Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Fax : +91 - 261 - 2227312
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

ક્રમાંક : ઓથો./પરિપત્ર/૨૯૮૩૩/૨૫
તા.૨૧/૧૧/૨૦૨૫

પ્રતિ,
આચાર્યશ્રી,
શ્રી જી.સી.પટેલ ઈન્સ્ટીટયૂટ ઓફ આર્કિટેકચર,
ઈન્ટીરીયર ડિઝાઈન એન્ડ ફાઈન આર્ટ્સ
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષય:– Diploma in Architecture Sem-4 & 5 નાં અભ્યાસક્રમ અંગે.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, આર્કિટેકચર ફેકલ્ટીમાં શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવેલ ડિપ્લોમાં ઈન આર્કિટેકચરના અભ્યાસક્રમમાં શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી સેમેસ્ટર–૪ અને સેમેસ્ટર–૫ નો ડિપ્લોમાં ઈન આર્કિટેકચરનો અભ્યાસક્રમ સુધારા– વધારા સાથે આર્કિટેકચર વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ વિદ્યાશાખા વતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૨૪/૧૨/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંક : ૩૫૩ અન્વયે માનનીય કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે, જેની આથી જાણ કરવામાં આવે છે.

બિડાણ : ઉપર મુજબ

કુલસચિવ

નકલ રવાના:
પ્રતિ,
૧) અધ્યક્ષશ્રી, આર્કિટેકચર વિદ્યાશાખા,
૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

...તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY
DIPLOMA IN ARCHITCTURE

Semester – IV

				Hours				Credit	Internal		External		
Sr. No.	Subject Name	Category	Sem	L	T	P	Total		Exam	Continous /Viva /Jury	Exam	Viva/ Jury	Total
1	Architectural Design Studio-IV	Professional Core	4	0	0	10	10	6	0	50	0	50	100
2	Building Services	BS & AE	4	2	0	2	4	3	20	30	50	0	100
3	Structure - II	BS & AE	4	2	0	0	2	3	20	30	50	0	100
4	Enviromental science	BS & AE	4	2	0	0	2	2	20	30	50	0	100
5	History of Architecture-II	Professional Core	4	2	0	2	4	2	20	30	50	0	100
6	Computer Skills-II	SEC	4	0	0	4	4	2	20	30	50	0	100
7	Bldg. Bye Laws & professional practice	Professional Core	4	2	3	0	2	2	20	30	50	0	100
8	Indian Knowledge System & Tradition	PAEC-Elective 1 (Any One)	4	2	0	0	2	2	20	30	25	25	100
Total							30						

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External,On Job Training(OJT) is equivalent to Practical

Course Title: Architectural Design Studio – IV

Semester – IV

1. TEACHING AND EXAMINATION SCHEME

				Hours					Internal		External		
Sr. No	**Subject Name**	**Category**	**Sem**	**L**	**T**	**P.**	**Total**	**Credit**	**Exam**	**Continous/ Viva/ Jury**	**Exam**	**Viva/ Jury**	**Total**
1	Architectural Design Studio-IV	Professional Core	5	0	0	12	12	06	0	50	0	50	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical - External, On Job Training (OJT) is equivalent to Practical

1. EMPHASIZE

To understand the use of technologies developed in other fields as a precursor to creatingarchitecture. The design shall deal with multiple functions resulting in complex form. The design shall be sensitive to the needs of disabled, aged people and children To understand creating of spaces. Formal, informal and interactive spaces and their hierarchies in built Environment.

Design emphasis shall also be laid on structural feasibility and use of innovations in materials and techniques of construction for achieving the thermal comfort and energy efficiency for a given context. The design shall be mainly addressing to the local issues and construction processes.

2. INTENSION OF THIS SUBJECT

Understanding of architectural structures and building services and the coordination thereof through a comprehensive resolution of the design of a complex building in the urban context.

3. COURSE OUTCOMES (COs)

CO1: To foster an understanding required to handle large scale building projects like campuses and multi-utility building complexes.
CO2: Understanding design as a function of specific agendas of complex building services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems.
CO3: Integrating aspects of Sustainability in design and Site planning as essential components of the projects.
CO4: Incorporating active methods for achieving sustainability like Water Harvesting, Waste management, Solar and Wind Energy beside others for achieving a smaller carbon footprint of the project.

4. SUGGESTED PRACTICAL/STUDIO EXERCISES

- Designing an Institutional /Public Building with Complexity Of Services/Functions having 500-750 sq.mt area.
- Studio project shall include problems involving above considerations such as institutes, Residential schools, Shopping malls (medium size), Single function Sports Complex, medium rise buildings, apartments etc (G+3).

- One major project and one minor project and a time problem to be tackled in the semester. Detailing of architectural features of the major project has to be attempted
    - Study of various building techniques and planning methods adopted in building forachieving thermal comfort and energy efficiency.
    - Study of structural system adopted
    - Case study, data collection, literature survey
    - Design proposal including study model
    - Detailing of architectural features involved shall be attempted

The COs' sub-components are the subsequent practical outcomes (PrOs). They are essential for that specific CO at the 'Precision Level' of Dave's Taxonomy in the 'Psychomotor Domain'.

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Case Study: Prepare an analytical drawing for various parameters like Site context, master plan, climatical, circulation, bye-laws, built-up, services, cluster level, unit level, Architectural character etc. for appropriate case-study or reference projects of similar nature.	I	20
2	Prepare a Conceptual Design by formulating design requirements for a given single volume design project.	II	15
3	Prepare preliminary sketch designs of the given design projectto the scale using anthropometric requirements	III	15
4	Prepare a set of final presentation drawings including plans, sections, elevations and views for the designed building	IV	20
5	Draw 3-dimensional view of the designed building	IV	08
6	Make a model of the designed project to scale	IV	08
	Total Hrs.		**86**

Note:

- *The teacher of the relevant course may design and provide additional practical exercises to help students achieve the COs by enhancing their industry-related skills and outcomes. Just a suggested list, the table above.*
- *Due to the fact that this is a first-year study report, caution must be given when assigning and grading it. A group assignment is required for the study report, data collection report, and analytic report. Before the group begins their market research, the teacher must discuss the types of data (which and why).*
- *The following are a few examples of "Process" and "Product" related skills that are present in the above-mentioned Practical Exercises of this course and are ultimately incorporated into the COs and the competency (more may be added or omitted depending on the course).*

Sr. No.	Examples of Performance Measures for PrOs	Weightage in %
1	Accurate measurement and graphical representation of data collection for the given design project	20
2	Ability to analyze the form and functional clarity of the studied buildings.	10
3	Prepare bubble diagram showing inter-relationships and circulation	10
4	Concept development with originality of idea	20
5	Apply the inferences from the studied buildings in the design process	20
6	Final presentation drawings and model	10
7	Adherence to deadlines	10
	Total	**100**

5. AFFECTIVE DOMAIN OUTCOMES

The following ***sample*** Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

a) Work as a leader/a team member.
b) Follow ethical practices.
c) Practice environmentally friendly methods and processes. (Environment related)

6. CONTENT:

The primary theory is shown below and is based on the higher level UOs of the Revised Bloom's taxonomy that are developed for the growth of the COs and competencies. The course instructor may add more of these UOs if necessary to emphasize proficiency and the achievement of COs.

Unit	Unit Outcomes (UOs)
Unit – I **Introduction**	1. Understand and learn how to solve the Built Environment needs for multifaceted public activities especially for large campuses. 2. Recognizing and Integrating aspects of Sustainable design and planning.
Unit –II **Site Analysis & Case Study**	1. Examining existing case and literature studies of similar nature to develop design criteria. 2. Extensive Site analysis of the proposed site for assessing on-site and off-site potentials and constraints.
Unit– III **Design Proposal** **Design of large campuses**	1. Incorporating principles of efficient and sustainable site planning, space planning, circulation and services.
Unit– IV **Integration of Advanced Services**	1. Structure and Active Sustainable Strategies 2. Besides design and planning of buildings within the campus the concentrations also need to be on integration of complex building

	services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems. 3. Strategies of water harvesting, waste management, utilization of solar and wind energy and reducing the overall carbon footprint of the project.

7. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student- related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

a) Undertake periodic site visits to relate to the present architectural practices.
b) Identify and explore the design parameters for the locally available Public buildings.
c) Attend Interactive sketching workshops.
d) Visit and explore art exhibitions and libraries
e) Give seminar on the relevant topic under consideration.
f) Prepare portfolio of Architectural Design for Public Buildings
g) Participate in model making workshops

8. SUGGESTED LEARNING RESOURCES

1. High rise buildings of urban design
2. Jencks, Charles – Modern Architecture
3. North, Whitney – Small urban spaces
4. Ashuhano, Yoshinobu – Exterior design in architecture
5. Time Saver Standards for Architectural Design Data by John Hanock,
6. Architectural Graphic Standard by Ramsay and Sleeper.
7. Neufert Data Standards Ernst Neufert Archon Books
8. Building Drawing Shah, Kale, Patki Tata Mcgraw Hill Publishing

9. SOFTWARE/LEARNING WEBSITES

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

10. PO-COMPETENCY-CO MAPPING

Semester V	Architectural Design Fundamentals (Course Code: 1016301)								
	POs and PSOs								
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ develop-ment of solutions	PO 4 Engineering Tools, Experimentation &Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Management	PO 7 Life-long learning	* PSO 1 Planning & Design	#PSO 2 Execution
Competency	Prepare architectural design for a single volume building, its presentation drawings and models								
Course Outcomes CO1: To foster an understanding required to handle large scale building projects like campuses and multi-utility building complexes.	2	2	3	1	-	-	1	1	-
CO2: Understanding design as a function of specific agendas of complex building services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems.	1	2	3	2	1	1	2	-	1
CO3: Integrating aspects of Sustainability in design and Site planning as essential components of the projects.	1	1	-	1	1	-	-	3	-
CO4: Incorporating active methods for achieving sustainability like Water Harvesting, Waste management, Solar and Wind Energy beside others for achieving a smaller carbon footprint of the project.	-	-	2	1	3	1	2	-	1

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Building Services

Semester – IV

1. TEACHING AND EXAMINATION SCHEME

				Hours				Credit	Internal		External		
Sr. No.	Subject Name	Category	Sem	L	T	P	Total		Exam	Continous /Viva /Jury	Exam	Viva/ Jury	Total
2	Building Services	BS & AE	4	2	0	2	4	03	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. RATIONALE

This course focuses on a learner's acquisition of knowledge, skills and practices of essential building services for proper functioning and utility of building as a 'whole' unit/entity. Buildingservices play a critical role in the overall functioning and performance of a building, affecting factors such as energy efficiency, comfort, safety, and sustainability. Building services are a cross-disciplinary field, involving aspects of electrical, mechanical, and plumbing engineering, and it is important to have a basic understanding of these systems. Knowledge about domestic water supply & sanitation system (external & internal) and house drainage & disposal facilities,rain water harvesting, ventilation and air conditioning, acoustics and creation of movement provisions and fire safety measures is imparted. Understanding of building services is essential for architects in the design and construction process, as well as for maintenance of buildings in the future. Hence, the study of building services is a critical component of the education ofarchitecture students, providing them with the knowledge and skills necessary to design and manage the technical systems of buildings effectively.

3. COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop required skills so that students are able to acquire following competency:

- **Apply knowledge of essential building services in architectural designs for their effective & efficient functioning**

4. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement ofthe following COs:

a) Draw layout plan of water supply system, drainage system and rain water harvesting for a given building.
b) Prepare a plan indicating the location of ventilation/air conditioning system, lift, escalators, ramps and fire safety provision for a given building.
c) Select appropriate type of acoustic material as per the requirement for a given building.

5. SUGGESTED PRACTICAL/STUDIO EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. T*hey are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.*

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Draw scheme for water supply for a given building	I	6
2	Draw detailed scheme for house drainage, sanitary fixtures and rain water harvesting for a given building	II	6
3	Prepare detailed layout of ventilation and air-conditioning for a given building	III	4
4	Design acoustics and identify fire safety provisions for a given building.	IV, V	6
5	Plan movement facilities: Lifts, escalators, ramps etc. for a given public building	V	6
	Total Hrs.		**28**

Note

*i. More **Practical/Studio Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.*

ii. Study report, data collection and analysis report must be assigned in a group. Teacher has to discuss about type of data (which and why) before group start their site visits.

*iii. The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical/Studio Exercises** of this course required which are embedded in the COs and ultimately the competency.*

S. No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Proper planning and layout of drawing sheet – overall composition (for optimum use of drawing sheet)	10
2	Completing given practice problems	20
3	Accuracy of drawing	20
4	Neatness of drawing	10
5	Timely submission of completed drawing sheet	20
6	Answering viva voce questions	20
	Total	**100**

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

S. No.	Equipment Name with Broad Specifications	PrO.No
1	Drawing Board with other drawing Instruments	1-5
2	Interactive board with LCD overhead projector	1-5

7. AFFECTIVE DOMAIN OUTCOMES

The following ***sample*** Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

a) Work as a leader/a team member.
b) Follow ethical practices.
c) Social and Functional Competence of design
d) Participates in class discussions and present the design effectively, Generate new ideals.
e) Practice environmentally friendly methods and design processes.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

i. 'Valuing Level' in 1st year
ii. 'Organization Level' in 2nd year.
iii. 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
Unit –I **Domestic water supply**	**1a.** Enlist various sources of water and uses of water. **1b.** Calculate demand of water for domestic purpose. **1c.** Explain the factors affecting rate of demand of water. **1d.** Explain various methods of water distribution and layout of distribution pipes with sketch.	1.1 Sources of water 1.1.1 Uses of water 1.1.2 Demand of water for domestic purpose only 1.1.3 Factors affecting rate of demand of water 1.2 Methods of water distribution 1.2.1 Systems of supply of water 1.2.2 Methods of layout of distribution pipes

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
	1e. Explain various water supply system **1f.** Explain various water supply fittings, fixtures and pipes. **1g.** Draw layout of water supply system for a residence. **1h.** Plan for Rain water harvesting in the new buildings	1.3 Water supply fittings & fixtures Air valves, Bib cocks, Fire hydrants, Refluxvalves, Relief valves, Sluice valves, Water meters 1.3.1 Pipes of different materials used for water supply 1.4 Simple layout of water supply system for a residence 1.5 Rain water harvesting for buildings
Unit– II Sanitation and house drainage	**2a.** Explain various purposes and principles of sanitation. **2b.** Define Bacteria, Invert, Refuse, Sewer, Sewerage **2c.** Explain various system ofsewerage. **2d.** Explain principles of housedrainage. **2e.** Define traps and classify them according to shape and function **2f.** Explain various system of plumbing and **2g.** Define Anti-siphonage pipe, Cowl, Fresh air inlet, Siphonage, Soil pipe, Vent pipe, Waste pipe. **2h.** Explain various sanitaryfittings and **2i.** Draw Drainage plan of a building. **2j.** Explain maintenance of house drainage system **2k.** Explain septic tank, soak pitand manholes with sketch. **2l.** Describe objective of manhole **2m.** Explain location and classification of manhole	2.1 Purpose of sanitation 2.1.1 Principles of sanitation 2.1.2 Definitions: Bacteria, Invert,Refuse, Sewer, Sewerage 2.1.3 Systems of sewerage: • Separate system • Combined system • Partially separate system 2.2 Principles of house drainage- 2.2.1 Traps: definition, function andrequirement of a good trap 2.2.2 Classification of traps according toshape-P,Q and S Traps 2.2.3 Classification of traps according to function-Intercepting traps, Gully traps, Grease traps 2.2.4 Definitions of Anti-siphonagepipe,Cowl, Fresh air inlet, Siphonage, Soil pipe, Vent pipe, Waste pipe 2.2.5 System of Plumbing • Single stack system • One pipe system • One pipe system partiallyventilated • Two pipe system 2.2.6 Sanitary Fittings-Sinks, Bath tub,Water closets, Flushing cistern, Urinals, wash basin 2.3 Drainage plan of a building 2.4 Maintenance of house drainagesystem 2.5 Septic tank and soak pit-constructional features,

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
		advantagesand disadvantages 2.6 Manholes: • Definitions • Objective • Location • Classification ofmanholes • Component parts
Unit – III **Ventilation and Air conditionin g**	**3a.** Define ventilation and its necessity. Explain the functional requirements and essentials of good ventilation system. **3b.** Describe system of ventilation **3c.** Define air conditioning and purpose and classification of air conditioning. **3d.** Explain the principles of comfort air conditioning. **3e.** Describe the system of air conditioning with sketch.	3.1 Definition of ventilation and its necessity 3.1.1 Functional requirements of ventilation system. 3.1.2 System of ventilation-Natural/mechanical i.e., exhaust airsupply and combined. 3.1.3 Essentials of good ventilating system. 3.2 Definition of air conditioning 3.2.1 Purpose of air conditioning. 3.2.2 Classification of air conditioning. • Comfort A.C • Industrial comfort • Summer, Winter airconditioning. 3.2.3 Principles of comfort air conditioning. • Temp control • Air velocity control • Humidity control 3.2.4 System of air conditioning. 3.2.5 Central system 3.2.6 Self-contained system unit 3.2.7 Combined system
Unit – IV **Acoustic s**	**4a.** List out and explain characteristics of audible sound **4b.** Explain various acousticaldefects. **4c.** Define insufficient loudness and external noise. **4d.** Classify various sound absorbent materials and explain them. **4e.** Explain the required conditions of good acoustics.	4.1 General discussion 4.2 Characteristics of audible sound • Frequency of pitch • Intensity of loudness of sound • Measurement of sound • Principles of acoustics. • Behavior of sound and its effect. 4.3 Acoustical defects • Formation of echoes. • Reverberation • Reverberation time • Optimum time of reverberation

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
	4f. Explain general principles inacoustical design.	• Dead spot • Sound foci 4.4 Insufficient loudness and external noise. 4.5 Sound absorbent material and their classification. 4.6 Requirement and conditions of good acoustics. 4.7 General principles in acoustical design • Site selection • Volume • Space • Treatment of interior • Surface • Reverberation • Sound absorption • Seats and seating arrangement
Unit – V Movement Facilities &Fire Safety Provisions	**5a.** Explain electrical lifts along with its component parts with sketch. **5b.** Describe what is an escalator, its types, space required and approaches. **5c.** Explain ramps for different **5d.** Apply various types of fire services as per requirements of building **5e.** Select suitable types of fire protection	5.1 Electrical lifts, lift wall, lift door andgates and their detail with sketch 5.2 Escalators – types, space required and approaches 5.3 Ramp details for different purposes as well as their spaces and locations 5.4 Causes and effects of fire 5.5 General requirements of fire resisting building as per IS and NBC 2005 5.6 Characteristics of fire resisting materials

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Domestic water supply	08	02	08	04	14
II	Sanitation and house drainage	10	02	10	04	16
III	Ventilation and Air conditioning	09	02	06	06	14
IV	Acoustics	09	02	08	04	14
V	Movement Facilities & Fire Safety Provisions	06	00	07	05	12
Total		**42**	**08**	**39**	**23**	**70**

Legends: *R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)*

Note: This specification table provides general guidelines to assist learners for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from above table.

10. SUGGESTED LEARNER ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested learner-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Learners should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (learner's) portfolio which may be useful for their placement interviews:

a) Visit of construction sites to observe the current services practices and prepare a report.

b) In a group of 4-5 students prepare an internet/library-based presentation for each of above topics considering recent practices prevailing across the world

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

a) Massive open online courses (***MOOCs***) may be used to teach various topics/sub topics.

b) Guide learner(s) in undertaking micro-projects.

c) ***'L' in section No. 4*** means different types of teaching methods that are to be employed by teachers to develop the outcomes.

d) About ***20% of the topics/sub-topics*** which are relatively simpler or descriptive in nature is to be given to the learners for ***self-learning***, but to be assessed using different assessment methods.

e) With respect to ***section No.10***, teachers need to ensure to create opportunities and provisions for ***co-curricular activities***.

f) Guide learners on how to address issues on sketching, model making, etc.

g) Use relevant video/animation films to explain various concepts and processes related to basic Architectural design themes for Public Buildings.

h) Use different instructional strategies in classroom teaching.

i) Use the relevant architectural assignments in the given situation.

j) Guide learners on form, functions utility, method of construction, etc. to facilitate them to prepare actual measured drawings.

k) Use the technique of table top discussions along with design jury sessions to teach the relevant content to the learners.

l) Adopt various strategies to enhance each learner's individual creative ability especially with reference to concept and form

12. SUGGESTED DESIGN MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a learner that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are

group-based (group of 3 to 5). However, **in the fifth and sixth semesters,** the number of learners in the group should **not exceed three.**

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each learner will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the microproject should be about **14-16 (fourteen to sixteen) learner engagement hours** during the course. The learners ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the Co. Similar micro-projects could be added by the concerned course teacher:

a. Study of on-going constructions works and documentation of the provisions of building services in the form of a report with photographs and sketches.

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication with place, year andISBN
1	The text book of Building Construction	S. P. Arora, S. P.Bindra	Dhanpat Rai Publications (P) Limited ISBN: 978-81-89928-80-3
2	Building Construction	Rangwala	Charotar Publishing House (P) Limited ISBN: 978-93-85039-04-1
3	Building Construction	Dr. B. C. Punmia, Er.Ashok K. Jain, Dr. Arun K. Jain	Laxmi Publication (P) Limited, Eleventh Edition (2016), ISBN: 978-81-318-0428-5
4	Building Construction and Materials	Gurcharan Singh	Standard Book House, ISBN-13: 9788189401214
5	Water supply and sanitary Engineering (including environmental engineering)	S.C. Rangwala	Charotar Publications, ISBN-10: 9385039202
6	Water supply and sanitary Engineering	Gurucharan Singh & Jagdish Singh	Standard Publishers, ISBN-10: 8180140296
7	A text book of Water supply and sanitary Engineering	G. J. Kulkarni	Oxford & IBH Pub. ISBN:812041683X
8	Building Services and Equipment: Volume 1 to 3	Frederick E. Hall	Routledge, ISBN-13, 978-0582236523
9	National Building Code of India - 2005	National Building Code of India - 2005	BIS, New Delhi

14. SOFTWARE/LEARNING WEBSITES

a) https://archive.nptel.ac.in/courses/105/102/105102176/

b) www.epa.gov/iaq/schooldesign/hvac.html

c) PO-COMPETENCY-CO MAPPING

Semester IV	Building Services (Course Code: 4345004)								
	POs and PSOs								
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ development of solutions	PO 4 Engineer-ing Tools, Experimentation &Testing	PO 5 Engineering practices for society, sustain-ability & environ-ment	PO 6 Project Management	PO 7 Life-long learning	* PSO 1 Planning & Design	#PSO 2 Execution
Competency	• Apply knowledge of essential building services in architectural designs for their effective & efficient functioning								
Course Outcomes a) Draw layout plan of water supply system and drainage system for given residential building.	3	3	2	-	1	1	1	3	1
b) Prepare a plan indicating the location of ventilation/air conditioning system, lift, escalators, ramps and fire safety provision for a given residential building.	3	3	2	-	1	1	1	3	1
c) Select appropriate type of acoustic material as per the requirement for a given building.	3	3	1	-	2	1	2	3	2

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements ofthe project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Structure- II

Semester – IV

TEACHING AND EXAMINATION SCHEME

				Hours				Credit	Internal		External		
Sr. No.	**Subject Name**	**Category**	**Sem**	**L**	**T**	**P**	**Total**		**Exam**	**Continous /Viva /Jury**	**Exam**	**Viva/ Jury**	**Total**
3	Structure - II	BS & AE	4	2	0	0	2	03	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External,On Job Training(OJT) is equivalent to Practical

FOCUS:

- To provide a comprehensive understanding of the structural characteristics of columns and beams.
- The purpose of this course is to offer an overview of the principles and techniques involved in designing reinforced concrete structures.
- Teaching the role of structures in architecture is necessary.

CONTENTS:

1. Concrete: This pertains to the composition, fundamental principles of mix design, water-cement ratio, strength, durability, and workability requirements.
2. The significance of Reinforced Concrete Construction (RCC) in the field of architecture Benefits of Reinforced Concrete Construction (RCC) compared to other traditional structural methods. The steel used for Reinforced Cement Concrete (RCC) consists of both plain and twisted bars, in accordance with the provisions of the IS 456 code.
3. Working Stress method of Design: The working stress method of design focuses on the basic concept, types of loads, assumptions, and the calculation of the moment of resistance for a singly reinforced concrete beam.
4. Key principles of pre-stressed concrete, pre-stressing techniques, materials, the structural response of pre-stressed concrete beams, and factors contributing to pre-stress reduction.
5. This text provides an introduction to specific structural forms and fundamental concepts related to shells, folding plates, domes, grid structures, flat slabs (reinforced concrete), space frames, tensile structures, and pneumatic structures. It does not involve any problem-solving exercises.

SUGGESTED BOOKS

- RCC by H. J. Shah
- RCC by Bhavikatti
- RCC by Jain and Jaikrishna
- RCC by Ramamrutham
- RCC – design and practice by N Krishna Raju and R N Pranesh

Course Title: Environmental Science

Semester – IV

TEACHING AND EXAMINATION SCHEME

				Hours				Credit	Internal		External		
Sr. No.	**Subject Name**	**Category**	**Sem**	**L**	**T**	**P**	**Total**		**Exam**	**Continous /Viva /Jury**	**Exam**	**Viva/ Jury**	**Total**
4	Environmental science	BS & AE	4	2	0	0	2	2	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External,On Job Training(OJT) is equivalent to Practical

FOCUS:

To develop the knowledge required for understanding the influence of climate on architecture. Understanding Environmental issues, ecology andecosystem. Also developing the understanding that how buildings can be designed with climate as the basic parameter of design.

CONTENTS:

- Environment, ecology, ecosystem with natural cycles, Resources, causes of resources exhaustion and resource pollution.
- Urbanization and impacts
- Introduction – Elements of climate, measurement and representations of climate data. Classificationsof tropical climates, Major climatic Zones of India.
- Thermal comfort: Effect of climatic elements on thermal comfort environment. Body's heat exchange with surrounding environment.
- Principles of thermal design and means of thermal control.
- Natural ventilation: functions of natural ventilation, Design consideration and effects of openingsand external features on internal airflow.
- Day lighting: Advantages and limitations, components of Day light factor, Shading devices – Sun –Path diagram, use of solar charts in climatic design. Types of shading devices. Procedure of designing shading devices.

PROJECTS:

- Projects on Ecosystem, study of some example of resources and pollution. Study of vernacular architecture.

SUGGESTED BOOKS

- Manual of Tropical Housing & Building (Part-II) by Koenigsberger
- Housing Climate and Comfort by Martin Evans

- Environment and Ecology by Norman Korm

Course Title: History Of Architecture - II

Semester – IV

TEACHING AND EXAMINATION SCHEME

				Hours				Credit	Internal		External		
Sr. No.	**Subject Name**	**Category**	**Sem**	**L**	**T**	**P**	**Total**		**Exam**	**Continous/ Viva /Jury**	**Exam**	**Viva/ Jury**	**Total**
5	History of Architecture-II	Professional Core	4	2	0	2	4	2	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS :

Acquiring knowledge regarding various architectural styles of ancient India and their historic evolution with respect to factors influencing them e.g. climate, geographical location, culture, construction technology, etc. To develop the appropriate skills of reading, discussion and writing as well as understanding the physical experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods.

Critical appreciation characterized by technology, ornamentation, planning practices & influences in general.

CONTENTS:

UNIT-1:

Introduction: Introduction and understanding of 'Islam's' philosophy and its interpretation in building type e.g. mosque, tomb, fort and their elements like domes, minarets, arch, squinch etc.

The Sultanate Style: With reference to the Slave, Khalji, Tughlaq, Sayyid, Lodhis and Shershah Suri regimes (who ruled from Delhi) and their architecture.

UNIT-2:

Provincial Architecture: Development of colloquial styles in various provinces of India like - Punjab, Jaunpur, Gujrat, Bengal, Bijapur, Bidar and Deccan.

UNIT-3:

Cities and Citadels: Morphology of fortified cities of Jaisalmer, fort/ palaces like Mandu, Chittorgarh, Orchha, Datia, Jodhpur etc. with an overview on architectural types like havelis, stepwells, gates, baradaris etc.

UNIT-4:

Mughal Architecture: The architecture of the Timurids in India-Babur, Hamayun, Akbar, Jahangir and Shahjahan.

The Later Moghuls: The Oudh architecture in Lucknow and its surroundings briefly outlining the Lucknow city.

UNIT-5:

Colonial Architecture: The British architecture of the colonial days in India- the capitol at Delhi and the residency at Lucknow emphasizing on their planning criteria and architectural features.

REFERENCE BOOKS

1. History of Architecture -Sir Banister Fletcher
2. Prehistory to post modernism -Marvin & Isabel
3. Indian Architecture – Islamic -Grover Satish Vikas Publishing House

Course Title: Computer Skills - II

Semester – IV

TEACHING AND EXAMINATION SCHEME

				Hours				Credit	Internal		External		
Sr. No.	**Subject Name**	**Category**	**Sem**	**L**	**T**	**P**	**Total**		**Exam**	**Continuous/ Viva/ Jury**	**Exam**	**Viva/ Jury**	**Total**
6	Computer Skills-II	SEC	4	0	0	4	4	2	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical.

Course Objectives

To develop skills required for preparation of two-dimensional drawings with the use of computer as a digital media for architectural design drawings.

Understanding AutoCAD:

Learn various 2D commands their functions and application. Understanding coordinate systems. Working on Layers and Colours Drawing plans, Elevations, Sections using Auto- Cad. Dimensioning Drawings Connecting from one file format to another. Various file formats & their Usefulness.

PRACTICAL-:

1. To present various 2D commands their functions and application and Understanding coordinate systems.
2. Working on Layers and Colors, Drawing plans, Elevations, Sections using Auto- Cad, dimensioning Drawings, Connecting from one file format to another., Various file formats & their Usefulness.

REFERENCE BOOKS

1. A primer on computer aided engineering drawing – VTU

Course Title: Building Byelaws & Professional Practice

Semester – IV

TEACHING AND EXAMINATION SCHEME

				Hours					Internal		External		
Sr.No	Subject Name	Category	Sem	L	T	P	Total	Credit	Exam	Continous/ Viva/ Jury	Exam	Viva/ Jury	Total
5	Building Byelaws & Prof. Practice	PE	4	2	3	0	2	2	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

Develop understanding of building bye laws and its implementation in reference to building design. To develop an understanding of basic professional skills to practice of various type of projects and its complexity.

CONTENTS:

BUILDINGY BYE LAWS

- Zoning of areas: residential, institutional, industrial agricultural entertainment etc
- Introduction to city, town and village bye laws,
- Evolution of GDCR (Mumbai municipal act, town planning act and GDCR)
- Need of bye laws
- Other prevailing laws (environment law etc)

PROFESSIONAL PRACTICE

- Role and responsibilities of a professional
- Prevailing pattern of professional practice
- Comparison and inter relationship with other professionals and professional bodies
- Various professional associations and registering body; their responsibilities, detail understanding of professional ethics; fee structure
- Office organization and management skills
- Detail understanding of office day to day responsibilities towards staff and other government bodies
- Understanding of contract and its management, site supervision, Role, responsibilities, liabilities

Course Title: Building Byelaws & Professional Practice

Semester – IV

TEACHING AND EXAMINATION SCHEME

				Hours					Internal		External		
Sr.No	Subject Name	Category	Sem	L	T	P	Total	Credit	Exam	Continuous/ Viva/ Jury	Exam	Viva/ Jury	Total
5	Building Byelaws & Prof. Practice	PE	4	2	3	0	2	2	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

Develop understanding of building bye laws and its implementation in reference to building design. To develop an understanding of basic professional skills to practice of various type of projects and its complexity.

CONTENTS:

BUILDINGY BYE LAWS

- Zoning of areas: residential, institutional, industrial agricultural entertainment etc
- Introduction to city, town and village bye laws,
- Evolution of GDCR (Mumbai municipal act, town planning act and GDCR)
- Need of bye laws
- Other prevailing laws (environment law etc)

PROFESSIONAL PRACTICE

- Role and responsibilities of a professional
- Prevailing pattern of professional practice
- Comparison and inter relationship with other professionals and professional bodies
- Various professional associations and registering body; their responsibilities, detail understanding of professional ethics; fee structure
- Office organization and management skills
- Detail understanding of office day to day responsibilities towards staff and other government bodies
- Understanding of contract and its management, site supervision, Role, responsibilities, liabilities

SUGGESTED BOOKS

- GDCR
- Hand book on professional practice by council of architecture, New Delhi
- Hand book on professional practice by Indian Institute of Architecture
- BPMC Act
- GTP and GDCR rules
- Professional practice with Elements of Estimating, Valuation contract and
- Arbitration By Dr. Roshan H. Namavati
- Estimating and costing in Civil Engineering Theory and Practice by B.N. Datta

Course Title: Indian Knowledge System & Tradition (Elective 1)

Semester – IV

1. TEACHING AND EXAMINATION SCHEMES

				Hours				Credit	Internal		External		
Sr. No.	**Subject Name**	**Category**	**Sem**	**L**	**T**	**P**	**Total**		**Exam**	**Continous /Viva /Jury**	**Exam**	**Viva/ Jury**	**Total**
8	Indian Knowledge System & Tradition	PAEC-Elective 1 (Any One)	4	2	0	0	2	2	20	30	25	25	100

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External,On Job Training(OJT) is equivalent to Practical

2. RATIONALE :

National education Policy 2020, has given ample emphasis on Indian Knowledge system. The significance of teaching of Indian knowledge and Tradition is very much required as for centuries this great tradition had been trampled under the feet of invaders. Even after Independence, Indian Knowledge System had been neglected and only Western parameters have been considered as standard.

The essence of Indian culture has been carried through centuries only because of its scientific and humanitarian approach. It is the need of the hour that young students learn the significanceof the contribution made by Indian Knowledge Systems and contribute to the world with pride and confidence even in the field of Science and technology which had been mastered centuries ago but was perished by invaders. This course will provide an opportunity to the students the hidden secrets of the great heritage of knowledge that existed thousands of years ago in Indian Tradition.

3. COMPETENCY:

1) Study of IKS will enable students to respect and relish the greatness of our tradition. Theawareness of IKS will make them feel proud about their own culture.

2) The knowledge of Indian knowledge will enable and empower them with the firsthand knowledge of India's great heritage, culture and traditions.

3) This will create a scope and awareness amongst the foreigners regarding India and itscontribution to the world.

4. COURSE OUTCOMES

1. Students will attain awareness regarding the significance of IKS
2. The syllabus will enhance their confidence in Indian traditional knowledge system and enable them to perceive at the problems with Indian perspective
3. This will also enable them to analyze the issues on their own and enable them for critical thinking.
4. The knowledge about the ancient Indian Scientific traditions will generate more confidence in themselves.
5. This will lead them to make research and innovative thinking which can result in global contribution at later stage.

5. PRACTICAL / PROJECT :

The student can visit any historical / monumental sights like Adalaj step well or Rani Ki Vav – Patan and study about architectural skills of Indians in past.

Topics:-

1. Ancient Indian Astronomy :

➢ **Development of Astronomy:**

A) Consideration of Purnima and Amavasya
B) Beginning of The New Year- Vasant Ritu- (Vernal Equinox)
C) Ancient Indian Calender
D) Science Behind "Adhikmaas"
E) Uttarayan and Dakshinayan

➢ **Knowledge about Constellations / planets / distance between planets etc.**

A) Saptarushi – seven Seers- Significant Knowledge of star and constellations
B) Knowledge of Speed of Light – Rigveda(1.50.04)
C) Distance between Earth and Sun (Hanuman Chalisa)

➢ **Advances in Mathematics and Geometry in Ancient India**

A) Sulbha- Sutra (Kalpa Sutra) composed by Baudhayana, Manava,.Apastamba andKatyayana

B) Contribution of Ancient Rushis to Mathematics

A) Bodhayana's value of pie
B) Lilavati
C) Bhaskaracharya
D) Arya Bhatt.

2. Town Planning in Ancient India

A) Roads in Ancient India – Uttarpath by Chandra Gupta
B) Ancient Indian Trade Routs/ Waterways
C) Ship- Building In Ancient India
D) Temple Architecture
-Nagar Style/ Dravida style/ Vesara style

3. **Atomic Theory of by Kanada**

A) Concept of Seven Padartha and Nine Dravyas

B) Theory of Gurutva

C) Characteristics of Atom

4. **Metallurgical Discoveries in Ancient India**

- Lime a Mortar
- Bronze
- Gold & Silver /\
- Glass / Iron
- Nagarjuna's Contribution in making Alloys

5. **Vimanshastra - Airbourne Vehicles.**

A) References of Vimana- Flying Machines in Rigveda, Mahabharat and Ramayana

B) BhardwajSutra- Chapter-1 Rasyagnoadhikari

6. **REFERENCE BOOKS:**

1) History of Science, Arts & Technology By Dr. Shripad Dattatrya Kulkarni, Bhishma Prakashan, Mumbai -1998.

2) Introduction to Indian Knowledge System: Concepts and Applications by B. Mahadevan, VinayakRajat Bhat, Nagendra Pavana, PHI Learning Pvt. Ltd., Delhi

3) Town Planning in Ancient India by Binode Bihari Dutt, Thacker, Spink & Co.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

DIPLOMA IN ARCHITCTURE

Semester – V

TEACHING AND EXAMINATION SCHEME

				Hours					Internal		External		
Sr. No	Subject Name	Category	Sem	L	T	P.	Total	Credit	Exam	Continous/ Viva/ Jury	Exam	Viva/ Jury	Total
1	Architectural Design Studio-V	Professional Core	5	0	0	10	10	06	0	50	0	50	100
2	Site Planning and Services	BS & AE	5	0	0	4	4	4	20	30	50	0	100
3	Environmental Science-II	BS & AE	5	2	0	0	2	2	20	30	50	0	100
4	Art Appreciation and Aesthetics	SEC	5	2	0	0	2	2	20	30	20	30	100
5	Estimation and Costing	Professional Core	5	2	0	2	4	2	20	30	50	0	100
6	Landscape Design	PAEC-Elective 1 (Any One)	5	2	0	2	4	2	0	25	0	25	50
7	Product Design	PAEC-Elective 2 (Any One)	5	2	0	2	4	2	0	25	0	25	50
Total							30	20					

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

Course Title: Architectural Design Studio – V

Semester – V

1. TEACHING AND EXAMINATION SCHEME

				Hours					Internal		External		
Sr. No	Subject Name	Category	Sem	L	T	P	Total	Credit	Exam	Continous/ Viva/ Jury	Exam	Viva/ Jury	Total
1	Design Studio-V	Professional Core	5	0	0	10	10	06	0	50	0	50	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. EMPHASIZE

Architectural working drawing as tool to communicate and execute architectural design, construction details with the relevant specifications.

3. INTENSION OF THIS SUBJECT

Learning to prepare a set of working drawings for the purpose of execution and construction, architectural detailing of building components, details and function of building services like electrical, plumbing and drainage, back and forth design processes, exposure to materials, products and assembly, methods of specifications writings in the drawings.

4. COURSE OUTCOMES (COs)

CO1: Develop and transform design intent to a technically sound plan and communicate the architectural vision of a given project to the contractors through a set of drawings and documents

CO2: Prepare the Submission Drawings and the techniques for preparation of Good For Construction drawings which will be easily readable by construction team, for the construction of a Residential structure

5. SUGGESTED PRACTICAL/STUDIO EXERCISES

1. Preparation of complete set of working drawings for a small dwelling/institute building unit of 500-750 sq.mt.
2. Preparation of working detail models of 1:50 scale

The COs' sub-components are the subsequent practical outcomes (PrOs). They are essential for that specific CO at the 'Precision Level' of Dave's Taxonomy in the 'Psychomotor Domain'.

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Case Study: Prepare an analytical drawing for various parameters like Site context, master plan, climatical, circulation, bye-laws, built-up, services, cluster level, unit level, Architectural character etc. for appropriate case-study or reference projects of similar nature.	I	20
2	Prepare a Conceptual Design by formulating design requirements for a given single volume design project.	II	15
3	Prepare preliminary sketch designs of the given design project to the scale using anthropometric requirements	III	15

4	Prepare a set of final presentation drawings including plans, sections, elevations and views for the designed building	IV	20
5	Draw 3-dimensional view of the designed building	IV	08
6	Make a model of the designed project to scale	IV	08
	Total Hrs.		**86**

Note:

- *The teacher of the relevant course may design and provide additional practical exercises to help students achieve the COs by enhancing their industry-related skills and outcomes. Just a suggested list, the table above.*
- *Due to the fact that this is a first-year study report, caution must be given when assigning and grading it. A group assignment is required for the study report, data collection report, and analytic report. Before the group begins their market research, the teacher must discuss the types of data (which and why).*
- *The following are a few examples of "Process" and "Product" related skills that are present in the above-mentioned Practical Exercises of this course and are ultimately incorporated into the COs and the competency (more may be added or omitted depending on the course).*

Sr. No.	Examples of Performance Measures for PrOs	Weightage in %
1	Accurate measurement and graphical representation of data collection for the given design project	20
2	Ability to analyze the form and functional clarity of the studied buildings.	10
3	Prepare bubble diagram showing inter-relationships and circulation	10
4	Concept development with originality of idea	20
5	Apply the inferences from the studied buildings in the design process	20
6	Final presentation drawings and model	10
7	Adherence to deadlines	10
Total		**100**

6. AFFECTIVE DOMAIN OUTCOMES

The following ***sample*** Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

a) Work as a leader/a team member.
b) Follow ethical practices.
c) Practice environmental friendly methods and processes. (Environment related)

7. CONTENT:

The primary theory is shown below and is based on the higher level UOs of the Revised Bloom's taxonomy that are developed for the growth of the COs and competencies. The course instructor may add more of these UOs if necessary to emphasize proficiency and the achievement of COs.

Unit	Unit Outcomes (UOs)
Unit – I **Preliminary Stage**	Design of a small project like residence, guesthouse etc. in an urban situation; making presentation drawings. Developing a set of corporation drawings following local byelaws.
Unit –II **Development Stage**	1 Architectural design development and resolving issues in plan, section and elevation. 2 Making structural drawings for foundation, plinth beams, floor beams and slabs and coordinating the architectural design drawings with structural drawings. 3 Making site layout drawings.
Unit– III **Space Detailing**	1 Detailing specific activity spaces; making plans, sectional elevations, details for toilets, kitchen, staircase etc.
Unit– IV **Services And Site Development**	1 Making sheets for electrical layout, TV, telephone etc. lines, internal plumbing and sanitation. 2 Site plan, sanitation and water supply drawings.
Unit– V **Element Detailing**	Making drawings of Door, window, ventilator details. Woodworking, grills, main gate, railings, boundary wall etc. detail sheets. Schedule of finishes.

8. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student- related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

a) Undertake periodic site visits to relate to the present architectural practices.
b) Visit and explore various material shops & meet vendors.
c) Visit and explore art exhibitions and libraries.
d) Attend seminar on the relevant topic under consideration.
e) Visit various sites under execution.
f) Participate in various construction related workshops.

9. SUGGESTED LEARNING RESOURCES

1. Architects working details – Vol. 1 to 5
2. Macay, W. B. – Building construction Vol. 1 to 4
3. Stitt – Architects detail library
4. Handisyde, Cicil – Everyday details
5. Styles, Keith – Working drawing hand book

6. Handisyde, Cicil – Everyday details

10. SOFTWARE/LEARNING WEBSITES

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

11. PO-COMPETENCY-CO MAPPING

Semester V	Architectural Design -V								
	POs and PSOs								
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ development of solutions	PO 4 Engineering Tools, Experimentation &Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Management	PO 7 Life-long learning	*PSO 1 Planning & Design	#PSO 2 Execution
Competency	Prepare architectural design for a single volume building, its presentation drawings and models								
Course Outcomes CO1: Develop and transform design intent to a technically sound plan and communicate the architectural vision of a given project to the contractors through a set of drawings and documents	2	1	3	-3	1	-2	3	1	3
CO2: Prepare the Submission Drawings and the techniques for preparation of Good For Construction drawings which will be easily readable by construction team, for the construction of a Residential structure	-	-	1	3	-	1	3	-	3

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Site Planning & Services

Semester – V

TEACHING AND EXAMINATION SCHEME

Sr. No	Subject Name	Category	Sem	Hours				Credit	Internal		External		
				L	T	P.	Total		Exam	Continous/ Viva/ Jury	Exam	Viva/ Jury	Total
2	Site Planning and Services	BS & AE	5	0	0	4	4	4	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

To develop an understanding towards factors influencing site planning. To develop understanding of principles and techniques of site planning and apply them to actual situation. To emphasize the role of an Architect in site planning.

CONTENTS:

- Introduction to zoning in site planning, definition of site planning, site planning history, site planning process, methods of site Analysis.
- Understanding various factors influencing site, like context, climate, social factors, topography etc., site selection and resource analysis.
- Difference between site planning in urban area, site planning in natural area and site planning in rural area.
- Site planning standards, sources of information for site data and site information.
- Topography-Contour map and its interpretation.
- Basics of drainage system in site planning.
- Formation of site plan, Site planning for residential projects, Site planning for institutions and public areas, Site planning for resorts, parks and tourist complexes.
- There will be two projects in a semester.
- The first project will be introductory and students will take up an existing site for detail analysis and study of various issues related to site planning.
- The second project will be the major project whereas the information and techniques of site planning will be applied in detail.

SUGGESTEDBOOKS

- Site planning, Lynch,Kevin
- A Guide to Site and Environmental Planning, Rubinstein, Harvey M.
- Grade Easy, Untermann, Richard K.
- Site Planning for Cluster Housing, Untermann, RichardK.
- Design with Nature, Mc Harg, Ian
- Urbanization Primer, Caminos, Horatio, and Reinhard Goethert
- Designed for Recreation, Beazley Elizabeth
- Campus Planning, Dober, Richard P.

Course Title: Environmental Science-II

Semester – V

TEACHING AND EXAMINATION SCHEME

				Hours					Internal		External		
Sr. No	**Subject Name**	**Category**	**Sem**	**L**	**T**	**P**	**Total**	**Credit**	**Exam**	**Continous/ Viva/ Jury**	**Exam**	**Viva/ Jury**	**Total**
4	Environmental Science-II	BS & AE	5	2	0	0	2	2	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

Developing an understanding regarding the importance and impact of sustainable architecture in present context. Enabling student to understand the design strategies for different climatic regions.

CONTENTS:

- Site Climate: Effect of landscape elements on site / microclimate.
- Design considerations for buildings in tropical climates with special reference to hot – dry, warm – humid and composite climates.
- Study of Passive Solar Architecture.
- Resource conservation and optimization, Role of Designer in achieving Sustainability.
- Modern techniques to analyse climatic parameters and design buildings accordingly.

PROJECTS:

- Live Case Study or literature study of a Well-Designed Building having various sustainable architecture features. Project on design strategies for different climatic regions.

SUGGESTED BOOKS

- Manual of Tropical Housing & Building (Part-II) by Koenigsberger
- Buildings in the tropics by Maxwell fry
- Climate Responsive Architecture by Arvind Kishan, Baker & Szok

Course Title: Art Appreciation and Aesthetics

Semester – V

TEACHING AND EXAMINATION SCHEME

				Hours					Internal		External		
Sr. No	**Subject Name**	**Category**	**Sem**	**L**	**T**	**P**	**Total**	**Credit**	**Exam**	**Continous/ Viva/ Jury**	**Exam**	**Viva/ Jury**	**Total**
5	Art Appreciation and Aesthetics	PE	5	2	0	0	2	2	20	30	20	30	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

A global survey and comparative exploration of art, architecture, and design from the historical origins of civilization to contemporary manifestations of art practice. Emphasis will be placed on the artist's role in society and how social factors give rise to various art forms. Students will evaluate and examine contextual and cultural factors and their influence on the patronage and production of formal and stylistic visual languages that arises out of a specific time, place, and culture. Art appreciation requires the acquisition of a critical and formal language in which students come to identify, describe, analyze and compare the visual characteristics of various works using the correct art historical terminology and vocabulary. Art appreciation cultivates a deeper and more expansive awareness of Art, images, and the vast cultural histories we have inherited. In addition to this course, the student should realize the importance of Aesthetics as one dimension of Quality in Business Products and Services. A good combination of Business, Information Technology will be integrated in Art Appreciation and Aesthetics.

CONTENTS:

- Identify the purposes and functions of art in human society and arrive at a coherent definition of what is meant by "art" as a cultural endeavor.
- Define basic art terms and processes; develop a knowledge of and an ability to recognize design principles and elements in selected works of art.
- Identify by artist, title, or style, major selected art works from various historical and global contexts in a variety of media.
- Understand the highlights of the biographies of a variety of artists as they relate to the meaning of their works.
- Study of different art isms such as Abstract Art, Dadaism, Brutalism, and Impressionism.
- Recognize major periods of world art history.
- Describe the techniques used in a variety of art media.
- Develop a formal analysis of a work of art.
- Evaluate the relationship of form to content and context.
- Understand and identify the symbols used in iconographic art works.
- Demonstrate an understanding of art criticism including the description, analysis, interpretation, and evaluation of a given work.
- Develop a deeper understanding of the culture that we are currently immersed in, and the ability to think critically with regards to the images and visual forms that engage us.

- ARTS IN TIME: Prehistoric, Egyptian, Greek, Roman, Medieval, Renaissance, Baroque, Rococo, Nineteenth Century, Twentieth Century, Art Since 1945
- AESTHETICS AND QUALITY: Dimensions of Quality, Products and Service Design, The Value of Aesthetics in Business

SUGGESTED BOOKS

- Introduction to Art Appreciation and Aesthetics by Panizo, Rustia, Rex Bookstore, Inc.
- Aesthetics and the Environment: The Appreciation of Nature, Art and Architecture by Allen Carlson, Routledge, 2000
- Art and ideas by William Fleming
- Aesthectics by Yuri Borev
- The story of modern art by Sheldon Cheney

Course Title: Estimation and Costing

Semester – V

TEACHING AND EXAMINATION SCHEME

Sr. No	Subject Name	Category	Sem	Hours				Credit	Internal		External		
				L	T	P.	Total		Exam	Continous/ Viva/ Jury	Exam	Viva/ Jury	Total
6	Estimation and Costing	Professional Core	5	2	0	2	4	2	20	30	50	0	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

- The objective is to acquire the essential expertise in estimating and drafting specifications for diverse architectural projects and construction endeavors, with the aim of optimizing both cost-effectiveness and quality standards.

CONTENTS:

1. This section provides an introduction to the topic, emphasizing the significance of estimating. It also covers several sorts of estimations and the methods used for measurement.
2. Analysis of regional SR rates, market rates, Measurement book (MB), RA bill, intermediate and final certificate
3. Comprehensive evaluation of the cost of building components based on the current schedule of rates (CSR) provided by the local Public Works Department (PWD) and Central Public Works Department (CPWD) in Delhi.
4. Schedule of Rates – provided solely for informational purposes
5. Proportions of different materials utilized in the construction of objects such as cement, steel, rubble, metal, sand brick, tiles, etc.
6. Comprehensive and specific standards for diverse materials and components utilized in construction
7. Comprehension of the significance of specifications in contract documents and their purpose in execution.
8. Estimation of :

a) Load-bearing and reinforced concrete (RCC) framed structures, with one example for each.
b) Different types of roofs, such as steel and wood, including roofing materials like Mangalore tiles, asbestos cement (AC), galvanized iron (GI) sheets, etc.
c) Water supply and sanitary works. d) A sample layout design, including roads, culverts, etc.

9. Acquire knowledge through hands-on site visits, informative presentations, in-depth case studies, interactive tutorials, analysis of Bill of Quantities (BOQ), and engaging workshops that focus on the practical application of theoretical concepts in the construction industry.

SUGGESTED BOOKS

- Estimating and Costing by S K Dutta
- Estimating by SC Rangwala

Course Title: Landscape Design (Elective -1)

Semester – V

TEACHING AND EXAMINATION SCHEME

				Hours					Internal		External		
Sr No	Subject Name	Category	Sem	L	T	P	Total	Credit	Exam	Continuous/ Viva/ Jury	Exam	Viva/ Jury	Total
7	Landscape Design	PAEC-Elective 1 (Any One)	5	2	0	4	6	2	0	50	0	50	100

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

To introduce students to the discipline of landscape architecture and to develop basic skills required inhandling simple landscape design projects.

CONTENT:

- Introduction to Landscape Architecture,
- Role of Landscape in architecture, natural and manmade landscape, urban and rural landscape
- Landscape elements – land forms, water bodies' vegetation, climate, and landscape furniture – theirapplication in design.
- Study of Landscape materials and plant materials of surrounding region
- Landscape Design principles.
- Graphic design in Landscape
- Introduction to site planning: site study, site analysis, requirement analysis, synthesis and final siteplan.
- Introduction to historical gardens like Mughal, Chinese, Japanese, Indian etc
- Study and analysis of contemporary landscape designs with two or three examples.
- Study of landscape of courtyards, roads, pathways, urban spaces, gardens, parking areas.

SUGGESTED BOOKS

- Landscape architecture by J .O. Simonds
- The landscape we see by Garrett Eckbo
- Introduction to landscape architecture by Michael Laurie.
- Time Saver Standards for Landscape architecture

Course Title: Product design (Elective -2)

Semester – V

1. TEACHING AND EXAMINATION SCHEME

				Hours					Internal		External		
Sr.No	Subject Name	Category	Sem	L	T	P	Total	Credit	Exam	Continous/ Viva/ Jury	Exam	Viva/ Jury	Total
9	Product Design	PAEC-Elective 2 (Any One)	5	2	0	2	4	2	0	25	0	25	50

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. RATIONALE

In today's world, there are many challenges and problems that need to be addressed. In this situation, innovation is what provides the solution that will benefit the maximum number of users. And such innovation is often enabled by design. Product Design focuses on design thinking, creative problem solving and understanding product design factors. Through this course, the learner can take on the role of a design maker of a table-top sized product.

Product design involves the design of an object from concept stage to design development employing graphics and model making. This course places a strong emphasis on the design process, and combines creative ability with technical skills. It is based on project work with an emphasis on learning by doing.

The design thinkers start by observing, interviewing or just plain experiencing a situation. Then, they proceed to improve the situation of the humans by solving problems for them.

The designed product should be eco-friendly materials, aesthetic appeal, functional and user friendly.

3. COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop required skills so that the students are able to acquire the following competencies:

- **To demonstrate the process of design of a product and create a viable product byfinding solutions to problems by modifying forms and functions**

4. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the learner for the achievement of the following course outcomes in cognitive, psychomotor and affective domains:

a. Introduce the notion of design of a product as it evolved through time
b. Understand creativity & its application
c. Develop the ability to identify problems and finding needs
d. Understand the Design process
e. Create a viable product

5. SUGGESTED PRACTICAL/STUDIO EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. *They are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.*

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	**Introduction to Creative Thinking:** 1. Prepare sketches and models showing the evolution of design any one table-top product (e.g. laptop base, mobileholder, coaster holder etc.) 2. Prepare sketches and models showing how to repurpose an item by selecting any and creating a fresh perspective leading to new uses of the existing item	I	14
2	**Problem Identification:** 1. Identify the product to be designed 2. Enlist the material, use and technology of the existing product 3. Sketch the various stages and reasons of transformation of the desired product with a brief historical back ground	II	14
3	**Design Process:** Prepare schematic sketch designs (10 to 15) and finalize one with material and technology and develop a rough prototype	III	14
4	**Design of the Product:** Prepare all necessary detailed drawings required for developing the product and construct its model	IV	14
	Total Hrs.		**56**

Note

i. *More **Practical/Studio Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above tableis only a suggestive list.*

ii. *Study report, data collection and analysis report must be assigned in a group. Teacher has to discuss about type of data (which and why) before group start their site visits.*

iii. *The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical/Studio Exercises** of this course required which are embedded in the COs and ultimately the competency.*

Sr. No.	Sample Performance Indicators for the PrOs	Weightage in %
Assessment should be done on the basis of demonstration of,		
1	Skills	40
2	Learning Process	20
3	Communication	20
4	Learning Attitude	20
Total		**100**

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

S. No.	Equipment Name with Broad Specifications	PrO. No.
1	Measuring Tape, Laser measure tape, Drawing Sheets, Tracing papers	1-4
2	Drawing Board (A1 size @ 23"X32") with other Other Instruments like Parallel, Set squares (45° and 30°-60°), Adjustable set square, Triangular scale, Tracing papers, Drawing Sheets	1-4
3	Interactive board with LCD overhead projector	1-4
4	Desktop PCs with latest configuration	1-4

7. AFFECTIVE DOMAIN OUTCOMES

The following ***sample*** Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

a) Work as a leader/a team member.
b) Follow ethical practices.
c) Social and Functional Competence of design.
d) Participate in class discussions and present the design effectively, Generate new ideals.
e) Practice environmentally friendly methods and design processes.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the levelof achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

i. 'Valuing Level' in 1st year
ii. 'Organization Level' in 2nd year.
iii. 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
Unit –I **Introduction to Creative Thinking**	**1a.** Evolution of Design **1b.** Logical Thinking vs.Creative Thinking **1c.** Exploring Creativity through various mediums	**1.1** Introduction to design thinking of a product **1.2** A brief history of evolution of designof a product **1.3** Product design elements: appearance, functionality and quality **1.4** Logical thinking **1.5** Creative thinking **1.6** Creativity and its applications

Unit– II **Problem Identificatio n**	**2a.** Methods and Techniques **2b.** Identification and Analysis	**2.1** Method 1: Define, envision, develop, deliver **2.2** Method 2: Ideation, research, planning and execution, launch **2.3** Brainstorming **2.4** Identifying and defining the product **2.5** Sketching the various stages and reasons of transformation of the desired product with a brief historical back ground
Unit – III Design Process	**3a.** Creating different designs for the defined product **3b.** Prototyping	**3.1** Sketching different designs for the product. **3.2** Shortlisting the best three designs and finalising one of them. **3.3** Creating a rough prototype of the finalised design.
Unit – IV **Design of theProduct**	**4a.**Producing a sample of the finalised product **4b.**Sample testing **4c.**Creating the final product after required modifications	**4.1** Preparing all detailed drawings to construct the model of the finalised design **4.2** Modifying the product as required after sample testing **4.3** Creating the final product

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction to Creative Thinking	**Not Applicable**				
II	Problem Identification					
III	Design Process					
IV	Design of the Product					
	Total					

Legends: *R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)*

<u>Note</u>: This specification table provides general guidelines to assist learners for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from above table.

10. SUGGESTED LEARNER ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested learner-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course. Learners should perform following activities in group and prepare reports of about 5 to 7 pages for each activity. They should also collect/record physical evidences for their (learner's) portfolio which may be useful for their placement interviews.

Students should conduct user surveys for the desired product, collect data and samples of different materials used for manufacturing them and analyze them by making a presentationand/or an interactive group discussion. These could be done individually or in a group. For such data collection and other study, students need to go out of the institute to markets, shops, industries or interior sites. Students should go for site visits and prepare a report on it. Such visits should be organized by concerned faculty member/s who should compulsorily accompany the students for this purpose.

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills (Course Outcomes in psychomotor and affective domain) so that learners are able to acquire the competencies (Programme Outcomes).
Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of Programme Outcomes/Course Outcomes in affective domain as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that learners also acquire those Programme Outcomes/Course Outcomes related to affective domain.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

a) Massive open online courses (***MOOCs***) may be used to teach various topics/sub topics.
b) Guide learner(s) in undertaking micro-projects.
c) ***'L' in section No. 4***means different types of teaching methods that are to be employedby teachers to develop the outcomes.
d) About ***20% of the topics/sub-topics*** which are relatively simpler or descriptive in nature is to be given to the learners for ***self-learning***, but to be assessed using differentassessment methods.
e) With respect to ***section No.10***, teachers need to ensure to create opportunities and provisions for ***co-curricular activities***.
f) Guide learners on how to address issues on sketching, model making, etc.
g) Use relevant video/animation films to explain various concepts and processes relatedto basic Architectural design themes for Public Buildings.
h) Use different instructional strategies in classroom teaching.
i) Use the relevant architectural assignments in the given situation.
j) Guide learners on form, functions utility, method of construction, etc. to facilitatethem to prepare actual measured drawings.
k) Use the technique of table top discussions along with design jury sessions to teach therelevant content to the learners.
l) Adopt various strategies to enhance each learner's individual creative ability especiallywith reference to concept and form
m) Expert lectures should be arranged to cover topics of all units thoroughly.

12. SUGGESTED DESIGN MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a learner that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of learners in the group should **not exceed three.**

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs

which are in fact, an integration of PrOs, UOs and ADOs. Each learner will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the micro-project should be about **14- 16 (fourteen to sixteen) learner engagement hours** during the course. The learners ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and theCO. Similar micro-projects could be added by the concerned course teacher:

a. Enlist the advantages and disadvantages of any existing product and work out a bettersolution for the same.
b. Create an imaginary functional product using some new innovative materials.

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication with place, year and ISBN
1	The Design of Everyday things	Donald Norman	The MIT Press, 1998 ISBN: 9780262525671
2	Product Design and Development	Karl Ulrich, Steven D. Eppinger	McGraw Hill Education, 1 July 2017 ISBN-13: 978-9352601851
3	Industrial Design-Reflections of a century	Jocelyn de Noblet	Thames & Hudson, 1993. ISBN 10: 2080135392
4	What is a Designer: Things, Places, Messages	Norman Potter	Princeton Architectural Press, 2002 ISBN 10: 0907259162 ISBN 13: 9780907259169
5	Design: History, Theory and Practice of Product Design	Bernhard E. Bürdek	Birkhauser Verlag AG (1 January 2005) ISBN-10 : 3038213810 ISBN-13 : 978-3038213819
6	Ergodesign Methodology for Product Design	Marcelo M. Soares	CRC Press (October 2021)ISBN: 9781032054483
7	Time Saver Standards for Interior Design	Joseph De Chiara Julius Panero Martin Zelnik	McGraw Hill Education;ISBN : 0-07-016299-9 ISBN : 0-07-112589-2
8	Color in Interior Design	John Pile	McGraw-Hill Professional (16 June1997) ISBN-10 : 0060501653 ISBN-13 : 978-0070501652
9	Inside Outside	Journal/Magazine	Business India Group ISSN: 0970-1761
10	Space Design	Archiworld	ARCHI (1 January 2015) ISBN-10 : 4956601494 ISBN-13 : 978-8957701492

14. SOFTWARE/LEARNING WEBSITES

- https://www.mycoted.com/Main_Page

- http://creatingminds.org/
- Creative teaching: Replacing problems with opportunities (YouTube Video)
- https://www.celt.iastate.edu/instructional-strategies/teaching-format/14-creative-ways-to-engage-students/
- https://www.teachingexpertise.com/classroom-ideas/creative-thinking-activity/
- www.designboom.com

15. PO-COMPETENCY-CO MAPPING

Semester V	Product design (Elective -2)								
	POs and PSOs								
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ develop-ment of solutions	PO 4 Engineer -ing Tools, Experimentation &Testing	PO 5 Engineer-ing practices for society, sustain-ability & environ-ment	PO 6 Project Manage-ment	PO 7 Life-long learning	* PSO 1 Planning & Design	#PSO 2 Execu-tion
Competency	To demonstrate the process of design of a product and create a viable product by finding solutions to problems by modifying forms and functions								
a) Introduce the notion of design of a product as it evolved through time	2	1	1	1	1	1	1	-	-
b) Understand creativity and its application	2	1	2	-	1	1	-	-	-
c) Develop the ability to identify problems and finding needs	2	1	2	-	1	1	-	-	-
d) Understand the design process	2	3	1	2	1	1	-	-	-
e) Create a viable product	3	2	3	1	1	2	2	2	3

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning & Design:** Prepare architectural designs and all types of drawings withappropriate material specifications and application techniques as per specific project requirements.

#PSO 2: Execution: Suggest appropriate building materials as per the requirement.