prepare a sheet of a drafted model in sketch-up 3D modelling software using layout tool.</li> </ul>	7	* Development of 3D model for a project.	2	CO2 CO3
<ul> <li>LLO 8.1 Explain surface modelling techniques.</li> <li>Elaborate wireframe models, surface models, and solid models.</li> <li>LLO 8.2 Draft an object and apply surface modelling techniques to a given object. (Minimum 3 objects)</li> <li>LLO 8.3 Prepare a sheet of given objects in sketch-up 3D modelling software by using layout tool.</li> </ul>	8	Application of surface modelling techniques.	2	CO2 CO3

COMPUTER AIDED DRAWING-II	<b>Course Cod</b>	le: 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 lavout 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 -				
• '*' 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 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	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	Ι	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

COM	OMPUTER AIDED DRAWING-IICourse 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

			Progra	amme Outco	mes (POs)			Pro S Ou	ogram Specifi Itcom (PSOs	ramme ecific comes* SOs)	
Course Outcomes (COs)	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									
Legends : *PSOs ar	- High:03, N e to be form	/ledium:02 ulated at i	2,Low:01, No	Mapping: -							

#### 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
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COM	PUTER 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.
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

WORKING DRAWING

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

		Learning Scheme Asses						ssess	ment Scheme																		
Course Code	Course Title	Abbr	Course Category/s	A Co Hrs	onta s./W	al ict 'eek	SLH	NLH	Credits	Paper	Theory		Theory		Theory		Theory		Theory		Ba	Based on LL & TL Practical		&	<sup>E</sup> Based or SL		Total Morks
				CL	TL	LL				Duration	FA- TH	SA- TH	To	tal	FA-	PR	SA-	PR	SI	А	19121 KS						
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min							
324003	WORKING DRAWING	WDR	DSC	2	-	2	2	6	3	-	-	-	-	-	50	20	50@	20	25	10	125						

Course Code : 324003

# WORKING DRAWING

# 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.

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 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. TLO 1.2 Collect and study any actual working drawing set of any live / already built project from any site or practicing architect.	Unit - I Introduction to Working Drawing 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. 1.2 Working drawing sets copy issued on site by architects showing different styles and methods used to convey the architectural information.	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
2	TLO 2.1 Draw building envelope using diagonal and coordinate Method TLO 2.2 Identify vertical structural members of the structure and their exact positioning in the drawing. TLO 2.3 Draw the floor plans showing important building elements & annotating the spaces. TLO 2.4 Locate existing structural elements on site & proposed changes in any of them as per design approved by client. TLO 2.5 Prepare interior design layouts (Plans) of the project with proper indications and annotations.	<ul> <li>Unit - II Working Drawings (Plans &amp; Layouts)</li> <li>2.1 Building outline (setting out plan) properly annotated with respect to Site Boundary</li> <li>2.2 Center line plan of the project with reference to the setting out plan</li> <li>2.3 Floor Plan Drawing with important building elements like walls, columns, doors, windows, projections, weather protections, claddings.</li> <li>2.4 Existing floor plan &amp; proposed changes in any of them as per design.</li> <li>2.5 Interior Furniture layouts, False ceiling layout &amp; electrical layout.</li> </ul>	White board / Chalk- board explainations, Video Demonstrations, Studio discussions,

# V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

WOR	KING 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	TLO 3.1 Explain the purpose and significance of sectional drawings & the information given through them on site. TLO 3.2 Incorporate the different information through the drawings of whole and part detail sections of the given project. TLO 3.3 Explain the purpose & information denoted in the building elevations. TLO 3.4 Prepare the schedule of openings and finishes.	Unit - III Working Drawings (Sections & Elevations) 3.1 Sections through important areas of the project with required information and annotations. 3.2 Full sections and Part detail sections of the building showing civil elements, finishes and annotations. 3.3 All sides building elevations with proper annotations, levels & finishes indications. 3.4 Door & windows schedule with sizes, levels, types, finishes etc.	Lecture Using Chalk- Board, Presentations, Collaborative learning
4	TLO 4.1 Explain water supply and sewer systems at Site Level & Building Level. TLO 4.2 Prepare the drawings of toilet details showing water supply & drainage systems, sanitary fixtures details etc. TLO 4.3 Explain electrical & lighting systems at Site Level & Building Level TLO 4.4 Explain HVAC systems at Site Level & Building Level TLO 4.5 Explain Fire fighting systems at Site Level & Building Level	<ul> <li>Unit - IV Building Services Details</li> <li>4.1 Water supply and Drainage</li> <li>layouts at Site Level &amp; Building</li> <li>Level.</li> <li>4.2 Water supply and drainage</li> <li>layouts of toilets and sanitary fixing</li> <li>details.</li> <li>4.3 Electrical &amp; Lighting layouts at</li> <li>Site Level &amp; Building Level.</li> <li>4.4 HVAC Layouts at Site Level &amp;</li> <li>Building Level</li> <li>4.5 Fire fignting Layouts at Site</li> <li>Level &amp; Building Level</li> </ul>	Video Demonstrations, Case Study, Lecture Using Chalk- Board, Collaborative learning
5	TLO 5.1 Explain the standard details of various architectural components like window framings, kitchen platforms, staircase finishes, railings and other fixtures. 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. TLO 5.3 Explain how to represent wall finishes, dado (lower wall cladding), and decorative elements. TLO 5.4 Explain the importance of sectional/elevational details & external/ Internal fenestration details.	Unit - V Building Component Details 5.1 Drawing set of details of various architectural components like window framings, kitchen platforms, staircase finishes, railings and other fixtures. 5.2 Flooring layouts showing different laying patterns (e.g., herringbone, diagonal, straight) for aesthetic and functional purposes. 5.3 Wall finishes drawings and sectional details showing different finishes, dado, cladding, and decorative elements. 5.4 external & Internal fenestration sections & sectional & elevational details at bigger scales. 5.5 Elevation drawings mentioning finishes, color codes etc.	Classroom Lecture, Presentations, Collaborative learning

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

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

WORKING DRAWING		C	ourse Cod	e : 324003
Practical / Tutorial / Laboratory Learning	Sr	Laboratory Experiment / Practical	Number	Relevant
Outcome (LLO)	No	<b>Titles / Tutorial Titles</b>	of hrs.	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		C	ourse Cod	e : 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
<ul> <li>Note : Out of above suggestive LLOs -</li> <li> '*' Marked Practicals (LLOs) Are mandatory.</li> <li>Minimum 80% of above list of lab experiment are to be performed.</li> <li>Judicial mix of LLOs are to be performed to achieve desired outcomes.</li> </ul>				

# 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

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			
	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	1 I Introduction to Working Drawing CO1		CO1	2	0	0	0	0
2 II Working Drawings (Plans & Layouts)		CO2	8	0	0	0	0	
3	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											
	Programme Outcomes (POs)								Programme Specific Outcomes* (PSOs)		
Course Outcomes (COs)	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 : *PSOs ar	- High:03, N e to be form	/ledium:02 ulated at i	2,Low:01, No nstitute level	Mapping: -							

### 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-workin g-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

Semester - 4, K Scheme