

## COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

(Abstract)

Faculty of Architecture - Bachelor of Architecture - Syllabus - Approved - Orders issued.

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### ACADEMIC C SECTION

No.CUSAT/AC(C).C1/3211/2021

Dated,KOCHI-22,17.09.2021

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Read:-Minutes of the meeting of the Academic Council held on 28.07.2021, Item No:I(a).

### ORDER

The Academic Council at its meeting held on 28.07.2021 considered, along with the recommendation of it's Standing Committee, vide Minutes item read above, the minutes of the meeting of the Faculty of Architecture held on 29.05.2021 and resolved to approve the Syllabus of B.Arch Programme from Semester I to X as per the guidelines for the courses of study under the Credit system for the Architecture Degree programme, stated by the Council of Architecture, with effect from 2021 Admissions, as in Appendix .

Orders are issued accordingly.

**Dr. Meera V \***  
**Registrar**

To:

1. Dr.Ranjini Battathiripad, Dean, Faculty of Architecture and Professor,School of Architecture,Government Engineering College, Thirssur-680009.
- 2.Dr.Sunil Edward, Chairman of Board of Studies in Architecture and Head,Department of Architecture College of Engineering, Thiruvananthapuram.
- 3.All members of the Board of Studies in Architecture.
- 4.The Principal, TKM School of Architecture,Musaliar Hills, Ezhukone, Kollam, Karuvelil, Kerala 691505.
- 5.The Principal, Nizar Rahim and Mark School of Architecture,Nizar Estates, Roaduvila, Kerala 691516
- 6.The Principal, Marian College of Architecture and Planning,Marian College Rd, Kazhakkootam, Menamkulam, Kerala 695582
7. The Finance Officer/ Controller of Examinations/ JR (Exam/Academic)/DR (Exams)/ AR (Exams/Academic)/Director of Directorate of Public Admissions/ CIRM.
8. PS to VC/PS to PVC/ PA to Registrar/ PA to CE
- 9.Exam H/ Y/Exam Confidential /Directorate of Public Admissions sections
10. Day file/ Stock File/ File copy

\* This is a computer generated document. Hence no signature is required.

**Appendix -2**  
**SYLLABUS**  
**B.ARCH DEGREE COURSE**  
**(2021 Scheme)**

**COCHIN UNIVERSITY OF SCIENCE AND  
TECHNOLOGY  
KOCHI -682022**

# SCHEME OF STUDIES

PC-Professional Core Course, PAEC-Professional Ability Enhancement Course, PE -Professional Elective, OE-Open Elective

CA-Continuous Assessment Marks, W-University Written Examination Marks, J-Jury Marks, P/V-Practical or Viva-voce Marks

FIRST SEMESTER (S I)											
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Hrs /w	Marks				
							CA	W	J	P/V	Total
1	AR1101	PC	Gr I (a)	Architectural Design I-Basic Principles	9	9	250		250		500
2	AR1102	BS&AE	Gr I (b)	Building Materials and construction I	4	4	100	100			200
3	AR 1103	PC	Gr II	History of Architecture I-Ancient Civilizations	3	3	50	100			150
4	AR1104	PC	Gr I (b)	Architectural Graphics and Drawing -I	4	4	100	100			200
5	AR 1105	PC	Gr I (b)	Geometrical Drawing	4	4	100	100			200
6	AR1106	OE	Gr II	Mathematics	3	3	50	100			150
7	AR1107	SEC 47	Gr III	Communication Skills	3	3	50			50	100
				Total	30	30	700	500	250	50	1500

SECOND SEMESTER (S II)											
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Hrs /w	Marks				
							CA	W	J	P/V	Total
1	AR1201	PC - 2	Gr I (a)	Architectural design II -Introduction to Architectural Design	9	9	250		250		500
2	AR1202	BS&AE	Gr I (b)	Building Materials and construction II	4	4	100	100			200
3	AR 1203	PC	Gr II	History of Architecture II: Europe-Classical to Renaissance	3	3	50	100			150
4	AR 1204	BS&AE	Gr II	Theory of Structures I- Introduction to structures	3	3	50	100			150
5	AR 1205	OE	Gr II	Environmental Studies	3	3	50	100			150
6	AR1206	PC	Gr I (b)	Architectural Drawing & Graphics -II	4	4	100	100			200
7	AR 1207	PC-12	Gr III	Work shop Practice &Site Exposure	4	4	100			50	150
				Total	30	30	700	500	250	50	1500

THIRD SEMESTER (S III)											
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Hrs /w	Marks				
							CA	W	J	P/V	Total
1	AR1301	PC	Gr I (a)	Architectural design III -Residential Project	10	10	250		250		500
2	AR1302	BS&AE	Gr I (b)	Building Materials and Construction III	4	4	100	100			200
3	AR1303	PC	Gr II	History of Architecture III :Indian Architecture -Ancient to Medieval	3	3	50	100			150

				period							
4	AR1304	BS&AE	Gr II	Theory of Structures II-Structural Analysis	3	3	50	100			150
5	AR 1305	SEC	Gr III	Computer Studio I	4	4	100			100	200
6	AR 1306	BS&AE	Gr II	Climate and Architecture	3	3	50	100			150
6	AR1307	BS&AE	Gr II	Surveying and Levelling	3	3	50	100			150
				Total	30	30	650	500	250	100	1500

PC-Professional Core Course, BS&AE-Building Science & Applied Engineering, OE-Open Elective, SEC-Skill Enhancement Course  
CA-Continuous Assessment Marks, W-University Written Examination Marks, J-Jury Marks, P/V-Practical or Viva-voce marks

<b>FOURTH SEMESTER (S IV)</b>											
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Hrs / w	Marks				
							CA	W	J	P/V	Total
1	AR1401	PC	Gr I (a)	Architectural design IV -Rural Project	10	10	250		250		500
2	AR1402	BS&AE	Gr I (b)	Building Materials and construction IV	4	4	100	100			200
3	AR1403	PC	Gr II	History of Architecture IV :Islamic Architecture	3	3	50	100			150
4	AR1404	BS&AE	Gr II	Theory of Structures III-Structural Analysis	3	3	50	100			150
5	AR 1405	SEC	Gr III	Computer Studio II	4	4	100			100	200
6	AR1406	BS&AE	Gr II	Building services -I Water Supply and sanitation	3	3	50	100			150
7	AR 1407	PC	Gr II	Site Planning and Landscape Architecture	3	3	50	100			150
				Total	30	30	650	500	250	100	1500

<b>FIFTH SEMESTER (S V)</b>											
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Hrs /w	Marks				
							CA	W	J	P/V	Total
1	AR1501	PC	Gr I (a)	Architectural design IV-Heritage Context	10	10	250		250		500
2	AR1502	BS&AE	Gr I (b)	Building Materials and construction V	4	4	100	100			200
3	AR1503	PC	Gr II	History of Architecture V Early Modern	3	3	50	100			150
4	AR1504	BS&AE	Gr II	Theory of Structures IV-RCC Structures	3	3	50	100			150
5	AR 1505	SEC	Gr III	Computer Studio III	4	4	100			100	200
6	AR 1506	BS&AE	Gr II	Building services -II Electrical design and Illumination	3	3	50	100			150
7	AR 1507	BS&AE	Gr II	Architectural Acoustics	3	3	50	100			150
				Total	30	30	650	500	250	100	1500

<b>SIXTH SEMESTER (S VI)</b>											
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Hrs / w	Marks				

							CA	W	J	P/V	Total
1	AR1601	PC	Gr I (a)	Architectural design VI-Functionally Complex Buildings	10	10	250		250		500
2	AR1602	BS&AE	Gr I (b)	Building Materials and construction VI	4	4	100	100			200
3	AR1603	PC	Gr II	History of Architecture VI -Modern & Post Modern	3	3	50	100			150
4	AR 1604	BS&AE	Gr II	Theory of Structures V-Steel Structures	3	3	50	100			150
5	AR1605	OE	Gr II	Society, Architecture and Environment	3	3	50	100			150
6	AR1606	BS&AE	Gr II	Building services III- Fire Protection and HVAC and Building Automation	3	3	50	100			150
7	AR1607	BS&AE	Gr III	Building Science Lab	4	4	100			100	200
				Total	30	30	650	500	250	100	1500

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CA-Continuous Assessment Marks, W-University Written Examination Marks, J-Jury Marks, P/V-Practical or Viva-voce marks

<b>SEVENTH SEMESTER (S VII)</b>												
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Hrs /w	Marks					Total
							CA	W	J	P/V	Total	
1	AR1701	PC	Gr I (a)	Architectural design VII-Campus Planning	10	10	250		250		500	
2	AR1702	OE	Gr II	Estimation, Costing and Specification	3	3	50	100			150	
3	AR1703	PAEC	Gr II	Human Settlements-History and Planning	3	3	50	100			150	
4	AR1704	PC	Gr II	Design Aspects of Earthquake resistant Buildings	3	3	50	100			150	
5	AR 1705	OE	Gr II	Elective I	3	3	50	100			150	
6	AR 1706	PE	Gr II	Elective II	3	3	50	100			150	
7	AR 1707	PAEC	Gr III	Dissertation	5	5	150			100	250	
				Total	30	30	600	500	250	150	1500	

Course no.	Elective I	Course no.	Elective II
AR 1705 a	Research Methodology	AR 1706 a	Sustainable Architecture
AR 1705 b	Disaster Preparedness and Management	AR 1706 b	Vernacular Architecture
AR 1705 c	Architectural Photography and journalism	AR 1706 c	Futuristic Architecture
AR 1705 d	Environmental Impact Assessment	AR 1706 d	Architectural Conservation

<b>EIGHTH SEMESTER (S VIII)</b>												
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Hrs /w	Marks					Total
							CA	W	J	P/V	Total	
1	AR 1801	PC	Gr I (a)	Architectural design VIII- Urban Design	10	10	250		250		500	
2	AR1802	PAEC	Gr II	Professional Practice	3	3	50	100			150	
3	AR1803	PC	Gr II	Housing	3	3	50	100			150	

4	AR1804	PC	Gr II	Urban Design	3	3	50	100			150
5	AR1805	PAEC	Gr II	Project Management	3	3	50	100			150
6	AR1806	PE	Gr II	Elective III	3	3	50	100			150
7	AR1807	PE	Gr II	Elective IV	3	3	50	100			150
8	AR1808	OE	Gr III	Architectural Travel Studies	2	2	50			50	100
				Total	30	30	600	600	250	50	1500

Course no.	Elective I	Course no.	Elective II
AR 1806 a	Product Design	AR1807 a	Energy Efficient Architecture
AR 1806 b	Behavioural Architecture	AR 1807 b	Advanced Building Technology
AR 1806 c	Contemporary Process in Architecture	AR1807 c	Smart Cities
AR 1806 d	Smart/Intelligent Buildings	AR1807 d	Online Course

PC-Professional Core Course, PAEC-Professional Ability Enhancement Course, PE -Professional Elective, OE-Open Elective

CA-Continuous Assessment Marks, W-University Written Examination Marks, J-Jury Marks, P/V-Practical or Viva-voce Marks

NINTH SEMESTER (S IX)											
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Days	Marks				
							CA	W	J	P/V	Total
1	AR1901	PAEC	Gr IV	Professional Training	15	100	400		600		1000
				Total	15	100	400		600		1000

PAEC-Professional Ability Enhancement Course.

CA-Continuous Assessment Marks, W-University Written Examination Marks, J-Jury Marks, P/V-Practical or Viva-voce Marks

TENTH SEMESTER (S X)											
Sl. No	Course No	Course Code	Group Code	Course Title	Credits	Hrs /w	Marks				
							CA	W	J	P/V	Total
1	AR11001	PC	Gr I(c)	Architectural Design Thesis	15	30	500		500		1000
				Total	15	30	500		500		1000

PC-Professional Core Course.

CA-Continuous Assessment Marks, W-University Written Examination Marks, J-Jury Marks, P/V-Practical or Viva-voce Marks

**SUMMARY OF CREDITS,WORKING DAYS AND MARKS DISTRIBUTION**

	Credits	Days	CA	W	J	P/V	Total
SEMESTER I	30	90	700	500	250	50	1500
SEMESTER II	30	90	700	500	250	50	1500
SEMESTER III	30	90	650	500	250	100	1500
SEMESTER IV	30	90	650	500	250	100	1500
SEMESTER V	30	90	650	500	250	100	1500
SEMESTER VI	30	90	650	500	250	100	1500
SEMESTER VII	30	90	650	500	250	100	1500
SEMESTER VIII	30	90	600	600	250	50	1500
SEMESTER IX	15	100	400		600		1000
SEMESTER X	15	90	500		500		1000
Total	270		6250	4100	3000	650	14000

CA	Continuous Assessment
W	Written Exams Conducted by the University
J	Jury Exams Conducted by the University
P/V	Practical/Viva Conducted by the Institution

**GROUP CODE**

<b>Group code</b>	<b>Subjects</b>
<b>I a</b>	Architectural Design 1-VIII
<b>I b</b>	Building Materials and construction I-VI
<b>I b</b>	Architectural Drawing & Graphics I-II
<b>I b</b>	Geometrical Drawing
<b>I c</b>	Architectural Design Thesis
<b>Gr II</b>	All theory subjects
<b>Gr III</b>	Communication Skill
<b>Gr III</b>	Work shop practice and site visit
<b>Gr III</b>	Computer Studio I-III
<b>Gr III</b>	Building Science Lab
<b>Gr III</b>	Dissertation
<b>Gr III</b>	Architectural Travel Studies
<b>Gr IV</b>	Professional Training

## **SEMESTER I**



### AR 1101: Architectural Design I - Basic Principles

SEMESTER - I	Course no.	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1101	PC	Gr. I (a)	Architectural Design I - Basic Principles	9	9	250		250		500

**Course Objective:** The studio will introduce students to the fundamentals of design, develop their design vocabulary, nurture design thinking, and help them apply the same thought process in developing three-dimensional compositions. It will also introduce drawings and models as tools that help conceptualize, organize, and further the design thought-process. This studio helps students learn the basics of graphic design and three-dimensional composition. It directly interfaces with the Architectural Drawing and Workshop studios.

#### Module-I

Introducing basic elements of design: points, lines, planes, solids and voids; Understanding design principles of organization and composition: balance, harmony, rhythm, contrast, symmetry, scale, proportion, colour, tone, texture, etc.; Studying solids and voids to evolve sculptural forms and spaces; Exploring the play of light and shade; Introducing external

and internal forms: analytical appraisal of forms, their quality, and variation in form; Introducing concepts of space, and interrelationships between space, volume and order

### **Module -II**

Anthropometry: Anthropometric study and understanding ergonomics of the human figure (including those physically disabled); Dimensions of furniture, and relationships with human anthropometrics (in toilets, kitchens, bedrooms, staircases, multi-user spaces, etc.); Freehand drawing of human figures, vehicles, trees, buildings, etc. to better understand proportions; Exercises experimenting with basic proportions, body relations and spatial concepts, including measuring spaces using the human body to understand scale and proportion

### **Module-III**

Introducing exercises using points, lines and shapes; Exploring colour schemes and their application in visual compositions, and architectural forms and spaces; Introducing thematic collage exercises; Using different textural elements to create focus and points of interest in design; Developing geometric patterns through addition, division, or subtraction, and expressing these patterns using colours.

Two- and three-dimensional exercises involving real and imaginary objects, including drawing compositions and models, to form an appropriate base for subsequent architectural design and theory: Modeling using different materials to create study models of paper, clay, wax, soap, wires, etc.

### **Module-IV**

Furniture layouts based on anthropometrics: Designing basic building components (kitchens, bedrooms, toilets, etc.)

Design exercise on small-scale domestic space: Students will learn skills in problem solving, visualization, and oral and graphic communication

Field trips to relevant architectural sites

## Note

Students are expected to develop a series of abstract models that demonstrate some of the essential spatial/programmatic characteristics of the project. Activities of the Architectural Drawing and Architectural Workshop studios are to be synchronized with the Architectural design exercises.

## **References:**

1. Pandya, Y., & Vastu-Shilpa Foundation for Studies and Research in Environmental Design. (2019). Elements of spacemaking. Ahmedabad : Mapin Publishing Pvt. Ltd.
2. Broadbent G. (1973). Design in architecture: Architecture and the human sciences. Chichester: Wiley.
3. Chauhan P (2005). Learning Basic Design. Mumbai: Rizvi College of Architecture.
4. Ching, F. D. K., & Juroszek, S. P. (1998). Design drawing. New York: Van Nostrand Reinhold.
5. Ching, F. D. K. (2012). Architecture: Form, Space and Order. 3rd Ed. Hoboken: John Wiley & Sons.
6. Lewis, R. K. (2013). Architect?: A candid guide to the profession. Cambridge, MA: MIT Press.
7. Rasmussen, S. E., & Wendt, E. M. (1962). Experiencing architecture 2nd Rev. Ed. Cambridge: MIT Press.
8. Ching, F. (2012). A visual dictionary of architecture. Hoboken, N.J: Wiley.
9. Von, M. P. (2014). Elements of architecture: From form to place. Routledge.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projcets	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Jury</b>	
Maximum Marks	250
1.The institution shall conduct the jury evaluation at the end of the semester as per the manual	
2.Two members of the faculty /architects appointed by the head of the institution shall conduct the jury evaluation (Manual)	

## **AR 1102: Building Materials & Constructions I**

<b>SEMESTER - I</b>	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1102	BS&AE	GR I (b)	Building Materials and Construction - I	4	4	100	100			200

### **Course Objectives:**

To develop understanding of building materials and its application in construction of various building elements. The subject also aims at introducing students with design ability for a certain building element integrating with architectural space and demand of time and place.

### **Module-I**

Introduction to construction as a subject and its relevance to architectural design. Construction and the logic of stability as its basis, construction

principles with respect to structural stability. Support and supported elements, concept of span and span - loading co-relation. Building elements, types and subtypes, basic understanding of elements from foundation to roof vis-à-vis its purpose, function, utility and necessity.

### **Module-II**

Building materials, categories - natural, processed, manufactured and designed. Availability, composition, general know-how with respect to physical, chemical and structural properties; utility and criteria for selection in design and construction of various elements of building. (market survey and study of catalogues) Manufacturing of clay bricks, bricks made from other materials and blocks. Building stones, its quarrying process, preservations, dressing and artificial stone(s). Manufacturing of lime, cement - its setting time; importance and need for curing. Aggregate coursed and fine, sources, grading and selection criteria, various uses and mix. Concrete types (based on materials), preparation and mix - criteria, its various uses, Manufacturing of glass, various types, forms, applications.

### **Module-III**

Basic structural systems, load-bearing, frame structure and composite structure, load transmission, suitability, merits, demerits etc. Introduction and understanding of various subsystem such as horizontal, vertical and foundation, sub systems with respect to stability, utility and its application in building design and construction.

### **Module-IV**

Different systems of Brick Bonding, English, Double Flemish, Single Flemish, Heading, Stretching, Rat trap bond, Garden Wall (Drawings and Hands own training)

### **References :**

1. Mckay WB (1990). 'Building Construction - Vol. 1 - 4
2. R Barry 'The Construction of Buildings, Vol. 1 - 5
3. Chudley Roy 'Construction Technology' Vol. 1 - 6
4. Ching Francis D.K 'Building Construction Illustrated'
5. Choudhary R.B 'Engineering Materials'

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projcets	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	4hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -40 Marks	2 Questions from each module ,10 Marks each, Answer any one full Question from each module
PART C-20 Marks	2 Drawing questions from the syllabus, Answer any one full question

## AR 1103: History of Architecture I-Ancient Civilizations

SEMESTER - I	Course no	Course code	Group code	Course title	Credits	Hrs /w	Marks				Total
							CA	W	J	P/V	
	AR 1103	PC	Gr II	History of Architecture I-Ancient Civilizations	3	3	50	100			150

**Course Objective:** To provide an insight in to the architecture of prehistoric period and early civilizations. Social, political, religious and character, construction methods, building materials and how they influenced their built form and settlement pattern shall be explained with suitable examples. To study other influence such as geology, geography, climate, beliefs, religion and culture on the architecture must be highlighted so as to appreciate how architecture embedded in place and specific context. To evaluate the various civilizations, appreciate chronological developments along the timeline and across geographies.

### Module I

#### Prehistoric / Primitive Architecture (BC10, 000-BC3000)

Evolution of shelters and settlements, burial systems, megaliths and memorials. Eg: Oval huts, Dolmen tomb, Gallery grave, Passage grave, Cairns, Tumulus, Houses at Catal Huyuk, Gobekli Tepe, Stonehenge etc.

### Module II

#### Euphrates and Tigris Valley Civilizations - Mesopotamia (BC 4500-BC 2000)

Architectural character as a reflection of climate and geology, planning of Palaces of Assyria and Persia, Ziggurats and corbelled drains of Assyria, Staircases of Persepolis, physical planning of Babylonia, City of Ur-Sumer

### Module III.

#### Nile Valley Civilization (B C 3500-AD 1500)

Study of socio-cultural, religious and political systems, people's beliefs, climate and other factors influencing Architecture, character of human settlements, typology of Shelters and buildings, Religious burial systems and Cult temples of Egypt, construction methods and materials used. Mastabas, Pyramid of Giza, Karnak Temple.

## Module IV

### Indus Valley Civilization BC 2500-BC 1500)

Contributions of Archaeologists, Timeline, socio-cultural, religious and political systems,

Settlement planning pattern, typology of Shelters and civic buildings, Citadel-Granary-Great baths, drainage systems. Decline of civilization.

#### References:

1. Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai : D.B. Taraporevala
2. Bubbar, D. K. (2005). The Spirit of Indian Architecture. New Delhi : Rupa & Co.
3. Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London Verona Printed

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.



## AR 1104: Architectural Graphics and Drawing -I

SEMESTER - I	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/W	
	AR 1104	PC	Gr I (b)	Architectural Graphics & Drawing -I	4	4	100	100			200

### Course Objective:

Introducing students to fundamental techniques of Visual representation and to equip with the basic principles of representation. Enhancing the skills in developing a graphical language of architecture.

### Module I

#### Learning Sketching, Drawing, and visual thinking

Free-hand drawing appropriate to visual & architectural representation, indoor & outdoor

Sketching, drawing from observation, terminology & abbreviations used in visual

representation, line & shape, tone & texture, Colour & value, shading & shadow.

Drawing of simple objects, parts of built forms, and natural elements such as plants, trees, human figures etc. Outdoor sketching.

### Module II

#### Design principles and representation techniques

Representation techniques focusing on rhythm, harmony, character, balance, emphasis,

Interpretation of scale and proportion.

### Module III

#### Understanding the complexity of forms

Metaphor in visual representation through natural objects, understanding complexity of forms using graphics and models.

### Module IV

## Rendering Techniques

Monochromatic & different themes of rendering, architectural rendering techniques

Using pen& ink, color, values, tones, and general approach to rendering. Architectural

representation of trees, hedges, foliage, human figures, cars, symbols etc., exposure to various mediums of presentation

## References:

1. Ching, F. D. K. (2011). A Visual Dictionary of Architecture. 2nd Ed. John Wiley & Sons.
2. Martin, L. C. (1970). Architectural Graphics. 2nd Ed. Macmillan Pub Co.
3. Morris, I. H. (1902). Geometrical Drawing for Art Students. Longmans.
4. Lockard, W. K. (1992). Drawing as a Means to Architecture. 6th Ed. New York : Van Nostrand Reinhold Company.
5. Zell, Mo. (2008). The Architectural Drawing Course. 1st Ed. Thames and Hudson
6. Atkins, B. (1986). Architectural Rendering. California : Walter Foster Art Books.
7. Batley, C. (1973). Indian Architecture. Bombay : D. B. Taraporevale Sons.
8. Bhatt, N. D. (2003). Engineering Drawing. Anand : Charotar Publishing House.
9. Dinsmore, G. A. (1968). Analytical Graphics. Canada : D.Van Nostrand, Company Inc.
10. Halse, A. O. (1972). Architectural rendering; the techniques of contemporary presentation. 2<sup>nd</sup> Ed. New York : McGraw-Hill.
11. Holmes, J. M. (1954). Applied Perspective. London : Sir Isaac, Piotman and Sons Ltd.
12. Narayana, K. L. and Kannaiah, P. (1988). Engineering Graphics. New Delhi : Tata McGraw-Hill.
13. Norling, E. (1969). Perspective drawing. California : Walter Foster Art Books.
14. Robert, W. G. (2006). Perspective: From Basic to Creative. 1st Ed. London : Thames and Hudson.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projcets	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	4hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
2 Questions of 25 marks from each module-Answer one from each module.	

### **AR 1205 Geometrical Drawing**

SEMESTER - I	Course no	COA course code	CUSAT group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR1205	PC	Gr I (b)	Geometrical Drawing	4	4	100	100			200

#### **Course Objective:**

Introducing students to fundamentals of geometrical concepts and constructions, develop practical understanding of Geometrical concepts (in art, architecture and nature). Enhancing the skills in developing a graphical language of mathematical concepts.

#### **Module I**

##### **Basic Geometric Constructions**

Basic geometrical constructions: lines (parallel, perpendicular, division), angles, shapes (triangles, quadrilaterals, trapezoids, regular polygons inscribed and circumscribed) tangent, curves etc.

Advanced geometrical constructions: conic-sections, spirals, helix, miscellaneous curves (involutives, cycloids & trochoids), and scales (plain & diagonal).

## Module II

### Section of solids and development of surfaces

Projection of solids, Section of solids such as prisms, pyramids, cylinders, cones and spheres etc., Development of surfaces of solids, Intersection of surfaces.

## Module III

### Isometric and Axonometric Views

Introduction to views, types and advantages. Isometric, Axonometric and Oblique view of objects, building components and Interior of the room. Exploded view of items.

Perspective drawing: Introduction to one point, two point & three point perspectives - Objects, study of picture plane, station point, vanishing point, Eye level, Ground level etc., its variation & effects.

## Module IV

### Advanced Perspective and Sciography

Sectional perspectives of objects. Introduction to Sciography, Principles of shade & shadow, Shadows of lines, planes & simple solids due to near & distant sources of light, shadows of architectural elements, Construction of sciography on building. Application of sciography on pictorial views.

### References:

1. Stephen Skinner (2009) Sacred Geometry: Deciphering the Code. Sterling.
2. Batley, C. (1973). Indian Architecture. Bombay : D. B. Taraporevale Sons.
3. Bhatt, N. D. (2003). Engineering Drawing. Anand : Charotar Publishing House.
4. Ching, F. D. K. (2009). Architectural Graphics. 5th Ed. Hoboken : John Wiley & Sons.
5. Ching, F. D. K. (2011). A Visual Dictionary of Architecture. 2nd Ed. Hoboken:John Wiley & Sons.
6. Dinsmore, G. A. (1968). Analytical Graphics. Canada : D.Van Nostrand, Company Inc.
7. Holmes, J. M. (1954). Applied Perspective. London : Sir Isaac, Piotman and Sons Ltd.
8. Narayana, K. L. and Kannaiah, P. (1988). Engineering Graphics. New Delhi : Tata McGraw-Hill.
9. Norling, E. (1969). Perspective drawing. California : Walter Foster Art Books.
10. Robert, W. G. (2006). Perspective: From Basic

NO	Split-up of Continuous Assessment Marks	Percentage
1	Class works/Assignments/Projcets	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

University Examination

Duration of Examination	4hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module

### AR 1106: Mathematics

SEMESTER-I	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1106	OE	Gr II	Mathematics	3	3	50	100			150

**Course Objective:** To develop basic Mathematical skills for Architecture students to understand structural concepts complex form and geometry. To inculcate understanding of the application of matrices, differential calculus, & analytical geometry in the study of architecture

#### Module-I

Matrix: Elementary Transforms, Echelon form, Rank using elementary transformation by reducing in to echelon form , Inverse of a matrix by Gauss Jordan method, Solution of a system of linear equations.

## Module-II

Ordinary Differential Equations: First Order differential equations-exact Differential equations- Bernoulli's Equations- Linear differential equations of higher order with constant coefficients- Complementary functions and particular Integral.

## Module-III

Probability distribution, Random Variable, Probability density functions, Mathematical Expectation- Mean and Variance of Probability distribution,

## Module-IV

Binomial distribution-Poisson distribution, Curve fitting, Method of least squares, Correlations and regression lines.

References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9/e , Wiley India,2013.
2. Veerarajan T, Engineering Mathematics for first year, 2/e, Tata McGraw Hill, New Delhi 2008.
3. Chandra Mohan and Varghese Philip, Engineering Mathematics I, Sanguine Technical Publishers-2008
4. Chandra Mohan and Varghese Philip, Engineering Mathematics II, Pearson Education India
5. Babu Ram, Engineering Mathematics -II, 2/e, Pearson Education.
6. Grewal B.S., Higher Engineering Mathematics, Khanna Publisher
7. Bali N.P. and Manish Goyal , A Text Book of Engineering Mathematics, Laxmi Publications 11<sup>th</sup>edition(2018).

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs

Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

### **AR1107: Communication Skills**

SEMESTER - I	Course no	Course code	Group code	Course title	Credits	Hrs /w	Marks				Total
							CA	W	J	P/V	
	AR 1107	SEC 47	Gr III	Communication Skills	3	3	50			50	100

#### **Course Objectives:**

To provide an adequate mastery and communicative English Language training primarily, reading and writing skills, secondarily listening and speaking skills.

To prepare the students for an effective participation in seminars, group discussions, paper presentation and general personal interactions at the professional level of above aim with proper grammar.

## **Module I**

### **Communication**

Importance of Communication - Elements of good individual Communication - organizing oneself - different types of communication.

### **Oral and Group communication**

Features of an effective speech- practice in speaking fluently - role play - telephone skills - etiquette.

## **Module II**

### **Public speech**

Short Extempore speeches - facing audience - paper presentation - getting over nervousness - Interview techniques - preparing for interviews - mock interview - Body Language.

## **Module -III**

### **Creative writing**

1.

- a) Scope of Creative Writing
- b) Writing a report/ format of the report
- c) Oral report
- d) Periodical Report
- e) Progress Report
- f) Field Report

2. Product Description - Description of devices & Mechanism

## **Module IV**

### **Communication & Compunication**

Preparation of minutes - video conference - Tele conference / Virtual meeting. Impact of internet on communication - communicate through computers - voice mail - broadcast messages - Internet relay Chat - email auto - response - FTP, etc.

### **References:**

1. Eric H Glendinning & Beverly Holmstrom, "study reading - A course in reading skills for academic purpose", Cambridge University Press, 1992
2. John Kriman, "Good Style - writing for science and technology", E & FN Spoon, an Imprint of Chapman & Hall, 1992.
3. English Language Communication Skills - Urmila Rai - Himalaya Publishing, 2010



4. Writing Your Thesis by Paul Oliver - Sage Study Skills - Sage Publications, March 2008

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>Practical/Viva voce</b>	
Maximum Marks	50
1. The institution shall conduct the evaluation of the portfolio/reports /practical tests and conduct Viva voce at the end of the semester	
2. Students shall submit the portfolio/reports etc consisting of the assignments done for the subject during the course period, as per the instructions from the head of the architectural institution/ department, latest before noon on the previous working day of the commencement of the practical evaluation/viva voce.	
3. Two members of the faculty appointed by the head of the institution shall conduct the evaluation and Viva voce	

## SEMESTER II

### AR 1201: Architectural Design II - Introduction to Architectural Design

SEMESTER - II	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1201	PC - 2	Gr I (a)	Architectural Design II- Introduction to Architectural Design	9	9	250		250		500

**Course Objectives:** The Studio will introduce architectural design as a process and as a final product. It must help students inculcate the fundamentals of space, form and order as basic architectural skills.

Involving them in a design project that deals with simple space planning will enable students to apply theoretical knowledge learnt in the previous semester, and understand the functional aspects of good design. The studio must also demonstrate an evolution in the design process, and explain how humans interface with various furniture and objects.

### **Module -I**

Lettering and technical drafting exercises: Drafted and freehand rendering, presentation techniques with pencil and ink, representation of material in architectural drawing, use of scales; Scaling and measuring 3D forms, and representing them in 2 D form

### **Module-II**

Fundamentals of architectural design: Demonstrating the application of form, space, proportion, scale, order, including Golden Ratio and Modular concepts, through examples from architectural theory and history; Importance of physical factors in architectural design, including (but not limited to) orientation, ventilation, adequate protection from rain, dust, insects, etc.; Human dimensions in various postures (applied form), their relation to everyday utilities; The concept of space in buildings: indoor space, outdoor space, defining spaces and the degree of enclosure, relationships between man and space, organization of spaces; Character of facades: Fenestration, enclosure, and internal spaces

### **Module-III**

Elements of built form:

- a. Basic Elements: Walls, floors, windows, doors, staircase, façade, etc.
- b. Ancillary Elements: Courtyards, balconies, canopy, patio, sit-outs, water bodies, pergola, etc.

c. Relevance of these elements in architectural expression and spatial quality

Drawing the elements of built form: Measured drawing of an existing small building

Furniture & Facilitation: Furniture as an aid that enhances human activity, studies of furniture layouts (in isolation or in combination), measured drawing of furniture.

### **Module IV**

Space Planning and Design: Basic human functions and their implications for space requirements, minimum and optimum areas for various functions (living, dining, sleeping, cooking, study, storage, toilet, etc.) inclusive of furniture layouts; Simple circulation/flow diagrams to understand the functional interrelationship of various spaces in a building  
Design of a small-scale project based on the above: It will introduce the idea that a successful proposition manifests the complex and imaginative inter-relationship between physical, environmental, social and cultural factors.

#### Note

The students are expected to develop a series of abstract models that demonstrate some of the essential spatial/programmatic characteristics of the project. Activities of the Architectural Drawing and Architectural Workshop studios will synchronize with the studio exercise. Student visits to suitable sites must be undertaken.

The students are expected to do architectural projects like play areas, cafeterias, bus shelters etc where they can incorporate certain design elements related to such projects as a continuation from the first semester .

Students can be asked to document a traditional simple building of their locality to understand vernacular architecture and influence of local materials

## References:

1. Mather, J. R. (1974). Climatology: Fundamentals and applications. McGraw-Hill.
2. Ching, F. D. K. (2012). Architecture: Form, Space and Order. 3rd Ed. Hoboken: John Wiley & Sons.
3. Roth, L. M. (2013). Understanding architecture: Its elements, history, and meaning, 3rd Ed. Philadelphia : West-view Press.
4. Arnheim, R. (1977). The dynamics of architectural form. Berkeley: University of California Press.
5. Luning, P. N. (1968). The Language of Architecture: A contribution to architectural theory. Hague Mouton & Co.
6. Johnson, P.-A. (1995). The Theory of architecture: Concepts, themes & practices. New York: Van Nostrand Reinhold.
7. Pandya, Y., & Vastu-Shilpa Foundation for Studies and Research in Environmental Design. (2019). Elements of spacemaking. Ahmedabad : Mapin Publishing Pvt. Ltd.
8. Von, M. P. (2014). Elements of architecture: From form to place. New York: Routledge.
9. Unwin, S. (2003). Analysing Architecture. London: Routledge.
10. Stevens, P. S. (1976). Patterns in nature. Harmondsworth, Eng: Penguin Books.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Jury</b>	
Maximum Marks	250
Two examiners appointed by the university shall conduct the jury evaluation at the end of the semester as per the manual.	

## AR 1202: Building Materials and Constructions II

SEMESTER - II	Course No	Course code	Group code	Course title	Credits	Hrs / w	Marks		Total
							CA	W	
	AR 1202	BS&AE	Gr I (b)	Building Materials and Construction -II	4	4	100	100	200

### Course Objectives:

To understand the basic building elements, their function and behaviour under various conditions with specific reference to timber construction. To help students to develop a clear understanding of basic principles of construction and materials suitable for load-bearing construction & concept of span.

### Module-I

Timber seasoning and preservation of timber. Ecological impact due to use of wood, Deforestation etc. , Study of manufactured wood used in buildings i.e. Plywood , block boards , particle boards and Types of timber joinery - principles and design considerations, their application in construction of various elements, items of building construction and in design of furniture.

### Module-II

a) wooden doors - design criteria and principles. Types and standard terminologies. Design and detailed drawing work for single leaf fully panelled doors, single leaf partly panelled partly glazed doors, double-leaf fully panelled doors; with important joinery details.(drawings of wooden doors )

b) wooden windows - design criteria and principles. Types and standard terminologies. Design and detailed drawing work for fully glazed windows with mullion(s) and with transom. Sash windows, centrally pivoted window, top hung window, louvered window, with adequate number of important joinery details study of various fixtures, fittings, fastenings for doors and windows. (drawings of windows)

### Module-III

Concept of span and its application in providing / making openings in masonry walls. Lintels its definition, purpose, basic terminology, load considerations. Lintel types such as stones, bricks, wood, steel, r.c.c., rein.

Brick with their design criteria and considerations. Arches: definition, purpose / function. Standard terminologies. Load considerations. .comprehensive study of classification and types of arches. Centering for arches.Design and detailed drawing of arches .

### **Module-IV**

Foundation, basic design considerations. Simple foundations for load-bearing walls in stone and brick masonry. Timbering to trenches for various types of soil. Design and detailed drawing work for foundations.

#### **References:**

1. Mckay W. B, Building Construction, Vol. 1 - 4
2. Barry, Building Construction, Vol. 1 - 5
3. Chudley , Construction Technology , Vol. 1
4. Ching Francis D. K., Building Construction Illustrated.
5. Michell, Elementary Building Construction.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	4hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -40 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question
PART C-20 Marks	2 Drawing questions from the syllabus, Answer any one full question

## AR 1203: History of Architecture II-Europe-Classical to Renaissance.

SEMESTER - II	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1203	PC	Gr II	History of Architecture II- Europe-Classical to Renaissance	3	3	50	100			150

### Course Objective:

To provide an insight into the architecture of Classical antiquity & early Medieval period. Social, religious, political and architectural character, construction methods, building materials and settlement planning shall be explained with suitable examples. To provide an understanding of the evolution of Classical architecture in the west. Combined influence of geology, geography, climate, beliefs, religion and culture on the architecture must be highlighted so as to appreciate how architecture is embedded in place-specific context. The study must enable students to do a comparative evaluation of developments in a chronological manner along the timeline and across different geographies. Also, students must be enabled to appreciate tangible and intangible aspects of heritage associated with history.

### Module I

#### Classical Architecture - Greek and Roman Architecture (Classic period -BC 400- AD 500)

Greece (BC 500- BC 300) Domestic architecture; Public Buildings: Agora, Stoas and Theatres- Greek Parthenon (Athens, 447 - 432 B.C.E.), and Orders in architecture: Doric, Ionic, Corinthian - Optical illusions in architecture. Study of principles of design, proportion.

**Rome** -( BC 200- AD 300) Roman history-Roman Empire : Republic and Empire - Rome religion and the Roman temple- Roman character lifestyle- Roman urban planning - art and architecture as imperial propaganda: Forums and basilicas- domestic architecture - Structural forms, materials and techniques of construction - orders in architecture: Tuscan and Composite Rome: Eg. Forum Romanum .Enclosure and manipulation of space pantheon - Public buildings: Colloseum, Circus Maximus, Thermae of Caraculla.

### Module II

#### Early Christian Architecture (From AD 313)



Evolution of Christianity ,evolution of Church form, study of Architectural character, building typologies, and building elements, polymath architecture, Baptisteries, early Basilican churches; settlement planning, and fortification systems. Eg. Old St.Peters Rome (AD 318-22)

**Byzantine Architecture:** Eastern Roman Empire, Historic and other aspects. Eg. Hagia Sophia (AD 532- 537) Plans, Techniques of construction, Domes and Pendentives. Fragmentation of Roman Empire.

### **Module III**

#### **Romanesque (AD 900- Ad 1100)**

Historic and other aspects of evolution.

The medieval ages - learning in the monasteries, evolution of the guilds - Factors influencing architecture - outline of architectural character. Pisa Cathedral (1063-1272),Durham Cathedral (1093).

**Gothic (AD 1100-Ad 1500)** -Religious and social influences - evolution of structural systems-ribbed vaulting, lancet (pointed) arch, flying buttress-outline of Architectural character - Examples: (French) Notre Dame, Paris (AD 1163-1250).

Development of English gothic vaulting - outline of Architectural character in England and Italy - Examples: Salisbury Cathedral England (AD 1220) , Milan Cathedral Italy (AD 1387).

### **Module IV**

#### **Renaissance (A D 1500)**

Historical aspects,

Italian Renaissance-The idea of rebirth and revival of art sociological influences in art and architecture - Development of thought, emergence of merchant communities and their patronage.

Study of life history philosophy, contribution of the following- Raphael (1483-1520), Andria Palladio (1508-1580), Filippo Brunelleschi (1377-1446), Michelangelo (1457-1564)

Outline of the Architecture during the early Renaissance, High Renaissance and Baroque Periods - Features of a typical Renaissance palace. St Peters Rome (1546) ,Villa Rotonda ( 1556),Florence Cathedral (From 1290)

#### **French & English Renaissance**

Outline of the architectural character of French and English Renaissance - Domestic Architecture in England - Study of the life, philosophy and works of Sir Christopher Wren. Character of Baroque and Rococo styles.

#### **References:**

1. Bubber, D. K. (2005). The Spirit of Indian Architecture. New Delhi: Rapa & Co.
2. Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London:

Verona Printed.

3 Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London: McGraw-Hill.

4. Cost of, S. (2012). A History of Architecture: Settings and Rituals. New York: Oxford University Press.

5. Dutt, B. B. (2009). Town Planning in Ancient India. Delhi: Isha Books.

6.. Kimball, F. and Edgell, G. H. (2012). A History of Architecture. Amazon : Ulan Press.

7. Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.

8. Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.

9. Hamlin, T. F. 1953. Architecture through the Ages. New York : Putnam Adult.

10. Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York: M. Courier Dover Publications.

11. Ingersoll, R. and Kostof, S. (2013). World architecture: a cross-cultural history. Oxford : Oxford University Press.

12. Pramari, V. S. (2005). A social history of Indian architecture. New Delhi: Oxford University Press India.

13. Roth, M. L. (2006). Understanding Architecture: Its Elements, History, and Meaning. Columbia: West-view Press.

14. Sengupta, B. K., Sen, J. and Banerji, H. (2010). Reading material on Human Settlements. Institute Of Town Planners of India, New Delhi.

15. Singh, U. (2009). A history of ancient and early medieval India: from the Stone age to the 12th C. Delhi : Pearson India.

16. Watkin, D. (2005). A History of Western Architecture. 4th Ed. London: Laurence King Publishing

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks

	each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question

### AR 1204: Theory of Structures I-Introduction to structures.

SEMESTER - II	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR1204	BS&AE	Gr II	Theory of Structures I- Introduction to structures	3	3	50	100			150

**Course Objectives:** Introducing simple structural concepts and behaviour of structural elements.

#### Module 1

Introduction: Force concepts - Classification of force system - Principle of transmissibility- Resultant and equilibrant of force systems-Composition of forces (Parallelogram law of forces, Triangle law of forces, Polygon law of forces) - Resolution of forces - Moment of a force - Couple - Properties of couple. Equilibrium conditions - Lami's theorem - free body diagrams. Friction - Coefficient of friction - Laws of friction - Angle of friction -Angle of repose - Cone of friction.

#### Module 2

Centre of gravity - Centroid - Use of axis of symmetry - Centre of gravity by moment method (Plane figures, symmetrical sections, unsymmetrical sections, solid bodies, section with cut-out holes). Moment of inertia - introduction - definition and unit - principal axes - radius of gyration - modulus of section - perpendicular axis theorem, parallel axis theorem - Moment of inertia of rectangular section, hollow rectangular section,

triangular section, circular section - moment of inertia of composite sections.

### Module 3

Basic concept of strength, stiffness, stability. Simple stresses and strains - types of direct stresses and strains - Hooke's law - stress strain curve. Ultimate stress, Working stress, Breaking stress, Proof stress. Elongation of bodies due to external loads - principle of super position - stresses in composite bars - Thermal stresses in simple bars - elastic constants.

### Module 4

Beams - support conditions - types, Load types - Point load, uniformly distributed and varying loads Beam analysis - Shear force diagram - Bending moment diagram of simple cases such as: a) Cantilever beams with point loads, UDL & moment b) Simply supported beams with point loads, UDL & moment c) Simply supported overhanging beams (one side & both sides) with point load, UDL & moment.

### References:

1. Tayal, "Engineering Mechanics",
2. R K Bansal, "Engineering Mechanics", Lakshmi Publications pvt ltd
3. Vazarani, "Mechanics of structures"
4. M. Chakraborti "Strength of Materials", SK Kataria & Sons, New Delhi,
5. Abdul Mubeen, "Mechanics of Solids", Parson Publications
6. Dr D.S. Kumar - Textbook of Engineering Mechanics , SK Kataria & Sons, New Delhi,
7. R.K. Rajput, Textbook of Engineering Mechanics, Danpat Rai & Sons, New Delhi,

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any

	one full Question
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### AR 1205: Environmental Studies

SEMESTER-I	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1205	OE	Gr II	Environmental Studies	3	3	50	100			150

**Course Objective:** To introduce the basics of environmental science and its relevance to mankind, the built envelop around. Also introduce fundamentals of Climatology in view of its integral importance for students of Architecture.

#### Module I

##### Introduction to Ecosystems and Environment.

Types of ecosystems, characteristics features, structure and functions of Ecosystems – Forest, Grassland, Desert, Aquatic (lakes, rivers and estuaries).

**Environmental resources-** Land, Forest, Water and Energy as environmental resources.

Bio-diversity and its conservation. Value of bio-diversity - consumptive and productive use, social, ethical, aesthetic and option values. Bio-geographical classification of India – India as a mega diversity habitat. Threats to biodiversity-Hotspots, habitat loss, poaching of wildlife, loss of

species, seeds etc. Conservation of bio-diversity, in-situ and ex-situ conservation.

## **Module II**

### **Environment and Environmentalism**

Different concepts and thoughts about environment and environmentalism. Current and future environmental problems.

Environmental problems in India. Local and Global Issues-Causes, effects and control measures. Air pollution, Indoor air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Solid waste management, composting, vermin culture, Urban and Industrial wastes, recycling and reuse.

Nature of thermal pollution and nuclear hazards, Global warming, Acid rain and Ozone layer

Depletion and Climate change.

## **Module III**

### **Architecture and environment**

Environmental impacts of constructions-Energy, Materials, Optimize building envelope, minimize demand through serious conservation, and supply energy with maximum efficiency and using renewable materials.

Site -micro climate, Energy conservation, Passive solar heating, Passive cooling and natural ventilation, Day lighting. Energy-optimised in architecture.

Social issues and the environment, urban problems related to energy; human population and environment- population explosion, resource exploitation and depletion, human-wild conflict, loss of wet lands, mangroves, increasing desert areas, spread of diseases.

## **Module IV**

Introduction to Government regulations, Monitoring and enforcement of environmental

regulations, Introduction to Environmental Acts, viz., Water (Prevention and Control of

Pollution) Act, Air Prevention and Control of pollution act, Environmental Protection Act,

Wild life protection Act, Forest Conservation Act, CRZ.

### **References:**

1. Agarwal, K. C. (2001). Environmental Biology. Bikaner : Nidhi Publications Ltd.
2. Benny, J. (2005). Environmental Studies. New Delhi : Tata McGraw Hill.
3. Bharucha, E. (2005). Text book of environmental studies for undergraduates courses. New Delhi :Universities Press, UGC.
4. Brunner, R.C. (1989). Hazardous Waste Incineration. New Delhi : McGraw Hill.

5. Kaushik, A. and Kaushik, C. P. (2010). Basics of Environment and Ecology. New Delhi : New Age International Publishers.
6. Ramachandra Guha, Environmentalism.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question

### AR 1206: Architectural Drawing & Graphics -II

SEMESTER - II	Course no	Course code	Group code	Course title	Credits	Hrs /w	Marks				Total
							CA	W	J	P/V	
	AR1206	PC	Gr I (b)	Architectural Drawing & Graphics -II	4	4	100	100			200

#### Course Objectives:

Introducing students to fundamental techniques of Visual representation and to equip with the basic principles of representation. Enhancing the

skills in developing a graphical language of architecture. To understand Broad overview of Art and Design, Enabling students to understand visual awareness. Understanding of Design as a Multidimensional creative Art. Develop the technical skills and the ability to organize the visual elements necessary to communicate concepts and experiences across various media. To translate concepts into visual composition. To Develop the Visual skills by examining a sculpture's formal and sensory qualities (i.e. line, colour, form, texture, etc.) and analyzing how the elements (i.e. scale, balance, rhythm, proportion, etc.) are organized Develop the skills of visual Composition, People & nature, Lighting & colour and Understand the mechanics of imaging.

### **Module I**

**Art and Design-** A historical perspective. Expression of Art and Design. Relations in Art, Design and Architecture. Introduction to art theories.

### **Module II**

**Introduction to history of Graphic Design,** Visual perception theory Principle of Compositions – Colour Theory – Type Design and Typography (Layouts / Format / Calligraphy). Environmental Graphics (Signage / Logo / enhancing the built environment). Lateral thinking for exploration of designing Ideas.

### **Module III**

**Painting and Sculpture,** Introduction to basic elements of painting. Various uses of colours. Exploring different ways of paintings on different medium. Exploring colours, light, transparency and composition. History of Art, Aesthetics, Drawing from full life, modelling from Life (Study of Human Head in Clay)

**Sculptural Design** (Modelling & Carving) Imagination and the Imaginary Hardcover, Kathleen Lennon.  
Dynamics of Architectural Form. Experiencing Architecture

### **Module IV**

#### **Architectural Photography**

Introduction to photography-history and development, Colour, lighting, visual angle, frames  
Photographic techniques. Post processing photo.  
Introduction to film theory and design for the dynamic media.

#### **Note**

**Assignments on theories, Paintings and sketching (plates),  
Sculpture in different materials,**

#### **References:**

1. Webb, Frank, "The Artist guide to Composition", David & Charles, U.K., 1994.





T E R - II	AR120 7	PC-12	Gr III	Work shop practice & Site Exposure	4	4	100			50	100
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**Course Objective:** To give opportunity to students for hands on experience, to expose the students to the construction of buildings in different sites.

### **Module I**

Need for architectural models. Role of scale-models in design. General practices in model making. Types of models: block, detailed, construction & interior models. Various materials and tools to be used in model making. Use of materials, viz. paper, mount board, cardboard in architectural models. Use of materials viz. Clay, Plaster of Paris (POP) in architectural models

### **Module II**

Hand on working demonstration by fabricators/works men on carpentry, model making, plumbing and sanitary fittings electrical wiring and bar bending. Finishing works etc

### **Module III**

Group projects involving brick bonds, Simple exercises in cutting, finishing and joinery with simple blocks, composition of basic geometrical forms etc

### **Module IV**

Minimum two site visits to get exposure to construction of buildings. Reports of site visits

### **References:**

1. Ching, F. D. K. (2009). Architectural Graphics. 5th Ed. New Jersey : John Wiley & Sons.
2. Criss. B. M. (2011). Designing with models: A Studio guide to Architectural Process Models.3<sup>rd</sup> Ed. Hoboken :John Wiley & Sons.
3. Kieran, S. and Timberlake, J. (2008). Lobolly House :Elements of a New Architecture. New York : Princeton Architectural Press.
4. Morgan, C. L. and Nouvel, J. (2002). The Elements of Architecture. London : Thames & Hudson.
5. Werner, M. (2011). Model Making. New York : Princeton Architectural Press

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Workshop/Projects/Site visit reports	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Practical/Viva voce</b>	
Maximum Marks	50
1.The institution shall conduct the evaluation of the portfolio/site visit reports /practical tests and conduct Viva voce at the end of the semester	
2. Students shall submit the portfolio/reports etc consisting of the assignments done for the subject during the course period, as per the instructions from the head of the architectural institution/ department, latest before noon on the previous working day of the commencement of the practical evaluation/viva voce.	
3. Two members of the faculty appointed by the head of the institution shall conduct the evaluation and Viva voce	

## **SEMESTER III**

**AR 1301: Architectural Design III - Residential Project**

SEMESTER - III	Course no	Course code	Group code	Course title	Credits	Hrs /w	Marks				Total
							CA	W	J	P/V	
	AR 1301	PC	Gr I (a)	Architectural Design III - Residential Project	10	10	250		250		500

**Course Objectives:** The studio will explore the interrelationship between human behavior and space within a residential environment, while including considerations of spatial volume, shape, external form, function, site, climate, and material. The studio must also equip the students to prepare municipal drawings.

### **Course Outline:**

Through site visits and studio exercises, students are encouraged to understand the interrelationship between human behavior and space in a detached residential building for a single family. Through this design exercise, they are expected to explore the volume of residential spaces, shape and built form, functional aspects and considerations, activity, climatic aspects, material sensitivity, and develop an understanding of the relationship between the proposed building and its surroundings.

Other focus areas in this Studio include building material use, aspects of construction and structural integrity, environmental and socio-cultural sensitivity, rules and regulations (KMBR), municipal drawing, architectural techniques, and verbal communication. Architectural techniques help represent the design process through drawing, modeling, and digital application. The studio will introduce software as a design tool to aid students in developing the two- and three-dimensional information necessary for the production of architectural rendering and fabrication.

### **Studio Project:**

Students are expected to design a residential building for a Kerala family, within an urban or rural setting. The project may not exceed 300 sq. m, and must be situated on a flat site.

Detailed municipal sanction drawings of the same residence is to be done so as to understand KMBR etc

**References:**

1. De, C. J., & Crosbie, M. J. (2001). Time-saver standards for building types. New York: McGraw-Hill.
2. Haraguchi, H. (1988). A comparative analysis of 20th-century houses. New York: Rizzoli.
3. Miller, S. F. (1995). Design Process: A Primer for Architectural and Interior Design. New York: Van Nostrand Reinhold.
4. Robson, D. (2002). Geoffrey Bawa: The Complete Works. New York: Thames & Hudson.
5. Schulz, N. C. (1985). The concept of dwelling. New York: Rizzoli International Publications.
6. Unwin S. (2010). Twenty Buildings every Architect should understand. New York: Routledge
7. Deasy, C. M. (1974). Design for human affairs. New York: Wiley.
8. Sealey, A., & Commonwealth Association of Architects. (1980). Introduction to building climatology. London: Commonwealth Association of Architects.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Jury</b>	
Maximum Marks	250
1. The institution shall conduct the jury evaluation at the end of the semester as per the manual.	
2. Two members of the faculty /architects appointed by the head of the institution shall conduct the jury evaluation	

## AR 1302: Building Materials and Constructions III

SEMESTER - III	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1302	BS&AE	GR I (b)	Building Materials and Construction III	4	4	100	100			200

**Course Objectives:** To strengthen student's knowledge about solids and reinforced cement concrete and its applications in buildings. To equip students about the methods of designing various structural members using reinforced cement concrete. To help the students to develop a clear understanding of building materials such as steel and metals. Also to equip the students with the design principles of vertical connectors and flooring.

### MODULE - I

Soils - their classifications, physical properties, and behaviour, bearing capacity, method of improving bearing capacity,

Cement - manufacturing process, physical and chemical properties, test for cement. Cement concrete definition, specification, water-cement ratio, preparation, curing, casting and different equipment used, fine and course aggregate types of concrete and grades of concrete, RCC, PCC etc.

### MODULE - II

Building materials - mild steel and reinforcement bar, stainless steel, aluminium, copper, titanium, w.r.t to composition, general know-how with respect to physical, chemical and structural properties their utilities and criteria for selection.

### MODULE - III

Vertical connector- stairs, design principles / considerations, proportions. Types on basis of geometry, material and structural systems used. Stairs in timber, mild steel and stone. Railing types for stairs etc. Design and

detailed drawing works .Concept of spanning and its application in formation of floors Traditional methods of flooring such as timber floors, jack arch floors, composite floors. Design and detailed drawing works on components of flooring, types of flooring, selection of flooring and materials.

### **MODULE - IV**

Principles of framed structures - reinforced cement concrete, complete drawing work with typical details of R.C.C. Footings, columns, lintels, Chajjas, beams, canopies, slabs, cantilever beams and slabs, fins, staircases etc. Study of form work, shuttering, for above components of R.C.C. Site visit to construction sites.

#### **References :**

1. Murthy, V. N. S. Soil Mechanics & Foundation Engineering.
2. Sai Kripa Technical Consultants. Punmia, B. C. (2005).
3. Punmia, B. C. Soil Mechanics And Foundation Engineering ,Laxmi Publications. Delhi: (2006).
4. Punmia, B.C, R C C Designs, Laxmi Publications. Delhi: (2007).
5. Punmia, B. C Limit State Design Of Reinforced Concrete. Laxmi Publications . Delhi (1999).
6. Mckay W. B. Construction of Buildings Vol.II. 5th Ed. Eastwest Press. New Delhi, (2005).

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	4hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -40 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question
PART C-20 Marks	2 Drawing questions from the syllabus, Answer any one full question



## AR 1303: History of Architecture III: Indian Architecture -Ancient to Medieval period (BC 1500- CE 1300)

SEMESTER - III	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR1303	PC	Gr II	History of Architecture III: Indian Architecture -Ancient to Medieval period	3	3	50	100			150

**Course Objective:** To study Indian Architecture in its various stylistic modes characterized by materials, technology, ornamentation and planning practices

### Module I

#### Vedic Civilization (1500 BCE -800BCE)

Civilization - theories and debates of origin - origins of early Hinduism - Vedic culture - Vedic Village and rudimentary form of bamboo and wooden construction.

### Module II

#### Buddhist and Jain Architecture in India (185 B.C.E - 600CE)

Evolution of Buddhism, Buddhist thought, art and culture - Hinayana and Mahayana Buddhism - interaction of Hellenic and Indian Ideas in Northern India - evolution of building typologies - the stupa, vihara and the chaitya hall - symbolism of the stupa - architectural production during Ashoka's rule. Ashoka Pillar, Sarnath - rock cut caves at Barabar - Sanchi stupa rock cut architecture in Ajanta and Ellora - Karli - Viharas at Nasik - Rani gumpha, Udaigirim - Takti Bahai, Ganadhara.

**Jain Architecture:** Understanding Importance of material and construction technique in Jain temple architecture

### Module III

#### Hindu Temple Architecture

**Hindu forms of worship** - evolution of temple form - meaning, symbolism, ritual and social importance of temple - categories of temple - elements of temple architecture - early shrines of the Gupta and Chalukyans period.

**Northern India** - Temple architecture of Gujarat, Orissa, Madhya Pradesh and Rajasthan -Salient features Lingaraja Temple Bhuvanesar (Indo Aryan -Orissa 1000CE), - Sun temple, Konark (Indo Aryan -Orissa 1250 CE). Khajuraho, (Indo Aryan -Madhya Pradesh 950-1050 C.E)

**Central India** -Early Chalukyan-(450-650 CE) Ladh Khan and Durga temple, Aihole - Papanatha, Virupaksha temples Pattadakal (680 CE)- Hindu Rock-cut (8<sup>th</sup> cen.CE) Kailasanatha temple, Ellora.

### **Module IV**

**Southern India** -Brief history of South India - relation between Bhakti period and temple architecture - of temple towns - Dravidian Order - evolution and form of gopuram. Rock cut productions under Pallavas: shore temple, Mahabalipuram (650- 700 CE) Cholas Architecture: Brihadeeswara temple (1010 CE) Later Chalukyan or Hoysala architecture: Belur and Halebid( 1050-1300 CE)

#### **References:**

1. Percy Brown, Indian Architecture (Buddhist and Hindu Perid) , Taraporevala and Sons, Bombay, 1983.
- 2.Satish Grover, the Architecture of India (Buddhist and Hindu Period), Vikas Publishing Housing Pvt. Ltd., New Delhi 2003.
3. Christopher Tadgell, The History of Architecture in India from the Dawn of civilization to the End of the Raj, Longmon Group U.K.Ltd., London, 1990.
- 4 A.Volwahren, Living Architecture - India (Buddhist and Hindu), Oxford and IBM, London, 1969.
5. Geaoge Michell, the Hindu Temple, BI Pub., Bombay, 1977. 3. Stella Kramrisch the Hindu Temple, Motilal Banarasidas, Delhi 1976.
6. K.V.Soundarajan, Art and Architecture of South India.
7. George Michell Ed, Temple Towns of Tamilnadu,
8. History of Indian Philosphy, Dasgupta.
9. Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question frm each module

## AR 1304: Theory of Structures II-Structural Analysis

SEMESTER - III	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1304	BS&AE	Gr II	Theory of Structures II-Structural Analysis	3	3	50	100			150

**Course Objectives:** To understand simple structural concepts and behaviour.

### Module 1

Theory of simple bending (derivation not required), section modulus, bending stresses in symmetrical beams, bending of composite beams – simple problems. Concept of shear stresses in beams, distribution of shear stresses in symmetric cross sections (derivations not required)

### Module II

Torsion – Concept of twisting of beams, torsion equation (derivations not required), torsional stresses in simple sections – simple problems. Simple plane trusses - different types of trusses, Truss analysis - Method of joints (cantilever and simply support trusses.) - Method of section (Theory only).

### Module III

Determinate and Indeterminate beams.(Static Indeterminacy). Deflection in beams - Macaulay's Method - Moment area method - Conjugate beam method.

### Module IV

Definitions of Columns & Struts – Long, Medium & Short columns – Effective Length – Slenderness Ratio – Critical load – Safe load – Different end conditions – Euler's formula for critical load— Assumptions and its limitations – Strength of columns.

### References:

1. S.B Junnarkar, 'Mechanics of Structures', Charotar Book Stall Anand (W.R) 1959.
2. B C Punmia and Jain, 'Strength of Materials & Theory of Structures: Vol – 1, Lakshmi Publications
3. Ramamrutham, 'Strength of Materials', Dhanpat Rai Publishing co (p) Ltd

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

## AR 1305: Computer Studio I

SEMESTER - III	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1305	SEC	Gr III	Computer Studio I	4	4	100			100	200

**Course Objective:** to familiarize students with basic understanding of development of computers, Operating systems, documentation and presentation software. Customization and Templates for repetitive function.

### Module I

#### Introduction to Computers

General Historical background of computer development. Brief description of various

Hardware and Software. Basic knowledge of operating systems: Windows, Unix, Linux etc.

Introduction to various software for documentation, presentation & drawing purposes. Simple operations such as creating, editing, formatting, saving and printing documents. Familiarizing the use of scanners, printers plotters etc.

### Module II

#### Word processing

Introduction to Applications of MS Office in presentation: Microsoft Word, Microsoft Power Point, Microsoft Excel, Adobe Page Maker.

### Module III

#### Spreadsheets

Use of spreadsheet and for various architectural calculations-estimation, area calculations, project reports. Preparations of templates for regular repetitive functions.

#### Presentations

Introduction of various software available for Architectural presentation such as Photoshop, Coral. Image doctoring and manipulation using computer software for graphics and animation (Photoshop and Flash).

### Module IV

Introduction to basics of Architectural softwares-CAD as 2D drafting tool. Digital drawings tools, drawing lines and shapes, modifying lines and

shapes, drawing with accuracy and speed. Organizing plans, sections and elevations, drawing and printing to scale, text styles and sizes, hatches and dashed lines. Stencils and blocks, advanced editing tools, and dimensioning drawings.

**References:**

1. Bark, S. (2012). An Introduction to Adobe Photoshop. Sheffield : Ventus Publishing ApS.
2. Gindis, E. (2014). Up and Running with AutoCAD 2015: 2D & 3D Drawing and Modelling. Oxford : Elsevier

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projects/Computer practical exercises	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Practical/Viva voce</b>	
Maximum Marks	100
<ol style="list-style-type: none"> <li>1. The institution shall conduct the evaluation of the portfolio of class works/Assignments/Projects/Computer practical exercises (Print out in A3 Size) submitted by the students (60marks) and conduct a practical test Viva voce (40 marks) at the end of the semester.</li> <li>2. Students shall submit the portfolio/reports etc consisting of the assignments done for the subject during the course period, as per the instructions from the head of the architectural institution/ department, latest before noon on the previous working day of the commencement of the practical evaluation/viva voce</li> <li>3. The practical test shall be of 2 hrs duration</li> <li>4. Two members of the faculty appointed by the head of the institution shall conduct the practical test, evaluation and Viva voce</li> </ol>	

## AR 1306: Climate and Architecture

SEMESTER - III	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1306	BS&AE	Gr II	Climate and Architecture	3	3	50	100			150

**Course Objectives:** Understanding fundamentals of climatology and its relation to human thermal comfort, and buildings. Equip the students with scientific background required to design climate responsive buildings, by offering a clear understanding of the various climatic zones and its climate responsive considerations in architectural design of building and built up areas.

### Module I

Introduction to climatology- Importance of climatology in Architecture- Climate and weather- Global climatic factors -Tilt of earth's axis- Summer solstice- Winter solstice-Solar radiation- The green house effect-Sun path Diagram- Earth's Thermal balance-Radiation at the earth's surface- Solar constant- Global wind pattern-Polar winds-Thermal forces and annual wind shift- Trade winds- Coriolis force, Local climatic zones- Micro and macro-climate-Site climate- Urban climate- Landscape elements on Climate and Architecture

### Module II

Elements of climate such as temperature, humidity, vapour pressure, precipitation, solar radiation-Solar radiation on inclined surfaces, walls-sky condition, wind, vegetation- Quantification of elements- units, measurement, data, various instruments graphical representations- Psychometric chart -Sun path diagrams- Sun angles- Stereographic chart- Global climatic zones around the world- Warm-humid equatorial climate - subgroup: warm-humid island- Hot-dry desert climate- subgroup: hot-dry

maritime desert climate- Composite or monsoon climate- subgroup:  
tropical upland climate- Designing for different climates.

### **Module III**

Thermal comfort- Human comfort conditions- Thermal balance of human body- Regulatory mechanisms- Subjective variables- Body's heat production and loss- Thermal comfort indices- ET/CET monograms- Bioclimatic chart- Effect of climate on environment, habitat and shelter- Active, Passive systems- Heat loss through common building elements due to transmission, R-values and U-values- Shelter for tropical climates- Shelter for the climate of Kerala

### **Module IV**

Radiation spectrum-spectral sensitivity of eye- Visual cone and comfort- Daylight assessment- Types of reflection, glare and quality and spread of light in buildings- Reduction Heat Transfer or Enhancement, insulation properties of materials and built forms- Shading device calculations- Evaluating various built form and its components / or materials for comfort conditions with respect to thermal, visual and air movement. Natural ventilation in and around the building- Ventilation systems

#### **References:**

1. Chand, I. and Bhargava, P. K. (1999). The Climatic Hand Book. New Delhi : Tata McGraw-Hill.
2. Duffie, J. A. and Beckman, W. A. (1980). Solar Engineering of thermal process. New York : John Wiley & Sons.
3. Kaushik, S. C. (1989). Solar Refrigeration and Space Conditioning, Jodhpur : Divya-jyoti Prakashan.
4. Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A. and Szokolay, S. V. (1980). Manual of Tropical Housing and Building: Climatic design. Hyderabad : Orient Longman.
5. Kukreja, C. P. (1982). Tropical Architecture. New Delhi : McGraw-Hill.
6. Lam, W. M. C. (1986). Sun-lighting as Form-giver for Architecture. New York : Van Nostrand Reinhold.
7. Olgyay, A. and Olgyay, V. (1976). Solar Control and Shading Devices. New Jersey : Princeton University Press.
8. Sudha, M. S., Bansal, N. K., Kumar, A. and Bansal, P. K. (1986). Solar passive buildings, science and design. London : Pergamon Press.
9. USGBC. (1996). Sustainable Building Technical Manual. Public Technology Inc.



10. Wright, D. (1984). Natural Solar Architecture. New York : Van Nostrand Reinhold Company.
11. Arvind Krishnan ,Climate responsive architecture.
- 12 O H Koenigsberegger, Manual of tropical housing and building.
13. Solar data book, CBRI, Roorkee.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

## AR 1307 Surveying and Levelling

SEMESTER - III	Course no	Course code	group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1307	BS&AE	Gr II	Surveying and Levelling	3	3	50	100			150

**Course Objectives:** 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, need and role of Surveying and Levelling related to Architecture, preparation and interpretation of survey drawings, methods, tools and equipment necessary to carryout different survey procedures and recent advancements in the field of landforms survey and measurements.

### Module 1

Introduction to surveying, Relevance of land topography in Architecture, Need for surveying. Chain survey and Triangulation , Offsets, Booking the field notes, obstacles in chaining, errors in chaining ,chaining on sloping ground and reciprocal ranging. Setting out the plan on site - Procedure and Precautions. Calculation of area by ordinate rule, trapezoidal rule and Simpsons rule.

### Module 2

Plane table surveying: Instruments used and methods, working operations in plane table surveying, two point problem and three point problem (mechanical method).

Theodolite surveying: Instruments used temporary adjustments. Measurement of horizontal and vertical angle.

### **Module 3**

Levelling : Principles of levelling; Study of instruments - Dumpy level and levelling staff, Temporary adjustments of level, Booking and reduction of levels - ' line of collimation method' and ' rise and fall method', Reciprocal levelling, Basic ideas on plotting of longitudinal and cross sections. Contouring - Contour interval - Characteristics, uses of contours.

### **Module 4**

Advanced Surveying Instruments: Introduction to Global Positioning Systems (GPS), theomat, Aerial photography, digital levels and auto levels (Uses, Advantages and Disadvantages). Electromagnetic distance measurement (EDM) - Principle of EDM, Modulation, Types of EDM instruments - Distomat, Total Station - Parts of a Total Station

### **References:**

1. Miller, V. C. and Westerback, M. E. (1989). Interpretation of Topographic Maps. Columbus Merrill.
2. Lynch, K. and Hack. G. (1984). Site Planning. 3rd Ed. Cambridge : Maple-Vail Inc.
3. Easterbrook, D.J. (1999). Surface Processes and Landforms. 2nd Ed. New York : McMillan.
4. Carson, M. A. and Kirkby, M. J. (1972). Hill slope Form and Process. London and New York Cambridge University Press.
5. Arror, K.R. (2004). Surveying Vol. 1-3. Delhi : Standard Book House.
6. Chandra, A. M. (2002). Plane Surveying. New Delhi : New Age International.
7. Duggal, S. K. (2004). Surveying Vol. 1-2. New Delhi : Tata McGraw Hill.
8. Punmia, B. C., Jain, A. K. and Jain, A. K. (2005). Surveying Vol. I-III. New Delhi : Laxmi Publications.
9. Shahani, P. B. (1980). Text of Surveying Vol. I. Oxford and IBH Publishing.
10. Subramanian, R. (2012). Surveying and levelling. New Delhi : Oxford University Press.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
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1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module

## **SEMESTER IV**

## AR 1401 Architectural Design IV - Rural Project

SEMESTER - IV	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1401	PC	Gr I (a)	Architectural Design IV -Rural Project	10	10	250		250		500

**Course Objectives:** The studio will aim to introduce students to the opportunities and challenges of designing in a rural environment. It shall sensitize the students to space-specific contextual factors in design, and direct their attention to how differently-able people, suffering from various types of physical limitations, negotiate the built environment. The studio must also provide students opportunities to apply theoretical knowledge learnt in the previous semester to the design problem. The studio will also enable students to prepare Working Drawings of buildings.

### Course outline:

Documentation exercise done as part of the second semester can help students to be familiarized with vernacular architecture and further emphasized through field visits and introductory lectures. This will help them to study local cultural milieu, built-form characters, building materials, and technology, and the relationship between built form and open spaces. They will learn the relationship between the building and its

natural environment. Students are also to be exposed to the principles of barrier free environment. They will study the movement patterns and ergonomic requirements to design facilities to meet the special needs of the people with physical disabilities. They are also expected to explore the opportunities and design implications of various types of building materials and structural systems, especially as they determine the artistic, conceptual, poetic, creative, spatial and experimental aspects of architecture.

Special emphasis shall be on understanding the implications of using different types of local building materials i.e. brick, stone, earth, timber, bamboo, steel, aluminium, concrete, glass etc. to leverage the special qualities of materials to meet the needs in terms of strength, durability, texture, visual appeal, & overall functionality.

This studio introduces and explores the connection between an architectural object and the landscape. The other focus areas are site planning, concepts of shared open space, clustering, community engagement. Emphasis shall be laid on clarity of detail (Working details) and architectural expression in functional and constructional terms. The design studio shall be closely integrated with building construction studio, building services such as water supply and sanitation, structural systems, energy efficiency and computer studio.

**Design project:** Design exercise could be any medium sized public building having more than one floor in a non-urban setting. Example: Library, Primary health centre, Auditorium, School Community centre, market etc.

### **References:**

1. Steinfeld, E., & Maisel, J. L. (2014). Universal design: Creating inclusive environments. Johanneshov: MTM.
2. Preiser, W.F.E., and Ostroff, E. (2011.) Universal Design Handbook. New York: McGraw-Hill.
3. Holmes-Siedle, J. (2003). Barrier-free design: A manual for building designers and managers. Oxford: Architectural Press.
4. Story, Molly, F., Mace, Ronald, L., & Mueller, James, L. (1998). The universal design file: Designing for people of all ages and abilities. North Carolina: NC State University, Center for Universal Design.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
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1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Jury</b>	
Maximum Marks	250
Two examiners appointed by the university shall conduct the jury evaluation at the end of the semester as per the manual.	

### **AR 1402: Building Materials and Constructions IV**

SEMESTER - IV	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1402	BS&AE	Gr I (b)	Building Materials and Construction IV	4	4	100	100			200

**Course Objectives:** To impart knowledge on various types of roofs and roof coverings material, partitions and panelling, various surface finishes. To equip students with advances in building construction methods and its applications.

#### **MODULE -I**

Roofs and roof coverings, introduction, characteristics of roofs, types of roof (flat -madras terrace roof, RCC, slab classification by method of

geometry and methods of construction, pitches lean-to couple collar, scissor.

## **MODULE- II**

Timber roofs - timber trusses, standard terminologies, types - design criteria, principles, construction details. Design details and drawing work of king post and queen post truss. General and conceptual drawing work of other types of timber roofs.

Steel roof - trusses. Types, design principles and considerations, standard terminology - design details and drawing work of m.s. Angle and tubular trusses. North light truss system. Conceptual and drawing work of types of steel trusses. General study of m.s. Frame and its various joints. Site study reports .expansion joints; types, design considerations, location consideration, principles and types.

## **MODULE- III**

Windows in steel and aluminium. Steel doors; design criteria and principles. Standard terminologies and types. Special doors such as sliding, sliding and folding, revolving doors, rolling shutter, collapsible gates - design criteria and principles. Standard terminologies. Design details and drawing works.

## **MODULE - IV**

Panelled and glazed partitions out of timber and aluminium - types, design principles and considerations, standard terminologies. Design details and drawing work, fixing details to surrounding elements / components. Partitions panelling and false ceiling, types of partition (brick, clay, concrete, glass, timber, gypsum etc.) Design details and works

### **References:**

1. Barry, R. (1999). The Construction Of Buildings Vol.ii. 5th Ed. New Delhi: Eastwest Press.
2. Bindra, S. P. And Arora, S. P. (2000). Building Construction: Planning Techniques And Methods Of Construction, 19th Ed. New Delhi
3. Dhanpat Rai Pub. Mckay, W. B. (2005). Building Construction Metric Vol.1-Iv, 4th Ed. Mumbai ,Orient Longman.
4. Rangwala, S. (2004). Building Construction. 22nd Ed. Anand.: Charotar Pub. House.
5. Joseph Iano, Edward Allen , (2013)Building Construction: Materials And Types Of Construction, 3rd Ed. New York: John Wiley And Sons.



NO	Split-up of Continuous Assessment Marks	Percentage
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	4hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -40 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.
PART C-20 Marks	2 Drawing questions from the syllabus, Answer any one full question

### AR 1403: History of Architecture IV-Islamic Architecture

SEMESTER - IV	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1403	PC	Gr II	History of Architecture IV- Islamic Architecture	3	3	50	100			150

**Course Objective:** To provide an insight into the Islamic architecture. Social, religious, political and architectural character, construction methods, building materials and settlement planning shall be explained with suitable examples.

## **Module I**

Brief History of Islam in terms of birth, spread across countries and principles - influences on Islamic Architecture - Evolution of Building types in terms of forms and functions - the mosque, the tomb and the minaret, the madrasa, the palace, the caravanserai, vernacular architecture, the market - important principles, elements & character of Islamic architecture in decoration, colour, geometry, light - important examples to illustrate development of Islamic architecture. (From AD 610)

## **Module II**

**Moorish Architecture** - (Southern Europe 8<sup>th</sup> to 16<sup>th</sup> Century). Characteristics and Planning Principles. Elements like Muqarnas and Horseshoe arch. (Ex. Alhambra Complex, Granada and Great Mosque of Cordova)

## **Module III**

### **Islamic Architecture in India- (AD 1206-AD 1506)**

Advent of Islam into the Indian subcontinents and its impact. Source of Islamic Architecture in India and influences on them - Brief history of development and classification of Urban, different styles and region. Development of architectural styles during the rule of the Slave, Khalji, Tuqlaq, Sayyid and Lodhi Dynasties - important examples of each period.

**Provincial styles** :Development of the provincial styles in different regions - Bengal (AD 1203-AD 1573), Gujarat(AD 1300 -AD 1572), Malwa (AD 1300 -AD 1572), Deccan -Bijapur, Golconda, Bidar and Gulbarga (AD 1347 -AD1617),- important examples for each style.

## **Module IV**

**Mughal Style** :Development of the Mughal style under the different rulers - Babur (AD1526-AD 1531), Humayun (AD 1531-AD 1556), Akbar (AD 1556-AD1605) , Jahangir (AD 1605-AD1627), Shahjahan (AD 1627-AD 1658), Aurangzeb (AD 1658- AD 1707)- important examples - development of the Mughal garden - important examples.

Cross-cultural influences- Cross cultural influences across India and secular architecture of the princely states: Oudh, Rajput, Sikh, Vijayanagara, Mysore, Madurai- important examples

### **References:**

1. Brown Percy.(1983). Indian Architecture (Islamic Period).Bombay, Taraporevala and Sons

2. Christopher Tadgell, (1990) , The History of Architecture in India . New Delhi ,Penguin Books (India) Ltd.

3. George Michel.(1978). Architecture of the Islamic World --its history and social meaning. London, Thames and Hudson.

4. Robert Hillenbrand. (1994) .Islamic Architecture, Form, Function and Meaning.Edinburgh University Press.

5. Satish Grover. (1981) .The Architecture of India (Islamic) , New Delhi , Vikas Publishing House Pvt.Ltd.

6. R.Nath .( 1985) .History of Mughal Architecture .New Delhi , Abhinav Publications.

WEBSITES <http://www.islamicart.com/pages/archcrea/index.html>

<http://libraries.mit.edu/rvc/aka/agakhan/index.html>

<http://www.greatbuildings.com/types/styles/Islamic.html>

<http://www.ets.uidaho.edu/arch499/nonwest /islam1.html>

<http://indiagateway.com/culture/architecture.html>

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### AR 1404: Theory of Structures III-Structural Analysis

SEMESTER - IV	Course no	Course code	group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1404	BS&AE	Gr II	Theory of Structures III- Structural Analysis	3	3	50	100			150

**Course Objectives:** To strengthen the students' knowledge about fundamental structural forces in buildings and the methods of analysis and calculations. To demonstrate an understanding of concepts taught during the semester through simple calculations and models.

### **Module 1**

Introduction Force method - Analysis of continuous beams using Three moment theorem - Shear Force Diagram - Bending Moment Diagram, Support settlement case. (Derivation not required). Consistent deformation method - fixed and propped cantilever - Shear Force Diagram - Bending Moment Diagram.

### **Module 2**

Introduction-Displacement method- slope deflection method-Beam only (settlement case not required.)Moment distribution methods or Kani's method -Shear Force Diagram - Bending Moment Diagram, Beams (without settlement case) Frame (Non-sway only.)

### **Module 3**

Arches: Types of arches, Theory of arches - Eddy's theorem - analysis of three hinged arches- Fundamental concepts of two hinged and fixed arches (theory only). Analysis of forces in cables - suspension bridges with three hinged stiffening girders.

### **Module 4**

Matrix analysis of structures: Static and kinematic indeterminacy- Concepts of Discretization Definition of flexibility and stiffness influence coefficients, Physical approach. Development of element flexibility matrix and development of element stiffness matrix for beam element and axial elements.

Introduction to **any one** Structural Analysis and Design Software Package like STAAD PRO, ETABS etc.

### **References:**

1. S.B Junnarkar.(1959) .'Mechanics of Structures'. Charotar Book Stall Anand (W.R)
2. B C Punmia and Jain. (2005). 'Strength of Materials & Theory of Structures: Vol - 1. Lakshmi Publications.
3. Ramamrutham. (2008) .'Strength of Materials' . Dhanpat Rai Publishing co (p) Ltd

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

## AR 1405 Computer Studio II

SEMESTER - IV	Course no	Course code	CUSAT group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1405	SEC	Gr III	Computer Studio II	4	4	100			100	200

**Course Objective:** To provide a broad awareness about the uses of software's as an aid for architectural presentations. To enable the students to make visual images of their design

### Module I

#### 3D modelling using CAD

Introduction to 3D-modelling technique using CAD or equivalent. 3D basics: Axes, Planes and Faces.

3D Object Modification: rotate Mirror, Array and Scale. 3D Boolean operations: Union, Subtract, Intersect. 3D primitive objects: Box, Wedge, Cone, Sphere, Cylinder, Torus and Pyramids. Solid modelling: Revolve, Shell, Taper, Loft, Path extrusion and sweep.

### Module II

**3D Modelling and Rendering-**Building Modelling and basic rendering techniques, using 3DSMax or equivalent.

### Module III

**Advanced 3D Modelling-** Sketch-up as modelling tool, Design as presentation tool  
(Introduction to other commonly used software tools in a one-day workshop)

### Module IV

#### Drafting Exercise-2 D

An exercise in fundamental elements in a "Working Drawing-Plan" an assignment on a typical standard "Working Plan".

Working drawing preparation, various types of vendor drawings, such as aluminium composite panels, steel doors, fire rated doors, curtain wall systems, aluminium windows, etc.

Developing elevations, sections, part sections, wall sections.

Construction details for lifts, dumb waiters, escalators. External Plumbing Layout and details. Details of Septic tank.

## References:

1. Bark, S. (2012). An Introduction to Adobe Photoshop. Sheffield, Ventus Publishing ApS.
2. Seidler, D. R. (2007). Digital Drawing for Designers: A Visual Guide to AutoCAD 2012. London. Fairchild Publications.
3. Smith, B. (2007). L3ds Max 2008 Architectural Visualization Beginner to Intermediate. Sarasota.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projects/Computer practical exercises	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Practical/Viva voce</b>	
Maximum Marks	100
<ol style="list-style-type: none"><li>1. The institution shall conduct the evaluation of the portfolio of class works/Assignments/Projects/Computer practical exercises (Print out in A3 Size) submitted by the students (60marks) and conduct a practical test Viva voce (40 marks) at the end of the semester.</li><li>2. Students shall submit the portfolio/reports etc consisting of the assignments done for the subject during the course period, as per the instructions from the head of the architectural institution/ department, latest before noon on the previous working day of the commencement of the practical evaluation/viva voce.</li><li>3. The practical test shall be of 2 hrs duration.</li><li>4. Two members of the faculty appointed by the head of the institution shall conduct the practical test, evaluation and Viva voce.</li></ol>	

## AR 1406: Building services -I Water Supply and Sanitation

SEMESTER - IV	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR1406	BS&AE	Gr II	Building services -I Water Supply and Sanitation	3	3	50	100			150

**Course Objectives:** To equip the students of architecture about the building services related to water supply and building sanitation, so as to enable them to comprehend the subject thoroughly and integrate the learning into architectural design.

### Module I

Introduction Sources of water / hydrological cycle Quantity of water – factors effecting demand & consumption. Quality of water – Drinking water standards – physical and chemical characteristics, of water. Introduction to Processes involved – sedimentation, coagulation, filtration & disinfection.

### Module II

Distribution system – gravitational, pumping and combined, intermittent and continuous system, Layout of distribution networks. Domestic water piping system – cold and hot water distribution within the building. Specifications and sketches of various plumbing fittings for buildings. Uses of Valves and taps and their different types. Water supply to high rise buildings: problems encountered & systems adopted.

### Module III

Sanitation: Basic principles of sanitation. One pipe, two pipe system. Various sanitary fittings and their uses. Traps. Details of Septic tank, Imhoff tank and soak pit – Design.

Design considerations on drainage scheme. Planning of bathrooms, lavatory blocks and kitchen in domestic and multi-storeyed buildings. Preparation of plumbing drawings, symbols commonly used in these drawings. Sewer System: Quantity of sewage and storm water. Design of sewer, shapes of sewer, joints used in sewer system. Laying and testing of sewer.

### Module IV



Sewer appurtenances: Manholes, Sub-drains, Culverts, ditches and catch basins, storm overflow regulators, Intercepting chambers, Inspection chambers.

Wastewater disposal: Disposal into land, water bodies, Stream, ocean - disposal by irrigation. Process of self-purification.

Solid waste management Refuse collection, disposal, Incinerator, Composting, Vermi-composting, Sanitary Land filling, Bio gas system and Modern renewable energy system

**References:**

1. Birdie, B. S. (1996). Water supply and Sanitary Engineering. Dhanpat Rai and Sons.
2. National Building Code of India. (2005).
3. Punmia, B. C., Jain, A. K. and Jain, A. K. (1995). Water Supply Engineering. New Delhi : Laxmi Publications.
4. Punmia, B. C., Jain, A. K. and Jain, A.K. (1998). Waste Water Engineering. New Delhi : Laxmi Publications.
5. Rangwala, S. C. (2005). Water Supply and Sanitary Engineering. Charoter Publishing.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module

## AR 1407: Site Planning and Landscape Architecture

SEMESTER - IV	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1407	PC	Gr II	Site Planning and Landscape Architecture	3	3	50	100			150

**Course Objectives:** To understand the various approaches to Landscape Architecture from history. Evolving understanding of the site and its context. Creation and design of open space structure on the site and achieving aesthetic, functional and environmental goals.

### Module - I

Introduction to Landscape Architecture: Scope, Difference between Landscape Design and Building Design, Significance of Time in Landscape Design .Landscape Development in historical perspective: Gardens of Ancient World- Babylon, Egypt, Persia, Greece, Rome; Islamic tradition, Mughal in India. Renaissance, English; Industrialization, Parks movement in America; Indian, Japanese, and Chinese Landscapes and Contemporary movements.

### Module - II

Elements of Landscape: Major and Minor Elements, Natural and Manmade elements, Tangible and Intangible elements; Landform, Water, Plants and Built Elements.

Understanding Visual (colour, form, texture) and Non visual (smell, touch, sound) characteristics.

Principles of Landscape Design: Scale, Proportion, Unity, Rhythm, Harmony, Balance, Contrast. Angle of Vision and approach.

### Module - III

Principles of Site Planning: Selection of site, Site analysis, Microclimate, Topography, Hydrology, Functional suitability of site, Movement of Pedestrian and Vehicles, Parking etc.

Landscape Construction: Cutting and Filling, Grading, Retaining walls, fencing, steps, ramps, decks, gates, pergola, pools, ponds, fountains, sculptures etc.

Landscape Services: Lighting, Garden lighting, Avenue lighting; Surface Water Drainage and Irrigation systems; Underwater construction, Issues in

riverbank and Coastal Constructions; Terrace gardens, terrace pools, Rock gardens.

#### **Module - IV**

Study of Plant Materials: trees, shrubs, ground cover, climbers, physical characteristics and habit; Plant selection criteria - Functional, visual, ecological and microclimatic aspects.

Horticulture: planting and transplanting, planting techniques, techniques of propagation, cutting, pruning, grafting etc. Lawns, preparation and maintenance; Hydroponics, Bonsai

Indoor landscaping: Functions and behaviour of indoor plants, light, air and water requirements, plant materials, Potting and Re potting, Raising of Indoor Plants.

#### **References:**

1. Appleton J.( 1996). The Experience of Landscape. John Wiley & Sons.
2. Bose T. K. and K. Choudhary. (1991) . Tropical Garden Plants in Colour, Horticulture and Allied Publishers.
3. Dee C. , (2001). Form and Fabric in Landscape Architecture: A visual introduction . Taylor& Francis
4. Eckbo G.,(1964) . Urban Landscape Design, McGraw Hill.
5. Gopalswamiengar, K. S., (1991) Complete Gardening in India, 4/e, GopalswamyParthasarathy,.
6. Jellicoe G., and S. Jellicoe, (1991) . The Landscape of Man . Thames and Hudson.
7. Kanvinde A. and H. James Miller, (1969) Campus Design in India: Experience of a Developing Nation, Jostens/American Yearbook Co.
8. Kaplan R., R. L. Ryan and S. Kaplan, (1998) With People in Mind – Design and Management of Everyday Nature, Island Press.
9. Laurie M. (1986) . An Introduction to Landscape Architecture, Elsevier.
10. Lyall S.( 1998) . Designing the New Landscape, Thames & Hudson..
11. Lynch, K. and G. Hack. (1984). Site Planning, 3/e, The MIT Press.
12. McHarg I.(1978) . Design with Nature, John Wiley.
13. Motloch J. L.(2001) .Introduction to Landscape Design, John Wiley and Sons.
14. Randhawa M.S.(1998) . Flowering Trees, National Book Trust.

15. Rutledge, A. J.(1971) . Anatomy of a Park, McGraw Hill.
16. Simonds J. O.(1961) .Landscape Architecture: The Shaping of Man's Natural Environment.
17. Thompson I. H.(2000). Ecology, Community and Delight: Sources of Values in Landscape Architecture, E & FN Spon.
18. Williams S. (1995). Outdoor Recreation and the Urban Environment, Routledge .

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

## **SEMESTER V**

### **AR 1501: Architectural Design V - Heritage context**

SEMESTER - V	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1501	PC	Gr I (a)	Architectural Design V - Heritage Context	10	10	250		250		500

**Course Objectives:** This studio will enable students to study the existing built environment of an urban context, understand human behaviour within the setting, and identify the character of the place, including socio-cultural aspects. It will sensitize students on the specific requirements of design interventions in areas with significant built heritage characteristics. The studio must enable students to apply theoretical knowledge learnt in the previous semesters (including structural systems) to the architectural design exercise.

#### **Course outline:**

Students will study and understand special built environment characteristics within an urban context having significant distinct architectural features. The urban context may include old quarters of Indian cities, or even newer areas having important architectural landmarks (including buildings designed by a well-known architect) in the near vicinity.

Through site visits and studio exercises, students will be exposed to a historic sense of place, social and physical relationships, and the cultural milieu. Students are especially expected to apply previous semester learning in History of Architecture, and combine them with design principles, in design exercises in this studio.

The design philosophy should support the architectural character of the built environment, and respond (but not necessarily mimic) to the historic context through appropriateness of use, built form, and choice of building material. Theory subjects studied and applied in the previous semester, and electrical and mechanical services studied up to fifth semester, are among the focus areas for the design problem. Students are also expected to apply costing and specification to building design.

### **Design Project:**

Design of a multi-storeyed multi-functional public building (Office complexes, Theatre complexes, Art galleries/Exhibition spaces, Memorials, Museums, Interpretation centres) in the urban setting in any historic context (either within or in close proximity to a locally significant land mark).

Projects could also involve adaptive reuse or addition / to an existing building (documentation) having significant architectural characteristic.

Students are introduced to urban development control; codes and bye laws; Special zoning guidelines related to heritage conservation; Exercises in articulation and manipulation of programmed needs, design methodology, criticism and evaluation of alternative concepts are to be performed

### **References:**

1. Cullen, G. (1961). The Concise townscape. London: Routledge/Architectural Press.
2. Giedion, S. (1956). Space, time and architecture: The growth of a new tradition. Cambridge [Mass.]: Harvard University Press.
3. Rossi, A., Ghirardo, D. Y., Ockman, J., Eisenman, P., Graham Foundation for Advanced Studies in the Fine Arts., & Institute for Architecture and Urban Studies. (1982). The architecture of the city. Cambridge, Mass: MIT Press.

4. Norberg-Schulz, C. (1988). Architecture: Meaning and Place - selected Essays. 1st American Ed. New York: Rizzoli International Publications.
5. Norberg-Schulz, C. (1996). Genius loci: Towards a phenomenology of architecture. New York: Rizzoli International Publications.
6. Steele, J. (2005). The Architecture of Rasem Badran: Narratives on people and place. London: Thames & Hudson.
- 7.

NO	Split-up of Continuous Assessment Marks	Percentage
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Jury</b>	
Maximum Marks	250
1. The institution shall conduct the jury evaluation at the end of the semester as per the manual.	
2. Two members of the faculty /architects appointed by the head of the institution shall conduct the jury evaluation as per the manual.	

### **AR 1502: Building Materials and Construction V**

SEMESTER - V	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1502	BS&AE	Gr I (b)	Building Materials and Construction V	4	4	100	100			200

**Course Objectives:** To develop understanding of surface finishes and circulating equipment in buildings. To familiarize the students with the design principles and considerations of advanced RCC structures. Need for building repair and maintenance, cause and effect of building deterioration and defects, and material, methods and techniques of maintenance, repair and restoration are covered in the course.

#### **MODULE I**

Surface finishes: protective and decorative coatings. Different materials and application (market surveys and reports)



## **MODULE II**

Circulating equipment in buildings; Elevators - planning considerations - number, size, arrangements. Types of elevators - electric, hydraulic passenger, hospitals, capsule, freight etc

Dump waiters, details of life shaft and other mechanisms, details and fittings for physically handicapped, escalators and conveyors. Parallel and criss-cross escalators, horizontal belt conveyors, horizontal moving walkways - concern for physically handicapped, mechanical safety systems and automatic controls.

## **MODULE III**

Advance RCC foundation, types such as strip foundation, combined footings, eccentric footing. Foundation system for floating column on cantilever beam. Types of raft foundations. General study of steel grillage foundation, machine foundation, cellular foundation, cassion foundations. Design principles and considerations for pile foundation, its types. Piles in timber, steel and r.c.c. Both precast and cast-in-situ, under rimmed piles, pile caps. Design principles and considerations of advanced r.c.c. Structures - such as grid / coffered slabs - various types - study of reinforcement detailing i) at crossing of beams ii) grid beams with peripheral beams and columns. Flat slabs, flat-plate slabs - all types. Lift slab method of construction.

## **MODULE IV**

Study of various defects in building - causes and remedies / precautions. Brief study about various non-destructive tests - concepts, purposes, such as rebound test, penetration test and pull out techniques, surface hardness test. Study of building structure rehabilitation. Principles / concepts, causes / reasons. Various methods such as grouting, jacketing - construction principles, techniques. Study of construction chemicals / admixtures, need, purpose, types. A general study - with emphasis on commonly used chemicals / admixtures, repair solutions. Water proofing aspect of building for different elements, avoiding dampness.

### **References:**

1. Guha, P. K. (2011). Maintenance And Repairs Of Buildings. Central Book Agency, New Delhi.

2. Chandler, I. (1992). Repair And Renovation Of Modern Buildings. Mcgraw-Hill.

3. Nayak, B. S. (2013). A Manual Of Maintenance Engineering. New Delhi: Khanna Publishers.

4. Mitchel.(1963) . Advanced Building Construction. B.T Bastford

5. V S Foster, Advanced Building Construction.

NO	Split-up of Continuous Assessment Marks	Percentage
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	4hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -40 Marks	2 Questions from each module ,10 Marks each, Answer any one full Question from each module.
PART C-20 Marks	2 Drawing questions from the syllabus, Answer any one full question

### AR 1503: History of Architecture V- Early modern

SEMESTER - V	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1503	PC	Gr II	History of Architecture V- Early Modern	3	3	50	100			150

**Course Objective:** To Understand about Industrial Revolution and its influence on the built form and settlement patterns, Colonial mercantile capitalism and spread of Western influences in India; Synthesis of architectural styles as modes of political accommodation. Also, students must be enabled to appreciate tangible and intangible aspects of heritage associated with history.

### Module I

## **Industrial Revolution and its impact (From 1800)**

Advent of Industrial Revolution, technological changes, The Social, economic and political changes effected, new requirements of the society, new materials and technological developments. Development of the railways and changes in settlement systems; Building of factory towns Rapid urbanization and urban crisis; Birth of modern town planning; Garden City, City Beautiful and other visionary movements; New building technologies and implications on architecture - usage of use of concrete, steel and glass; new Industrial Exhibitions. The Crystal Palace, London (AD 1850 -1854), the Eiffel Tower, Paris (AD 1889)

## **Module II.**

### **Art Nouveau (AD1890-1910), Arts and Crafts Movement**

Art Nouveau movement and Arts and Crafts Movement to Modern Architecture. London. Casa Mila, Casa Batlo, Sagrada Familia, Tassel House, Brussels, Paris Metro Station entrance, Red Roots of Art Noveau as protest movement against classical architecture, fluidity and plasticity, organic influences; works of Antonio Gaudi, Victor Horta, C.R.Makintosh.

## **Module III**

### **Colonial Architecture in India -Portuguese architecture (From AD 1500)**

Spread of European mercantile capitalism and development of early colonial architecture,  
Inflow of new cultural practices and construction technology,  
Stylistic transformations: Neo-classicism, Gothic Revival and Indo Saracenic.  
Portuguese architecture in India- Impact. Goa-Bom Jesus Cathedral Complex-Old Goa -Fountainahs.

## **Module IV**

### **Colonial Architecture in India-British (From AD -1800)**

The styles and trends of Architecture brought by British to India and their evolution. Examples from Mumbai- Victoria Terminal, Municipal Corporation of Greater Mumbai. Calcutta -Victoria memorial, Lutyens Delhi.

### **References:**

1. Brown, P. (1983). Indian Architecture (Islamic Period). Bombay: Taraporevala Sons and co.

2. Catherine, A. (2001). Architecture of Mughal India. Cambridge University Press.
3. Grover, S. (2002). Islamic Architecture in India. New Delhi: CBS Publications.
4. Hillenbrand, R. (1994). Islamic Architecture-Form, Function and Meaning. Edinburgh University Press.
5. Juneja, M. (Ed). (2001). Architecture in Medieval India: Forms, Contexts, Histories. New Delhi. Permanent Black.
6. Mitchell, G. (1978). Architecture of the Islamic World - its history and social meaning. London. Thames and Hudson.
7. Nath, R. (1985). History of Mughal Architecture Vols I to III. New Delhi: Abhinav Publications.
8. Tadgell, C. (1990). The History of Architecture in India. New Delhi: Penguin Books (India) Ltd.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### **AR 1504: Theory of Structures IV -RCC Structures**

<b>SEMESTER - V</b>	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1504	BS&AE	Gr II	Theory of Structures IV-RCC Structures	3	3	50	100			150

**Course Objectives:** To provide the students with the knowledge of the behaviour of reinforced concrete structural elements in flexure, shear, compression, tension and torsion and to enable them to design such elements under various loads. Understand design philosophies, Analyses and design beams, slabs, columns and footings.

### **Module I**

Design philosophy of Limit state method – Analysis and design of singly reinforced beams under flexure and shear by limit state method, Check for deflection, service ability. Design of Doubly reinforced beams under flexure and shear by limit state method. Design of T-Beams under flexure and shear by limit state method.

### **Module II**

Slabs – Classification. Design of One Way slab under flexure and shear. Design of Two way slab under flexure and shear with corners free to lift up and held down. Check for deflection.

### **Module III**

Design of short column subjected to axial loads. Column interaction curves. Design of column subjected to combined axial load and uniaxial bending by limit state method.[ Use SP 16 Charts]. Footings-Types of footings. Design of isolated footings- Square and Rectangular shapes only - Subjected to Axial compressive loads

### **Module IV**

Introduction to timber beam, Types of timber – Classification, allowable stresses-Design of beams flexure, shear, bearing and deflection considerations, Flitched timber beam- Types of Flitched Beam-Design of flitched timber beam

### **References:**

1. Park and Paulay. (1975) Reinforced Concrete. John Wiley & Sons.
2. Mallick S. K. and Gupta A. K.(1996) . Reinforced Concrete, Oxford and IBH.
3. Jain A. K.(2007) . Reinforced Concrete- Limit State Design, Standard Book House.

4. Jain and Jaikrishna (1952) . Plain and Reinforced Concrete Vol II, Nemchand
5. Sinha N. C. and Roy S. K.(2013) . Fundamentals of Reinforced Concrete, S. Chand and Company Ltd.
6. Purushothaman.(1984) . Behaviour, Analysis and Design of Reinforced Concrete Elements, Tata McGraw Hill.
- 7.Gambhir M. L.(2008) . Design of Reinforced Concrete Structures, Prentice Hall of India

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### **AR 1505: Computer Studio III**

<b>S<sup>#</sup></b>	<b>Cours</b>	<b>Cours</b>	<b>Group</b>	<b>Course title</b>	<b>Cr</b>	<b>Hr</b>	<b>Marks</b>	<b>Total</b>
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MESTER-V	e no	e code	code		edi ts	s / w	CA	W	J	P/V	
	AR 1505	SEC	Gr III	Computer Studio III	4	4	100			100	200

**Course Objectives:** To provide a broad awareness about the uses of softwares as an aid for architectural presentations. To enable the students to make working details, visual images of their design-Landscape designs, Interior design etc.

### Module I

Introduction to GIS and its usage in the field of Architecture and Planning.

### Module II

Working drawing details: Developing Key plans, General Arrangement Plans, Part plans, Roof Plan / Terrace Plan and the like. Excavation drawings, Foundation drawings, Canter-line drawings, Floor Plans, Sections, Elevations. Basic internal electrical and plumbing drawings.

### Module III

Design and Drafting exercise-Landscape design and drawing based on Site Planning and Landscape Architecture (AR 1407) Developing Site Plan, Site Marking Plan, Site Grading / Levelling Plan. Landscape construction drawings. Method of dimensioning, appropriate section line markings.

### Module IV

Design and Drafting exercise in interior design: Interior design plan and other detailing, views, colour themes, furniture etc. 2 D and 3 D drawings.

NO	Split-up of Continuous Assessment Marks	Percentage
1	Class works/Assignments/Projects/Computer practical exercises	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

**Practical/Viva voce**

Maximum Marks	100
<ol style="list-style-type: none"><li>1. The institution shall conduct the evaluation of the portfolio of class works/Assignments/Projects/Computer practical exercises (Print out in A3 Size) submitted by the students (60marks) and conduct a practical test Viva voce (40 marks) at the end of the semester.</li><li>2. Students shall submit the portfolio/reports etc consisting of the assignments done for the subject during the course period, as per the instructions from the head of the architectural institution/ department, latest before noon on the previous working day of the commencement of the practical evaluation/viva voce.</li><li>3. The practical test shall be of 2 hrs duration.</li><li>4. Two members of the faculty appointed by the head of the institution shall conduct the practical test, evaluation and Viva voce.</li></ol>	



SEMESTER - V	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1506	BS&AE	Gr II	Building services -II Electrical Design and Illumination	3	3	50	100			150

**Course Objective:** To provide the basic knowledge of electrical services and basic concept of illumination in Architectural design

### Module I

Introduction to electrical engineering. Generation and distribution of power, LT and HT lines. DC/AC System-electrical load and emergency power stand-by and alternate power supply system. Voltage, amperage, wattage. Three phase systems: Representation-star and delta connection, concept of balanced and unbalanced loads in three phase systems.

### Module II

Classification of voltages, electrical services in buildings, general aspects of design of electrical domestic installations, Electrical distribution in buildings. Sub stations, Transformer, Panel Board, MCB, MCCB, SFU, and ELCB.

### Module III

Electrical installation in commercial and high rise buildings, concept of rising mains. Principles of lighting in building, definitions and units, type of luminaries and fittings, design of illumination scheme in halls and auditoriums. Integration of services –Electrical power monitoring-IBMS systems

### Module IV

Electrical safety: Pipe and pale earthing, lighting protection in buildings, safety regulation in domestic, commercial and high rise buildings. Solar radiation fundamentals and their applications in buildings

### References:

1. Abnwo, F. and Others. Electrical Engineering Hand Book.
2. Bovay, H. E. (1981). Handbook of Mechanical & Electrical systems for Buildings. McGraw-Hill Higher Education.

3. Bureau of Indian Standards. (2005). Code of Practice for Electrical Wiring Installations IS-732.
4. Electrical Wiring & Contracting (Vol.1 to Vol.4).
6. Taylor, E. O. and Rao, V. V. L. (1971). Utilisation of Electric Energy in SI units. Bombay : Orient Longman.
- 7.K.B.Raina& S.K.Bkhattacharya .(2010) . 'Electrical Design ,Estimating and Costing' .New Age
8. Uppal . (2008) . Electrical wiring-Estimating and Costing . New Delhi ,Khanna Publishers
9. J.B.Gupta . (2013) .Electrical Installation –Estimation and Costing . S K Katraria and sons.
- 10.Dorota Chwieduk. (2014). Solar Energy in Buildings: Thermal Balance for Efficient Heating and Cooling . Elsevier Inc.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

## AR 1507: Architectural Acoustics

SEMESTER - V	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1507	BS&AE	Gr II	Architectural Acoustics	3	3	50	100			150

**Course Objectives:** Subject is dealt with the study of importance of acoustics in design for acoustically sound environment in both enclosed and open space. To familiarize the students with nature and propagation of sound. To understand the impact of sound on human beings in built as well as un built spaces and methods to control them. To understand prevailing standards, materials and methods related to the above and their application.

### Module - I

Origin and propagation of sound: the nature of sound. Propagation of sound. Properties of sound – velocity, frequency, wavelength of sound, sound pressure, sound intensity and loudness. Units for measuring sound. The human ear and hearing characteristics. Audibility. Noise and human behavior.

### Module - II

Behaviour of sound: room acoustics. Behaviour of sound in enclosures - sound reflection, diffusion and diffraction. Sound absorption and sound absorption coefficient. Reverberation and reverberation time. Calculation of reverberation time. Sabine's formula. Acoustical defects in the enclosed spaces.

### Module - III

Study of Noise, Sources of noise, Air borne and structure borne sound transmission. Noise criteria. Transformation loss, Permissible noise levels for different types of building .Noise control in specific buildings like Auditorium and lecture halls.

### Module - IV

Acoustical treatment of spaces: sound absorptive materials and construction – porous material, membrane absorbers, cavity resonators, space absorbers, variable absorbers – their absorptive characteristics. Mounting and distribution of absorptive materials. Acoustical design of different types of rooms such as auditoriums recording studios and lecture halls – acoustical corrections.

### References :

1 .Kinsler L.E and A. R Frey .(2000) Fundamental of Acoustics . 4/e, John Wiley & sons.

2. Knudsen V.O and C.M Harris . ( 1963) .Acoustical Designing in Architecture , Wiley .
3. Templeton D.(1997) . Acoustics in the Built Environment , 2/e Architectural Press .
4. Acentech and J.P Cowan .(2000) .Architectural Acoustics Design Guide , McGraw Hill .
5. Cavabaugh W.J., G.C. Tocci and J.A Wilkes . (2000) .Architectural Acoustics : Principles and Practice .John Wiley & sons .

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question each module.

**SEMESTER VI**

## AR 1601 Architectural Design VI -Functionally Complex Buildings

SEMESTER - VI	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1601	PC	Gr I (a)	Architectural Design VI - Functionally Complex Buildings	10	10	250		250		500

**Course Objective:** To expose the students to the challenges of designing functionally complicated buildings having a complex array of activities and services

To familiarize the students to the task of coordinating integration of structural design and specialized building services in the framework of architectural design.

To let the students understand advanced construction technology and newer building materials.

**Course Content:** The focus of the studio is on functionality and integration of advanced technology and services. The studio enables understanding the complex mechanisms of designing services intensive buildings in tight urban context, having multiple levels (above and/or underground). The special emphases are on utilitarian parameters, space optimization, conformance with regulatory requirements, integration of structural systems and building services (HVAC, fire, electrical, communication, plumbing etc.) in architectural layout and construction technology. The studio encourages the students to explore modern automation and intelligent systems for building management and energy conservation. They will learn about site planning and landscaping in tight spatial context, energy optimization and sustainable approaches in design.

**Studio Project:**

Emphasis on the design of services intensive, multi-storied, buildings in tight urban spatial context, such as buildings for health care, hospitality, residential (apartments), institutional or multifunctional commercial usage.

Design focuses on closed environment with emphasis on interior spaces, integration of various services, and conformance with regulatory norms. The external environment to take into consideration circulation of emergency vehicles and parking optimization. The design studio may be closely synchronized with working drawings including services.

## References:

1. Baiche, B., Neufert, E., & Neufert, P. (2011). Architects' data. New York, Oxford: Blackwell Science.
2. De, C. J. (2001). Time-saver standards for building types. New York: McGraw-Hill.
3. Gauzin-Müller, D., & Favet, N. (2002). Sustainable architecture and urbanism: Concepts, technologies, examples. Basel: Birkhäuser.
4. Huxtable, A. D. (1984). The tall building artistically reconsidered: the search for a skyscraper style. New York: Pantheon books.
5. Eisele, J., & Kloft, E. (2004). High-rise manual: Typology and design, construction and technology. Basel: Birkhauser-Publishers for Architecture.
6. Ebner, P. (2010). Typology +: Innovative residential architecture. Basel: Birkhäuser.
7. Parker, D., & Wood, A. (2013). The tall buildings reference book. London: Routledge.
8. Wood, A., & Salib, R. (2012). Natural Ventilation in High Rise Office Buildings. London: Rutledge.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Jury</b>	
Maximum Marks	250
Two examiners appointed by the university shall conduct the jury evaluation at the end of the semester as per the manual.	

## AR 1602 Building Materials and Construction VI

SEMESTER - VI	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1602	BS&AE	Gr. I (b)	Building Materials and Construction VI	4	4	100	100			200

**Course Objective:** To familiarize the students with the advanced building technologies.

### MODULE I

Space structures, introduction, definition, design and structural principles. Types of space structures, in different materials. Skeleton / grid structures - definition, design and structural principles. Various types / category / varieties - single layer / double layer - constructional and design aspects about flat grids, spatial grids, single and double curvature skeletons. Advantages, disadvantages.

### MODULE II

Pre stressing- introduction to pre stressed concrete. Need / reasons and principles of pre-stressing. Different methods and systems of pre stressing such as pre-tensioning, post-tensioning, chemical and thermal. Their application various types / methods of post tensioning such as freyssinet, magneblaton, gifford-udal, lee-mccall, ccl etc. Examples, advantages, disadvantages.

### MODULE III

Precast cement concrete construction / system: - introduction, definition. Need / reason for this system. A complete study (from foundation to roof) of various systems such as fully precast and composite and various types / subsystems under them - their design and structural principles, constructional and joinery techniques/concepts and details with examples. Precautions, advantages, disadvantage over cast-in-situ construction.



## MODULE IV

Temporary structures - utility / purpose - various functions. Introduction, design and structural principles, materials, construction and joinery techniques. Design, constructional aspects and detailing. Design and constructional drawing and details for problems on small temporary structures, by employing commonly

### References:

1. Hayder, A. R. (2014). Strengthening Design Of Reinforced Concrete With Frp. CRC press
2. Bureau Of Indian Standards. (1993).
3. Code Of Practice For Ductile Detailing Of RCC Structures Subjected To Seismic Forces.

NO	Split-up of Continuous Assessment Marks	Percentage
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	4hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -40 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question
PART C-20 Marks	2 Drawing questions from the syllabus, Answer any one full question

### AR 1603: History of Architecture VI- Modern & Post Modern.

SEMESTER - VI	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1603	PC	Gr II	History of Architecture VI- Modern & Post Modern	3	3	50	100			150

**Course Objectives:** To introduce the condition of modernity and bring out its impact in the realm of architecture. To study modern architecture as evolving from specific aspects of modernity: industrialization, urbanization, material development, modern art as well as society's reaction to them. To create an overall understanding of the architectural developments

#### Module I.

##### Modernism School of thoughts

Introduction to Modern Architecture- The principles and philosophy of modernism- in art, design and architecture, world view. Chicago School of Architecture, Contributions of Bauhaus School. Early Industrial buildings, De Stijl movement in Holland.

Masters of Modernism-Louis Sullivan, Walter Gropius, Ludwig Mies Van der Rohe, Le Corbusier. Works and Philosophies.

#### Module II

The principles and philosophy of Structuralism - in art, design and architecture- worldview.

Impressionism, Expressionism, Cubism, Neoclassicism, Neo Plasticism, Supermationism, Constructivism, Italian Futurism, Critical regionalism, Ecological architecture.

Works and Philosophies of Aldo Rossi, Kenzo Tange, Eric Mendelson, Eero Saarinen, Alvaro Siza, Louis Khan, Kisho Kurokawa, Philip Johnson, Sant'Elia, PL Nervi, Geoffrey Bawa, Hassan Fathy.

### **Module III**

#### **Post modernism**

**Innovations and ideas of Archigram-Peter Cook, Pavolo Soleri, Robert Venturi.**

The principles and philosophy of Postmodernism- in art, design and architecture, worldview, Mode of reasoning.

**Post-structuralism**, The principles and philosophy of Post-Structuralism, of art, design and architecture. Deconstruction.

Works and Philosophies of Charles Moore, Mario Botta, Renzo Piano, Frank Owen Gehry. Norman Foster, Richard Rogers, Zaha Hadid, Santiago Calatrava, Daniel Libeskind, Rem Koolhaas, Zaha Hadid.

### **Module IV**

#### **Post-independent Architecture in India**

Chandigarh and Bhuvaneshwar experiments - Influence of Corbusier, Louis Khan .The formation of Institutions - works and ideas: Nari Gandhi , B V Doshi , Kanvinde, Charls Correa, Raj Rewal, Allen Stein, Laurie Baker, Christopher Charls Beneger, Hafeez Contractor.

#### **References:**

1. Benevolo, L. (1977). History of Modern Architecture. 2 Vols., reprint, MIT Press.
2. Curtis, W. J. (1982). Modern Architecture since 1900. Phaidon Press.
3. Frampton, K. (1994). Modern Architecture: A Critical History. London : Thames & Hudson.
4. Jenks, C. (2007). The Story of Post-Modernism. London : Wiley and Sons.
5. Lang, J., Desai, M. and Desai, M. (2000). Architecture and independence : The search for identity - India 1880 to 1980. New Delhi : Oxford University Press.
6. Lang, J.T (2002). A Concise History of Modern Architecture in India. New Delhi, Permanent Black
7. Lu, D (Ed). (2011). Third World Modernism, Architecture, Development and Identity. Oxon Routledge.
8. Mehrotra, R. (2011). Architecture in India Since 1990. Pictor.
9. Metcalf, T. (1980). An imperial Vision. Electa : Faber & Faber.
10. Schulz, C. N. (1993). Meaning in Western Architecture. New York : Rizzoli International Publishers.
11. Singh, M. and Mukherjee. (2012) R. New Delhi- Making of a Capital. New Delhi : Roli Books.

12. Tafuri, M. (1980). Modern Architecture. Harry N. Abrams Inc.  
 13. Verma, P. (2010). Becoming Indian - The Unfinished Revolution of Culture and Identity. New Delhi : Penguin India.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### AR 1604 Theory of Structures V- Steel Structures

SEMESTER - VI	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1604	BS&AE	Gr II	Theory of Structures V- Steel Structures	3	3	50	100			150

**Course Objectives:** To provide the students with the knowledge of the behaviour of steel structural elements and to enable them to design such elements under various loads. Analyze and design steel structural elements.

#### Module I

Introduction to steel structures - Materials and specifications - Types and properties. Introduction to limit state design of steel structures. Connections: - Classification (Simple, Rigid, Semi rigid) Bolted connections

- Types of bolts - Bearing and High strength bolts. Welded connections - Structure and properties of weld metal.

### **Module II**

Tension member - types of cross section - types of failure - design of axially loaded tension member. Compression members- design of columns. Use IS 800

### **Module III**

Beams - types - classification of sections - design of beams. Plate girder, Gantry girder, Roof truss - design considerations only.

### **Module IV**

Industrial buildings - Layout - Structural framing - Braced and unbraced- Roof Systems - Industrial Floors (design not expected). Tubular structures - framed tube structures, bundled tube structures, braced tube structures, core structures, outrigger braced structures (theory only).

### **References:**

1. Gaylord. (1992) . Design of Steel Structures. New York, McGraw Hill.
2. Dayaratnam, P.(2012) . Design of Steel Structures . S Chand publishing.
3. Lothers .(1960) . Advanced Design in Steel, Prentice Hall, USA.
4. N. Subramanian. (2010) .Design of Steel Structures .Oxford University Press.
5. R.P. Johnson . (2004) .Composite Structures in Steel & Concrete, Blackwell Scientific Publications, UK.
6. Relevant IS codes

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	

PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

### **AR 1605 Society, Architecture and Environment**

SEMESTER - VI	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1605	OE	Gr II	Society, Architecture and Environment	3	3	50	100			150

**Course Objectives:** To understand the basic concepts of sociology and relate these concepts to architecture. To make the students aware the society, architecture and environment relationship.

#### **Module I**

Basic concepts of sociology-society, community-urban community, rural community, tribal community, difference between urban and rural

community, family, institutions, groups, associations, social system, and networked society. Relevance of study of sociology for architects.

### **Module II**

Social change, dynamics of social change-traditional society, transitional society and modern society. Social change and architecture. Culture, Cultural influence in architecture, Cultural anthropology. Social structure and spatial structure, Social problems-rural and urban. Social stratification-class and caste. Urbanism and urbanization. Urban safety and security, urban crime and disasters.

### **Module III**

Society, environment and architecture in Kerala. Settlement pattern of Kerala. Environmental conditions of Kerala-land, water, air. Architecture and nature, Environmental principles of Architectural design, Biophilia thesis,

### **Module IV**

Patterns and activity in time and space, the ecology of a neighborhood, park and playground, cross-cultural issues, social and psychological issues in the planning of new towns ,environmental perceptions and experience of environments, awareness and sensitivity to open spaces, environmental cognition.

### **References:**

1. Burnette, C. (1971). Architecture for human behaviour. Philadelphia Chapter : AIA.
2. Canter, D. and Lee, T. (1974). Psychology and the built environment. New York : Halstead Press.
3. Christopher, A. et al. (1977). A Pattern Language. New York : Oxford University Press.
4. Clovis, H. (1977). Behavioural Architecture. McGraw Hill.
5. Lynch, K. (1973). The image of a city. Cambridge : MIT.
6. Sanoff, H. (1991). Visual Research Methods in Design. New York : John Wiley & Sons.
7. Zeisel, J. (1984). Enquiry by design: Tools for Environment-Behaviour Research. Cambridge : Cambridge University Press.
8. Zeisel, J. and Eberhard, J. P. (2006). Inquiry by Design - Environment/Behaviour/Neuroscience in Architecture, Interiors, Landscape and Planning. New York : W. W. Norton & Company.
9. Vidya Bhushan .(2020) .‘An Introduction to Sociology’. Kitab mahal
10. K. Singh, ‘Principles of Sociology’
11. Dr.Valsyayan , ‘Urban Sociology’.

12.Dr.K.Kumar, 'Rural Sociology'.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

### **AR 1606 Building services -III Fire Safety, HVAC and Building Automation**

<b>SEMESTER - VI</b>	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1606	BS & A E	Gr II	Building services -III Fire Safety, HVAC and Building Automation	3	3	50	100			150



**Course Objective:** To provide the basic knowledge of heating, ventilation, air conditioning and fire protection in buildings,

### **Module I**

Fire Safety in Buildings Fire, causes of fire and spread of fire, fire fighting, protection & fire resistance, equipment & methods of fighting fire, Code of fire safety, fire regulations, fire insurance, combustibility of materials. Structural elements and fire resistance, planning and design of Fire escape routes and elements, wet risers, dry risers, sprinklers, smoke detectors, fire dampers, fire doors, water curtains, Design of fire hydrants etc. Bylaws related to fire safety in buildings. Project work-Drawing should be prepared showing all details of the system of building /part of building (to be combined with design project and computer studio)

### **Module II**

General introduction-objectives-Principles of heat transfer-Conduction-Convection-Radiation-Fourier Law of heat conduction-Thermal conductivity -Heat transfer coefficient -conduction through plain wall-Overall heat transfer coefficient -simple problems -insulation-Properties of insulation - Critical thickness of insulation. Simple problems in Critical layer of Insulation

### **Module III**

Air-conditioning: Definition-Comfort and industrial air conditioning, refrigeration cycle, Difference between heat pump and refrigerator. Refrigerants and their properties-Mixture refrigerants- Refrigeration systems components-Compressors-Condensers-Evaporators-Expansion devices-Cooling towers, Simple vapour absorption system. Solar energy for refrigeration, Introduction about non-conventional refrigeration system, Systems of air conditioning: Central plant, Room air conditioners- Unit, split, packaged system, all air system, Chilled water System, Ducting & air conditioning layout, fittings and fixtures.

### **Module IV**

Building Automation Concept and application of Automation Systems in buildings. Design issues related to building automation and its effect on functional efficiency. Components of building automation system integrating HVAC, electrical, lighting, security, fire-fighting, communication etc. Current trend and innovation in building automation



S T E R - V I	AR 1607	BS & AE	Gr III	Building Science Lab	ts 4	4	100			V 10 0	200

**Course Objectives:** To familiarize the students with building science, related parameters and its application in buildings. To understand various equipment and their principles for determination of functional efficiency of buildings. To understand prevailing ISO Standards related to the above parameters.

### Module I

Measurement of Air temperature (indoor and outdoor), Relative Humidity (indoor and outdoor) Mean Radiant Temperature (MRT), Air movement indoors, Wind velocity outdoors, Solar radiation, Surface Temperature and Thermal insulation of materials.

### Module II

Study of relationship between MRT and Solar Radiation, Study of comfort parameters and comfort indices, Evaluation of thermal comfort using Architectural Evaluation System Measurement of illumination indoors-natural and artificial, Study of sun path and shading devices.

### Module III

Measurement of sound indoor and outdoor. Determination of acoustical properties of materials. (Sample martial collection)

### Module IV

Non Destructive tests for Concrete –Measurement of compressive strength of concrete using Rebound Hammer, Determination of cavities in concrete using Ultra Sound Method, Locating reinforcement bars embedded in concrete using Rebar Locator.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

**Practical/Viva voce**

Maximum Marks

100

1. The institution shall conduct the evaluation of the assignments/Practical records/sample material collection and conduct Viva voce at the end of the semester.
2. Students shall submit the portfolio/reports etc consisting of the assignments done for the subject during the course period, as per the instructions from the head of the architectural institution/ department, latest before noon on the previous working day of the commencement of the practical evaluation/viva voce.
3. Two members of the faculty appointed by the head of the institution shall conduct the practical test, evaluation and Viva voce.

## SEMESTER VII

### AR 1701 Architectural Design VII - Campus Planning

SEMESTER	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/	

T E R - V I I	AR	PC	Gr I (a)	Architectural	10	10	250		250	V	500
	170			Design VII- Campus Planning							
	1										

**Course Objectives:** Students shall be familiarized with campus planning principles through the design of a campus environment, incorporating sustainable design principles, detailed site analysis, and site suitability. Students shall develop zoning and site plans that incorporate function, climatic response, structural systems, materials, universal design, services, etc. They shall be made aware of applicable building rules, including National Building Code of India, universal design standards, or other regulations such as Cinemas Regulation Act, CRZ, etc. Students shall also be familiarized with concepts of Indian Green building standards such as IGBC, GRIHA, ECOHOUSING, and other relevant rating systems.

Further, students shall understand planning principles and appropriate landscaping strategies suited to site topography. They shall apply these leanings to the design detail of Assembly Buildings, emphasizing on angle of vision, raking design, acoustics, etc.

Students shall learn to apply sustainable campus design principles that account for climate, building envelope, site preservation, HVAC, green materials, renewable energy, natural lighting, fresh air ventilation, fire protection, efficient landscape, etc. There shall be a focus on sustainable building techniques incorporated in campus design, such as usage of renewable energy, rain water harvesting, passive cooling techniques, use of low embodied energy materials, water and waste management, etc.

**Course Outcome:**

Upon completing the studio, students shall have an understanding of campus planning principles, the importance of site planning, and built-open space relationships. They shall understand aesthetics of 3-dimensional composition of built form, and learn sustainable approaches

in campus planning through efficient utilization of energy, water and materials.

**Studio Project:** Developing a master plan layout of an urban or rural campus, and design of the various built and un-built spaces that constitute the campus. The project shall entail architectural design and detailing of at least two major built components (of maximum built-up area 4000 sq. m), open space design, and details.

Principles that govern campus planning shall include open space design and detail, hierarchy of built and un-built spaces, detailing of pathways and road network, and suitable response to site topography.

**References:**

1. Richard P Dober (1992), Campus Design. John Wiley & Sons.
2. Richard P Dober (1996), Campus Architecture: Building in the Groves of Academe. McGraw-Hill Education.
3. Richard P Dober (2000), Campus Landscape. Wiley.
4. Achyut Kanvinde, & James Miler, H. (1969), Campus Planning in India. Topeka, Kan.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Jury</b>	
Maximum Marks	250
1.The institution shall conduct the jury evaluation at the end of the semester as per manual  2.Two members of the faculty /architects appointed by the head of the institution shall conduct the jury evaluation as per the manual.	

## AR 1702 Estimation, Costing and Specification

SEMESTER - VII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1702	OE	Gr II	Estimation, Costing and Specification	3	3	50	100			150

**Course Objective:** This course is intended to impart students with the necessary technical knowledge for preparation of Specifications and calculating estimates and detailed costing for small to medium scale projects.

### Module I

Introduction to Quantity estimation, costing and specifications related to building projects. Definition of estimating and costing, Purpose of estimation and costing, Procedure of estimating or method of estimating, data required preparing an estimate (Drawings / specification / rates), completing estimate structure.

Measurement of materials and works: Introduction to measurement of various construction work items, importance and significance in construction projects i.e. Units of measurement, rules for measurement, Methods of taking out quantities- Long wall and short wall method, centre line method, partly centre line, cross wall method. Standard modes of measurement as per Indian Standards for various work items.

### Module II

Types of estimates Preliminary/Approximate Quantity Estimates: Importance & purpose of Preliminary / Approximate estimates, Plinth area method, Cubical contents method and centre line method and their preparation. Types of approximate estimates, basic differences and advantages. Detailed Quantity Estimation: Types of detailed estimates and their application, Methods of deriving detailed quantities for various construction work items. Preparation of Detailed estimate, Work items as per construction stages: Foundations, Superstructure, Finishing works in a



simple building. Description & significance of Items in Bill-of-Quantities (BOQ).

### **Module III**

Costing Introduction, meaning, purpose, methods of estimating cost of construction for various work items, cost indices, rates of labour and material, analysis of rates, preparation of abstract of estimated cost, use of CPWD, PWD, BIS schedule of rates. Deriving construction cost as per BOQ.

### **Module IV**

Specifications: Introduction, Definition, importance and purpose of specifications, impact on costing. Principles and practices. Types of specifications. Knowledge of manufacturers' specifications for construction materials/products. Specification of common building materials including carriage & stacking of materials. Specifications for a simple building. Standard specifications of BIS. General abbreviations used in specifications. Specification of new building materials.

Note: Exercise to write down the detailed estimate to find out the quantity of various items of work of different types of structures-tiled roof, load bearing and structures.

### **References:**

1. Birdie, G. S. (2005). Text Book of Estimating and Costing. Dhanpat Rai Publishing. Chakraborty, M. Estimating, Costing, Specification & Valuation
2. C.P.W.D. Standard Schedule of Rates.
3. Dutta, B. N. (1998). Estimating and Costing in Civil Engineering. 24th Ed. CBS Publishers Distributors Ltd.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100

<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

### **AR 1703: Human Settlements-History and Planning**

SEMESTER - VII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1703	PAEC	Gr II	Human Settlements- History and Planning	3	3	50	100			150

**Course Objectives:** The Study aims at Understanding terminologies and key definitions. Connecting History with stages of Evolution of Settlement and learning's from the past which offered cities which were process driven, demand driven and evolved out of necessity. This Continues with contribution of Various Masters and Pioneers in the field of Urban Planning and various tools of reading the city. Also aims to understand the different types of planning followed in India after the independence.

#### **Module I**

Origin & evolution of human settlements - Relevance of study of evolution of human settlements - Human settlements as an expression of civilization - Town planning in ancient- Mesopotamia, Egypt, Indus Valley, Greece, Rome, Medieval, Renaissance and industrial and Post industrial period

#### **Module II**

Contributions of Ebenezer Howard, Le Corbusier, Clarence Stein, Patrick Geddes, C .A. Doxiadis. Impacts of urbanization on cities- urban environmental problems, land use, traffic and road network. Urban land use - CBD, urban nodes, fringe area and suburb.

#### **Module III**

Town Planning in India after independence. Various types of plans- Master plan, structure plan, Comprehensive plan, Subject plan, Zonal Development plan, their scope and content, Planning process- Master

plans, Development plans ,Town planning schemes. Neighbourhood planning - Area planning - Regional planning - The planning components/ elements like land use, zoning, floor area ratio, land development techniques, surveys for planning.

### **Module IV**

Urban Development Authorities, its setup and functions, Land Acquisition Act, 74th Amendment, Coastal Regulation Zone Act, SEZ, JNNURM IUDP, Megacity, Sustainable City Programme - their context, concept, scope, content and funding mechanism. Smart Cities.

**References:**

1. A.P. Gallion/ Simon Eisner/ Stanley Eisner (1993). Urban Pattern; John Wiley & Sons
2. AEJ Morris (1994). History of Urban Form before industrial revolution; Longman
3. Peter Hall (2010). Urban & Regional Planning; Routledge.
4. C. L. Doxiadis, Ekistics (1968). An Introduction to the Science of Human Settlements; London: Hutchinson
5. Paul D Spreiregen (2016). Urban design, the Architecture of Towns and Cities; McGraw-Hill Inc.
6. Government of India, 'Report of the National Commission on Urbanization', 1988.
7. Ministry of Urban Affairs and Employment, Government of India, New Delhi, 'Urban Development Plans: Formulation & Implementation' - Guidelines - 1996.
8. Hansen N. (1996), Regional Policy and Regional Integration; UK: Edward Elgar.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

### **AR 1704: Design Aspects of Earthquake Resistant Structure**

SEMESTER - VII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1704	PC	Gr II	Design Aspects of Earthquake Resistant Structure	3	3	50	100			150

**Course Objectives:** To give an introduction to the design concepts of seismic resistant structures To equip the students to understand Earthquake resistant design of RCC structures Numerical design examples are not intended.

#### **Module 1**

Elementary Seismology-Causes of earthquakes Seismic waves-magnitude, intensity. Earthquake hazard map of India. Seismic design philosophy-Stiffness, strength, ductility, damping, centre of mass, centre of rigidity, torsion. Earth quake effects on ground-liquefaction, land slides.

Seismic planning : Plan Configurations - Torsion Irregularities - Vertical Discontinuities - Irregularity in strength and stiffness - Mass Irregularities - Vertical Geometric Irregularity - Proximity of Adjacent Buildings.

#### **Module 2**

Codal design provisions : Review of the latest Indian seismic code IS:1893 - 2016 (Part-I) provisions for buildings - Earthquake design philosophy

Analysis by seismic coefficient and response spectrum methods, Dynamic time history analysis.

### Module 3

Ductility considerations in Earthquake resistant design of RCC buildings. Impact of ductility, Requirement of ductility. Assessment of ductility, Factors affecting ductility. Reinforcement detailing -beams, columns, beam column joints, openings- IS code explanation-IS 1893,IS 13920.

### Module 4

Vulnerability assessment and retrofitting- Seismic vulnerability assessment of RC building and masonry buildings. Retrofitting of RC and masonry buildings. Earthquake effects on non structural elements-Failure mechanisms-Prevention of non-structural damages

### References:

1. Agarwal, Shrikhande (2006), Earthquake resistant design of Structures; Prentice Hall
2. T. Paulay and M.J.N. Priestley (2013). Seismic design of reinforced concrete and masonry building; Wiley India Pvt Ltd.
3. F. Naeim (2001), The Seismic Design in handbook; Kluwer Academic Publishers.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

4.

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

### AR 1705 a: Research Methodology

SEMESTER - VII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1705 a	OE	Gr II	Research Methodology	3	3	50	100			150

**Course Objectives:** To introduce research concepts to students enabling them to identify research questions and formulate hypothesis. To inculcate ethical practice in research, report writing and publishing and publishing.

#### Module I

Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method - Understanding the language of research - Concept, Construct, Definition, Variable. Research Process

#### Module II

Problem Identification & Formulation – Research Question – Investigation Question – Measurement Issues – Hypothesis – Qualities of a good Hypothesis, Hypothesis Testing.

Research Design: Concept and Importance in Research – Features of a good research design – Qualitative and Quantitative Research: Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches.

### **Module III**

Concept of measurement- what is measured? Problems in measurement in research – Validity and Reliability. Sampling: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response. Characteristics of a good sample. Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample – Practical considerations in sampling and sample size.

Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages)

### **Module IV**

Interpretation of Data and Paper Writing – Layout of a Research Paper. Ethical issues related to publishing, Plagiarism and Self-Plagiarism. Writing of reports, structure of report.

### **References**

1. Alan Bryman & Emma Bell (2007). Business Research Methods; Oxford University Press.
2. C.R. Kothari (1985). Research Methodology.
3. Day R. A. (1991), How to Write and Publish a Scientific Paper; Cambridge University Press.
4. Dawson, Catherine. (2002), Practical Research Methods; New Delhi: UBS
5. Publishers' Distributors
6. Groat L. and Wang D. (2002), Architectural research methods; John Wiley & Sons Ltd
7. Knight A and Ruddock L. (2008). Advanced research methods in the built
8. Environment; Wiley Blackwell publishers
9. Kothari, C.R. (1985), Research Methodology- Methods and Techniques, New Delhi,
10. Wiley Eastern Limited.
11. Kumar, Ranjit. (2005). Research Methodology-A Step-by-Step Guide for
12. Beginners; (2nd.ed.), Singapore, Pearson Education.

13. Lucas R. (2016), Research methods for Architecture; Lawrence King Publishing.
14. Sanoff H. (2016), Visual research methods in design, New York: Routledge Publications
15. Select references from the Internet

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

1.

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

### AR 1705 b: Disaster Preparedness and Management

SEMESTER - VII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1705 b	OE	Gr II	Disaster Preparedness and Management	3	3	50	100			150

**Course Objective:** To become familiar with definitions and term used with the disciplines of disaster preparedness and emergency management. To understand planning, mitigation, in- crisis decision making, evacuation, response, and recovery within the leadership during an event



## **Module I**

Hazard, Disaster, Risk, Vulnerability, Disaster- an overview; Disaster- the Indian perspective; Type of disasters and its understanding.

## **Module II**

Natural hazards and Disasters- Earthquake, cyclone, floods, droughts, landslides, lightning, - Causes, Hazardous effects, mitigation measures. Man induced hazards & disasters:-Soil erosion- Causes, conservation measures; nuclear explosion- environmental problems, corrective measures; fire mitigation measures; terrorism.

## **Module III**

Preparedness and mitigation- Preparing hazard zonation maps, Predictability/forecasting & warning, Community preparedness, retrofitting, Population reduction in vulnerable areas, Awareness, Capacity building.

## **Module IV**

Disaster Management, Community health and causality management, Disaster Management- role of various agencies; Relief measures; Post disaster- Recovery, Reconstruction and Rehabilitation. Remote-sensing and GIS applications in real time disaster monitoring.

## **References**

1. GOEL.S.L. (2006), Encyclopaedia of Disaster Management; Deep and Deep Publications.
2. Government of India, (2004), Disaster Management in India- A status report, Ministry of Home Affair (Disaster Management Division), New Delhi.
3. Zebrowski, Ernet Jr. (1997) - Perils of a Results Planet: Scientific Perspectives on Natural Disasters; Cambridge University Press, Cambridge.
4. Guha-Sapir D., Hargitt D. and Hoyois P. (2004) Thirty years of Natural Disasters; 1974-2003, The Numbers; UCL Presses, De Louvain.

5. Ministry of Home Affairs (MHA), (2004)- National Programme for Capacity Building of Architects in Earthquake Risk Management(NCPCBAERM), National Disaster Management Division (Government of India), New Delhi.
6. Hewitt, K. (1983), Interpretation of a Calamity; Harper Collins Publisher Ltd.
7. Erik Auf Der Heide (1989) - Disaster Response: Principles of Preparation and coordination; C.V. Mosby, Baltimore.
8. Amarnath Chakrabarthi, Devdas Menon, Amlan Sengupta (2008). Handbook on Seismic retrofit of buildings; Narosa Pub House.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### **AR 1705c: Architectural Photography & Journalism**

<b>SEMESTER - VIII</b>	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1705c	OE	Gr II	Architectural Photography & Journalism	3	3	50	100			150

**Course Objectives:** This course covers topics on photography in relation to Architecture & Journalism. The other objective of the course is to make students aware about importance of visually analyzing the architecture and its interpretation through journalism.

### **Module I**

General introduction to the art of photography: Development of photography, Historical background, Different types of cameras, properties and priorities. Photography Techniques-Digital photography with DSLR, concept of colour; concepts of lighting, distance, visual angle, frames; media. Exposure, Aperture, Speed; Printing techniques. Photography -methodologies of critical observation and writing brief report Module II

Introduction to architectural journalism, Brief history, Definition of journalism. Analysis of recent historical and contemporary examples of written and journalistic criticism of architecture, including selected writings by Indian and overseas critics; discursive techniques, analysis of major critical themes, thematic categories in architectural writing over the past three centuries.

### **Module III**

Works of Indian and international writers and critics will be presented and discussed. Indian architectural writers, journalists and critics. Exercise on integrating photography in architectural journalism.

### **Module IV**

Project report writings-based on kinds of architectural journalism – for national news papers, Television, films, architectural journals, interviews and biographies, thematic.

### **References:**

1. Paul Markow (1998). Professional Secrets of Advertising Photography; Amherst Media .
2. Eastman Kodak Company (1979), Encyclopedia of practical photography; Amphoto.
3. Julian Calder, John Garrett (1999). The New 35mm Photographer's Handbook: Everything You Need to Get the Most Out of Your Camer; Three Rivers Press.
4. Julie Adair King (2012). Digital Photography for Dummies; John Wiley & Sons.
5. <https://www.re-thinkingthefuture.com/career-advice/a2801-a-brief-history-of-architecturaljournalism/#:~:text=Architectural%20Journalism%20is%20a%20medium,and%20now%20in%20digital%20format.>
6. Adrian Schulz (2015). Architectural Photography: Composition, Capture, and Digital image Processing Reilly Publications.

7. Anthony White, Yokio Fukazawa, Vance Bibliographies; University of California, Digitized 2009.
8. MIT University Architecture Journals.
9. The Journal of Architectural Historians.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

1.

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### **AR 1705 d: Environmental Impact Assessment**

<b>SE</b>	Cours	Cours	Group	Course title	Cr	Hr	Marks	Total
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MESTER - VII	e no	e code	code		edi	s /	CA	W	J	P/	
	AR	OE	Gr II	Environmental	ts	w				V	150
	1705			Impact	3	3	50	10			
	d			Assessment				0			

**Course Objective:** Introduce tools and techniques of EIA and its application; Ensure that environmental factors are considered as a part of decision making process; to identify possible adverse impacts so as to avoid or mitigate them.

### Module I

Introduction: Definition, concepts, need & relevance of Environmental Impact assessment in decision-making process; Evolution of EIA and its importance in global, Indian and local context; Principles of EIA; Classification of EIA projects.

### Module II

Process and Methodologies: Measurement of environmental impact, Process of EIA in India & Abroad; Importance of scoping & screening in EIA process; Role of public participation at various levels of decision making; Methodologies, checklists, matrices, network & social cost-benefit analysis, habitat evaluation systems, comprehensive study of various project types, impact calculation & ways of mitigate.

### Module III

Environmental audit and management: Definitions & concepts of audits, GHG Emissions, energy foot print, carbon foot print, partial audits, compliance audits, methodologies & regulations. Assessment techniques: PRA techniques, definition & concepts, objectives, techniques, advantages & limitations; SEA, evolution need and relevance, scope and tasks.

### Module IV

EIA in India. EIA regulations in India, initiatives, environmental appraisal procedure, problems associated with relocation, resettlement, refugees & environmental justice, future strategies. Study of an environmental appraisal report and EIA statement of any two projects of national importance.

### References:

1. Glasson, J. R. and Chadwik, A. (2012). *Introduction to Environmental Impact assessment*; Routledge Publications.
2. Kulkarni, V. and Ramachandra, T. V. (2006). *Environmental Management*; The Energy and Resources Institute.
3. Richard, K. M. (2002). *Environmental impact assessment, a methodological perspective*; Boston: Kluwer Academic Publishers.
4. Thorpe, A. (2007). *The Designer's Atlas of Sustainability*; Washington DC: Island Press.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

## AR 1706 a: Sustainable Architecture

SEMESTER - VII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1706 a	PE	Gr II	Sustainable Architecture	3	3	50	100			150

**Course Objectives:** To understand the concept of sustainability and sustainable development To understand the various issues like climate change, ecological footprint etc  
To understand low impact construction practices, life cycle of buildings and alternative energy resources.

### Module I

Concept of sustainability-Carrying capacity, Sustainable development, Bruntland report. Definitions of Sustainability - Various types of sustainability - Pillars of Sustainability - Circle of Sustainability - Need for Sustainability - systems and their sustainability -History and development of sustainability - Early man lifestyles - Present day - Scale and context of sustainability - Principles of sustainability. Political Sustainability, economic sustainability, cultural sustainability, social sustainability, building sustainability. Co-relationship between all.

### Module II

Sustainability in the built environment context, Buildings and energy consumption- Carbon footprint and eco footprints of buildings - Climate Change, Global warming - National and International policies and Regulations on sustainability. Difference between Green and Sustainability, Current Issues and Solutions of sustainability.

### Module III

Vernacular architecture and its relevance. Eco architecture-Low impact constructions, Selection of materials, Bio mimicry, Life cycle analysis, Embodied energy, Renewable and non-renewable energy. Reduce, Reuse, Recycle (3R).

Applications in the built environment- Concepts of green buildings, climate responsive building - Reduction of energy consumption, direct and indirect methods - Reduction of water consumption, direct and indirect methods

### **Module IV**

New concepts and trends in green buildings, national and international. Rating systems-LEED, GRIHA, BREEM etc. Urban Ecology, Urban heat island effects, Sustainable communities.

#### **References:**

1. Margaret Robertson (2014). Sustainability Principles and Practice; Routledge.
2. Martin A. A. Abraham (2005). Sustainability Science and Engineering: Defining Principles; Elsevier Science.
3. Tony Clayton, Nicholas J. Radcliffe, Anthony M. H. Clayton (1996). Sustainability: A Systems Approach; Routledge.
4. Stephen M. Stephen, Stephen M. Wheeler (2012). Climate Change and Social Ecology: A New Perspective on the Climate Challenge; Routledge.
5. Gursharan Singh Kainth (2011). Climate Change, Sustainable Development and India; LAP Lambert Academic Publishing.
6. Dominique Gauzin – Muller (2012). Sustainable Architecture and Urbanism: Concepts, Technologies and examples; Birkhauser.
7. Slessor, Eco-Tech (1997). Sustainable Architecture and High Technology; Thames and Hudson.
8. Ken Yeang. Ecodesign (2006). A manual for Ecological Design; Wiley Academy.
9. Arian Mostaedi (2002). Sustainable Architecture: Low tech houses; CarlesBroto.
10. Sandra F.Mendler&Willian Odell (2000). HOK Guidebook to Sustainable Design; John Willey and sons.
11. Richard Hyder (2007). Environmental brief: Pathways for green design; Taylor and Francis.
12. Brenda Vale and Robert Vale (1996). Green Architecture: Design for a sustainable future; Thames and Hudson.
13. Fuller Moore. Environmental control systems Heating, Cooling, Lighting; McGraw Hill, New York.
14. Caring A. Langston, Grace K.C. Ding, Sustainable practices in built environment; second edition, Butterworth- Heinmann Linacre House Jordanhill Oxford.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10



Total	100
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University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### AR 1706 b: Vernacular Architecture

SEMESTER - VII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1706 b	PE	Gr II	Vernacular Architecture	3	3	50	100			150

**Course Objectives:** To provide theoretical knowledge base on the uniqueness of Indian traditional architectural principles, the meaning of space, its manifestation of energy, the selection of site etc. The other objective is to instil sensitivity towards the less explored field that is concerned with Architectural building traditions/practices that are cost effective, ecologically sensible and culturally relevant. Students acquire a working vocabulary that can help them describe vernacular architecture in meaningful ways. The course introduces grass root principles of indigenous architecture that has evolved over time in response to environment, climate, culture, economy and basic human needs. The course covers variations in built forms and their environmental performance across different climatic and geographical regions of India and cases studies of adaptations of vernacular architecture in contemporary buildings.

#### Module I

Introduction to Vernacular Architecture, definitions and theories, Categories, Contextual responsiveness: Climatic, Geographical, Anthropological and Cultural influences. Environment and Materials Typical building materials, Built form & elements, Construction techniques & environmental performance.

#### Module II.

Regional Variations in Built Form: Tribal Architecture Settlement Pattern, Dwelling Typology, Symbolism, Typical features, Construction materials and techniques. Kerala, Madhya Pradesh, Odisha (Kondha and Santals) and Northeast (Naga and Khasi tribes), Tamil Nadu – Toda Huts.

### **Module III**

Regional Variations in Built Form: Traditional Architecture and Settlement Pattern, Dwelling Typology, Symbolism, Typical features, Construction materials and techniques.

Southern Region: Kerala – Nalukettu, Houses of Nair & Namboothri's, Koothambalam, Tarawads, Kerala Muslim houses (Mappilah houses), Chettinad Houses (Chettiars). Karnataka – Gutthu houses (land owning community), Kodava ancestral home (Aynmane), Andhra Pradesh –Rural Kaccha houses. Western Region: Rajasthan- Rural Jat /Bhunga houses and Havelis. Gujarat- Deserts of Kutch, Pol houses of Ahmedabad, Wooden Havelis. Goa – Traditional Goan houses. (Portugese influence) Northern and Eastern Region: Kashmir – Typical Kutcha houses, Dhoongas (Boathouses), Ladakhi houses, bridges. Himachal Pradesh – Kinnaur houses, Punjab – Rural Houses, Bengal –Rural house form- AatChala houses, Thakur Bari (Mansions), Odisha – Rural houses of coastal areas.

### **Module IV**

Need for documentation and study of vernacular and historic buildings. Selection and techniques of documentation. Vernacular towns.

Adaptations in Contemporary Architecture- Sustainable building materials and construction techniques, Works of Laurie Baker, Hasan Fathy, Anil Laul, Gerard Da Cunha, Building Centres- Auroville, Anangpur.

### **References:**

1. Brunskill, R. W. (1987). Illustrated Handbook of Vernacular Architecture; Castle Rock: Faber & Faber.
2. Carmen, K. (1986). VISTARA – The Architecture of India. The Festival of India Publications.
3. Cooper and Dawson (1998). Traditional buildings of India. London: Thames & Hudson.
4. Jain, K. and Jain, M. (1992). Mud Architecture of the Indian Desert. Ahmadabad: Aadi Centre.
5. Kenneth, F. (1983). Towards a Critical Regionalism: Six points for an architecture of resistance, In The Anti-Aesthetic: Essays on Postmodern Culture. (Ed.) Hal, F. Seattle: Bay Press.
6. Muthiah, S., Meyappan, M., Ramswamy, V. and Muthuraman, V. (2000). The Chettiar Heritage. Chennai: Chettiar Heritage.
7. Oliver, P. (1997). Encyclopedia of Vernacular Architecture of the World; Cambridge: Cambridge University Press.
8. Pramari, V. S. (1989). Haveli-Wooden Houses and Mansions of Gujarat; Ahmadabad: Mapin Publishing.

9. Rapoport, A. (1969). House, Form & Culture. Eaglewood; Prentice Hall Inc.
10. Tillotsum, G. H. R. (1989). The tradition of Indian Architecture: Continuity, Controversy and Change since 1850. Delhi: Oxford University Press.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### AR 1706 c: Futuristic Architecture

SEMESTER - VII	Course no	COA course code	CUSAT group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1706 c	PE	Gr II	Futuristic Architecture	3	3	50	100			150

**Course Objective:** This course covers topics on future trends of architecture and its practice.

#### Module I

Futurism and Futuristic Architecture. Future concepts envisioned by earlier theorists and architects like Antonio Saint Elia and F.L. Wright and others. Emerging architectural paradigms such as programme generated architecture, dynamic architectural systems, virtuality, Trans architecture, data driven structures and 'global' approach through the study of relevant projects

#### Module II

Evolution of contemporary architectural concepts-historical revival, bio mimicry, adaptive reuse and low cost buildings. Futuristic building materials: Buildings; Building tectonics and systems .Dynamic Architecture, Rotating Tower Dubai.

### Module III

Study of specific building types-houses, Smart homes, office spaces, public buildings, skyscrapers and transportation hubs through various projects

### Module IV

Sustainable buildings including energy efficiency, Zero Energy and Energy Plus buildings and resource conservation

### References:

1. Bell .J, 21st Century House; Laurence King Publishing
2. Bell, Victoria Ballard, Materials for Architectural Design; Laurence King Publishing
3. Jodidio. P, Building a New Milleneum; Vol.1, Taschen
4. Jodidio. P, Architecture Now;.Vol. 2, Taschen
5. <https://www.nef.com.tr/en/blog/what-is-futurism-and-futuristic-architecture-groundbreaking-structures-around-the-world#:~:text=One%20of%20the%20main%20properties,and%20domes%20in%20the%20structures.>
6. John M. Johansen, Nano architecture: A New Species of Architecture; Princeton Architectural Press.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

1.

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### **AR: 1706 d: Architectural Conservation**

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1706 d	PE	Gr II	Architectural Conservation	3	3	50	100			150

**Course Objective:** To equip students to deal with Architectural conservation, along with the related design issues of existing Architecture, old Monuments, and natural and urban heritage areas.

#### **Module I**

Introduction to conservation of Historic Buildings. Definition, Need, Objectives and scope of Architectural conservation. Historic development of conservation movement. Contributions of John Ruskin, William Morris. Concepts and approach's to conservation in India and other countries. Definitions: Cultural Heritage, Natural Heritage, Built Heritage, Ancient Monument.

#### **Module II**

Institutional Aspects of Conservation, Conservation related Charters- Venice charter (1964), Burra charter (1979) World Heritage legislation and Sites, Conservation Acts & Legislation, Archaeological Acts. Agencies involved in conservation-ICCROM, ICOMOS, ASI, State department of Archaeology, Town planning department, State Art and Heritage Commission, INTACH.

### **Module III**

Conservation Area practice, adaptive reuse, up gradation programs in old areas, infill design. Conservation of traditional buildings. Causes of decay in materials and structure –Climatic causes-Thermal movements, rain, frost snow, moisture, and wind. Botanical, biological and microbiological causes-Animals, birds, insects, fungi, moulds, lichens. Natural disasters-Fire, earthquakes, flood, lightning. Manmade causes- wars, pollution, vibration, vandalism and neglect. Upgrading infrastructure, financing and implementation framework for redevelopment and revitalization projects.

### **Module IV**

Techniques of conservation-Preparatory procedures-Identification of 'values' in the object, monument or site- emotional, cultural and use values. Inventories, Initial inspections, Documentations, Research analysis and recording(Reports).Seven degrees of intervention-Prevention of deterioration, Preservation, Consolidation, Restoration, Rehabilitation, Reproduction, Reconstruction.

### **References:**

1. James Strike, Architecture in Conservation: Managing Development at Historic Sites.
2. Shanti Lal Nagar, Protection, Conservation and Preservation of Indian Monuments.
3. Jukka Jokilehto (1999), History of Architectural Conservation.
4. Bernard M. Feilden (2003), Conservation of Historic Buildings; Architectural Press.
5. ICCOMOS (1993), Earthen Architecture: The Conservation of brick and earth structures; A Handbook.
6. Paul Beckmann (2012), Structural Aspects of Building Conservation; Elsevier Butterworth-Heinemann.
7. Donald Appleyard (1979), The Conservation of European Cities; M.I.T. Press, Massachusetts.
8. James M. Fitch (1990), Historic Preservation: Curatorial Management of the Built World; University Press of Virginia; Reprint edition.
9. Robert E. Stipe (2003), A Richer Heritage: Historic Preservation in the Twenty-First Century; Univ. of North Carolina press.
10. Bernard Fielden (1989). Conservation Manual; INTACH Publication.

11. A.G. K. Menon ed. (1988), Conservation of Immovable Sites; INTACH Publication, N.Delhi.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module ,15 Marks each, Answer any one full Question from each module.

### AR 1707: Dissertation.

SEMESTER - VII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1707	PAEC	Gr III	Dissertation	5	5	150			100	250

### Course Objectives:

To research on a theoretical topic, this may be relevant to Architecture and allied subjects. Present the findings in report form and technical paper.

### Introduction

Preparation of an Architectural Dissertation including reference to an extensive study of architectural examples and precedents in the selected field of study. This can be a related study for the final thesis next

semester. Each student is expected to submit one or more synopsis for finalization of his/her topic. After finalization of topic by set of faculty members, the student shall be allotted one faculty member under whose guidance he/she has to carry out his/her dissertation.

**Stage I-Dissertation Plan**

Aims, Objectives, Hypothesis, Methodology, Scope & limitations. Brief literature review.

**Stage II- Mid-Term Review**

Detailed literature review, Case studies, Data collection & analysis. Revised dissertation plan.

**Stage III-Final Stage**

Final presentation of dissertation after incorporating suggestions of jury. Draft report.

(Submission of Final report shall be duly referenced in standard format)

**References:**

1. Raman Meenakshi and Sharma Sangeeta, “=Technical Communications – Principles and Practices; Oxford University Press, New Delhi.
2. Kate L.Tourabian, A manual for Writers of Research Papers,=; Theses and Dissertation, 8th edition.
3. Joseph Gibaldi, MLA handbook for Writers of Research Papers.
4. Iain Borden and Katerina Ruedi Ray (2014), The Dissertation –A Guide for Architecture Students; Routledge, Special Indian Edition.
5. Anderson, J. and Poole, M. (1998). *Thesis and assignment writing*. Brisbane; John Wiley.
6. Borden, I. and Ray, K. R. (2006). *The dissertation: an architecture student's handbook*; 2nd Ed. Oxford: Architectural Press.
7. Fink, A. (1998). *Conducting research literature reviews: from paper to the Internet*. Thousand Oaks: Sage.
8. Murray, R. (2005). *Writing for academic journals*. Berkshire:Maidenhead; Open University Press.
9. Henry Sanoff (1991), Visual Research Methods in Architecture; Van Nostrand Reinhold,New York.
10. Linda Groat, David Wang (2013), Architectural Research Methods; Wiley & Sons.

NO	Split-up Continuous Assessment Marks	Percentage
1	Stage I	40



2	Stage II	50
3	Stage III	60
	Total	150

<b>Viva Voce</b>	
Maximum Marks	100
<p>1. The institution shall conduct the evaluation of the dissertation at the end of the semester as per the manual. (refer manual)</p> <p>2. Students shall submit the portfolio/reports etc consisting of the project done for the subject during the course period, as per the instructions from the head of the architectural institution/ department, latest before noon on the previous working day of the commencement of the practical evaluation/viva voce</p>	

## SEMESTER VIII

### AR1801: Architectural Design VIII - Urban Design

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1801	PC	Gr I (a)	Architectural Design VIII - Urban Design	10	10	250		250	500	

**Course Objectives:** To expose the students to the complexities of large-scale architectural interventions, with multiple stakeholders, in specific urban settings. To let students harmonize and contextualize the

architectural design with the immediate built environment, and the larger urban fabric

To sensitize the students about the interface between public and private domain

### **Course outline:**

The studio shall enable students to apply lessons learnt during urban design theory sessions. The students are expected to carry out site analysis and site planning at a real life location, while considering its location context, physical features, views, orientation, volumetric analysis of built form, figure-ground study of built-form characteristics, visual imagery, street-scape and skyline analysis, pedestrian and vehicular circulation patterns, and utility networks.

Students must try to understand the correlation between physical, socio-cultural, environmental, and socio-economic dimensions of the built environment, so as to identify opportunities and constraints associated with large-scale urban interventions. Students are encouraged to look beyond the concerns of individual building projects, and to address the interface between public and private realm, while contextualizing their design intervention to the surrounding urban environs.

Students must then apply this understanding to a realistic site, and create a physical environment using the basic tools of master planning, such as movement networks, open spaces, suggestive built forms, infrastructure networks, and planning norms.

### **Studio project:**

The design exercise could be any medium- to large-scale project in the public domain, situated within an existing (and preferably compact) urban fabric. Suggestive exercises include redevelopment of commercial areas, waterfront development, transit-hubs, market squares, densification along transit corridors, or mixed-use complexes.

### **References:**

1. Carmona, M. (2021). *Public Places Urban Spaces: The Dimensions of Urban Design*. Milton: Routledge.

2. Lang, J. T. (2017). *Urban Design: A Typology of Procedures and Products*. New York: Routledge.
3. Larice, M., & Macdonald, E. (2006). *The urban design reader*. New York: Routledge.

<b>NO</b>	<b>Split-up of Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/Projects	70
2	Tests(Minimum 2)	20
3	Attendance	10
	Total	100

<b>Jury</b>	
Maximum Marks	250
Two examiners appointed by the university shall conduct the jury evaluation at the end of the semester as per the manual.	

### **AR 1802: Professional Practice**

<b>SEMESTER</b>	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1802	PAEC	Gr II	Professional Practice	3	3	50	100			150

VIII												
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**Course Objective:** The study of this subject is to enable the student to acquaint with the various responsibilities of an architect and understand the technicality of the profession.

### **Module I**

Nature of profession, difference between trade, business and profession, taking instructions from the client, its interpretation, design process and its stages. Role of professional society, Professional code of conduct, Ethical ways of getting architectural commission, Importance of conduct of architectural competitions, architectural copy right. Responsibilities and Liabilities of an architect towards the client. Scale and basis of fees. Professional charges of various jobs. Stages of architectural design and the specific task in each of such stage. Profession of Architect in Kerala and India. Different organization across globe (RIBA, AIA etc)

### **Module II**

Architects Act 1972, its effects on profession and education. Architects Office management, Organization and Administration, Office Set up, Correspondence, filing, preparation of drawing, standardization and documentation. System approach for pre-construction stage, Professional partnership, various options, advantages. Partnership deal, responsibilities and liabilities of partners. Provisions of Professional Tax, Service Tax, Income Tax rules. Procedures to work in Kerala and outside Kerala. Various Licenses needed for architects in Kerala. Procedures to follow.

### **Module III**

Tender, types of tender, tender document, tender notice, procedure for opening and selection of tender, analysis bids, comparative statement, report to owner, work order. Contract, type of contract, contract document. Detailed knowledge of various condition of contract as published by Indian Institute of Architects with special reference to responsibilities and liabilities of architect, contractor and the client. Architect and employer under the contract-Clerk of works, Engineer in charge, Resident engineer, -Nominated sub-contractor-consultants-liquidated damages, Variation and extra prime cost and provisional sum-determination of contract, certificate of payments. KMBR & KPBR sanction drawings and submission procedures to be done , different hierarchy and Sections to be followed in submission of drawings in Kerala .

### **Module IV**

Arbitration, arbitration Proceeding and award, provision of fire insurance policy, architects responsibility towards fire loss assessment and claim report. Easements rights, acquisition of such rights, remedies for interference and loss of easement, Dilapidation, procedure for preparing report and schedule of dilapidation, settlement of such claims.

Supervision-Quality control, Daily report system, visual recording, site records. Profession-Options on cantering the profession-short comings while running own office -Duties and responsibilities of the principal architect-Secure clientage-Discipline of the office. RERA , its importance in current real estate of Kerala and India

General information and introduction to various acts and laws such as urban land ceiling Act. Building bye-laws, Sale deed procedure, ownership documents.

**Reference Books:**

1. Roshan Namavati, Professional Practice with Elements of estimating Valuation Contract and Arbitration; Lakhani Book Depot, Mumbai.
2. Roshan Namavati, Theory and Practice of Valuation; Lakhani Book Depot, Mumbai.
3. Ashok Nain (1997), Professional Valuation Practice; Tata Mc Graw Hill.
4. V.N. Vazirani, S.P. Chandola (2011), Construction Management & Accounts, Khanna publishers, Delhi.
5. Ar. V. S. Apte, Architectural Practice and Procedure.
6. COA Handbook of Professional Documents.
7. Architectural Practice in India by Prof. Madhav Deobhakta and Ar. Meera
8. Deobhakta (1996), Architects Reference manual IIA Kerala Chapter.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

## AR 1803: Housing

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1803	PC	Gr II	Housing	3	3	50	100			150

**Course Objectives:** To equip students to deal with housing, along with the related issues of existing Housing stock and its future requirement. To introduce the students into the field of housing-to make them understand its significance in the context of both global and national scenario, and thereby to make them sensitive to the critical social and economic issues related to housing especially in developing countries like India and Kerala in particular, with emphasis on the analytical study of relevant housing initiatives.

### Module I

Introduction to housing & human settlements, Nature and magnitude of housing problem in India-Housing shortages as a result of population explosion .Urbanization and poverty issues in the Indian context. Study of Slums as a consequence of rapid urbanization and industrialization, and its impact on the urban housing scenario in India and abroad.

Housing policies and programs, settlements in the development of human civilization, role of Housing in social and economic development of the nation. Housing in five year plans & Social Housing plans. National housing Policy, Major elements of housing policy: land, finance, material, technology & legislation.

### Module II

Study of principles of housing standards: Housing for all classes, Housing cost. Financing the housing for the economically weaker section of the population, working class. Housing for special groups such as single or aged persons. Different methods for providing housing such as housing Co-operatives, Employees housing etc., their applicability to the different parts of the country; their prospects and problems. Slum area development, Slum improvements. Examples of the some of the major Slum clearance and Slum Improvement Schemes successfully carried out

in India. Slums - growth, arresting growth of slums, measures adopted to control growth and development of slums.

### **Module III**

Mass housing programs. Housing design and standards. Rural Housing. Units of housing design form and structure of housing as shaped by socio economic and physical parameters, housing systems & sub systems. Partial and integrated environment quality; post occupancy evaluation, housing Satisfaction, housing demand and policy analysis.

House in rural areas, study of houses in different climatic zones in India. Efficiency of rural houses at different climatic zones, Roof insulation, ventilation, Damp and Moisture prevention, Planning and Circulation, sanitation, Health and Hygiene.

### **Module IV**

Important earlier Housing Schemes in India for various categories like HIG, MIG, LIG, EWS etc . Concept of Aided Self Help-Housing the poor through the NGO's and through mass involvement of the beneficiaries on the basis of illustrative case studies of relevant and innovative housing schemes or projects in India and Kerala in particular. Housing Finance, Sources of Housing Finance and its essential characteristics. Major Housing Finance agencies at the National and State level like the NHB, HDFC, LICHL, GIC, UTI, Commercial Banks Etc. Role of the informal housing finance system as a major source of housing finance for the urban and rural poor.

### **References:**

1. Bennett L. Hecht, Developing Affordable Housing: A Practical Guide for Non-profit Organizations; Wiley Non-profit Law, Finance and Management Series.
2. Thomas Sowell (2009), The Housing Boom and Bust.
3. Sam Davis (1995), The Architecture of Affordable Housing
4. Barbara Miller Lane (2009), Housing and Dwelling: Perspectives on Modern Domestic Architecture.
5. Barbara Miller Lane (2006), Housing and Dwelling: Perspectives on Modern Domestic Architecture.
6. K. Thomas Poulse, Innovative Approaches to Housing for the poor.
7. Dr. Misra and Dr.B.S. Bhooshan, Habitat Asia.
8. Dr. Misra and Dr.B.S. Bhooshan, Habitat India.
9. Arthur Gallion, Urban Pattern.
10. Five Year Plans, Government of India Publications.
11. Abrams, Charles (1964), Housing in the Modern World; Faber, London
12. Allen, W.A., Happold, E., Word, A.M., & Courtney (Ed.) (1992), A Global strategy for Housing in the third millennium; E & FN Spon, London.



<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

## AR 1804: Urban Design

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1804	PC	Gr II	Urban Design	3	3	50	100			150

### Course Objectives:

Help students to formulate an understanding of the urban forms and spaces. To understand the fundamental concepts and theories of urban design and apply them in their design projects. To understand the contemporary needs of the society and the role of spaces will be dealt along with the need for design development and control. To study the contribution done by Masters and Pioneers in the field of Urban Design

### Module I

Introduction to Urban Design, its scope and relevance. Evolution of urban design as a discipline - Need for urban design -different realms attached to urban design- Elements of urban design (Streets , Buildings, public Space, transport and Landscape) and Elements and Principles of Urban forms (Grain, Texture, Tissue, Skyline, Massing etc). Comparison between Architect, Urban Designer and Urban Planner.

### Module II

Urban design theories , key personalities and their contribution to urban design -Gordon Cullen ,Kevin Lynch, Leon Krier, Rob Krier, Christopher Alexander Jane Jacobs. Concepts and theories of William H. White; place making concepts of Jan Gehl (case study: Copenhagen).

### Module III

Understanding various theories in Urban Design, through examples like New Urbanism, Transit oriented Development, Pedestrianisation, Malls and Plazas, River Front and Lake front Developments.

Reading of Urban Fabric through various representation techniques and methods, parameters and attributes for urban analysis.

### **Module IV**

Urban renewal, scope need and procedure-Urban conservation and economic considerations-Urban design projects in various scales; National, metropolitan city and project levels, case studies-Road form and hierarchy-Road patterns

Conducting an urban design survey, Analysis of data, Formulating urban design guidelines

### **References:**

1. Gordon Cullen. The Concise townscape; The Architectural press.
2. Kevin Lynch, Image of the city.
3. Cliff Moughtin, Urban design - Ornament and decoration; Bath Press.
4. Cliff Moughtin, Urban design - street and square; Bath Press.
5. Paul Zucker, Town and square.
6. Arthur B Gallion, The urban pattern; CBS publishers
7. Raymond J Curran, Architecture and the urban experience; Van Nostrand Reinhold Company.
8. Christopher Alexander, Pattern language.
9. Christopher Alexander, The timeless way of building.
10. David Gosling, Concepts of Urban design; Academy editions.
11. Spiro Kostof, City shaped, Bulfinch Press.
12. D. Speriregon, Architecture of town and cities; The MIT press
13. Johnathan Barnet, An introduction to urban design; Harper& Row Publishers
14. Amos Rapoport, Human Aspect of Urban Form.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60

2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

## AR 1805: Project Management

SEMESTER-VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1805	PAEC	Gr II	Project Management	3	3	50	100			150

**Course Objective:** To equip students with a practical approach to implement building projects, basic knowledge about construction industry, project management techniques needed for managing and coordinating building projects in a professional manner.

### Module I

Introduction to project management, construction industry, stakeholders, roles, responsibilities and functional relationships, Construction projects – objectives and lifecycle, existing construction practices & project management systems, Project Team, organization, roles, responsibilities. Concepts of project planning, scheduling & controlling. Project scale and construction technology, human aspects in managing projects.

### Module II

Project Planning and Scheduling Inputs for project planning, defining activities and their interdependency, time and resource estimation. Work breakdown structures. Linear Scheduling methods - bar charts, LOB, their limitations. Principles, definitions of network based scheduling methods:

CPM, PERT. Network representation, Network analysis – forward and backward passes.

Project Monitoring and Control Site layout and organization, Site investigations. Quality tests for construction material and processes. Quality control inspections. Project progress tracking. Crashing Project Schedules, its impact on time, cost and quality. Project direct and indirect costs. Safety in Construction Projects.

### **Module III**

Resources Management and Value Engineering Methods of material/resource estimation and management, Resources scheduling and levelling. Labour welfare, applicable labour Legislations. Construction equipment types, characteristics & applications. Value engineering, its application in building design and construction.

### **Module IV**

Contracts and Tenders Types of building contracts, their merits and demerits. Types of building tenders, contents of tender documents, tendering process. General conditions of contract, security deposits, interim certificates, defect liability periods, retention amounts, mobilization money and virtual completion.

### **References:**

1. Callahan, M. T., Quackenbush, D. G., & Rowings, J. E. (1992). Construction Project Scheduling; McGraw-Hill.
2. Chitkara, K. K. (2004). Construction Project Management: Planning, Scheduling and Controlling; Tata McGraw-Hill Education.
3. O'Brien, J. J., and Plotnick, F. L. (2009). CPM in Construction Management; McGraw-Hill Professional.
4. Punmia, B. C., and Khandelwal, K. K. (2006). Project planning and control with PERT and CPM; New Delhi: Laxmi Publications.
5. Wiest, J. D., and Levy, F. K. (1982). A Management Guide to PERT/CPM; New Delhi: Prentice Hall of India.
6. Callaghan, M.T, Quackenbush, D.G and Rowings.J.E, Construction Project Scheduling; McGraw Hill (1992)
7. Rebert B Harris (1978), Precedence and Arrow Network Techniques for Construction; John Wiley and Sons 1978
8. Steven James D (1989). Techniques of Construction Network Scheduling; McGraw Hill Inc.
9. Bhattacharjee S.K (2004), Fundamentals of PERT/ CPM and Project Management; Hanna Publishers.
10. N.P Vohra (2009), Quantitative Techniques in Management; McGraw Hill Edu, India.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### AR 1806 a: Product Design

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1806 a	PE	Gr II	Product Design	3	3	50	100			150

**Course Objectives:** To give students basic understanding about Product and Industrial design process. · The emphasis of the course is on group product design projects.

#### Module I

Introduction: Definition of product design, History of Product Design -design by evolution & design by innovation, essential factors, morphology of design, primary design phases and flow charting. Understanding of Product Design - Purpose of Product Design – Role of Product Designers.

#### Module II

Product Strategies & Analysis- Standardization, industrial design organization, role of aesthetics in product design, functional design practice, strength, stiffeners and rigidity considerations in product design.

Aspects of Product Design: Visual, Auditory, Tactual, Olfactory human mechanisms, Physical space and arrangement. Visual display, process of seeing, visual discrimination, quantitative and qualitative visual display, Alphanumeric and related displays, Visual codes and symbols.

### **Module III**

Product Design: Form, Colour, Symbols, User specific criteria, Material, Technology and recyclability, Packaging. Multiple Utility oriented approach to Product Design.

Review of Production Processes: Primary, machining & non-traditional machining processes, manufacturing requirements in design of machine components, design for forging, pressed components, casting & machining, designing with plastics, rubber, ceramics & wood

### **Module IV**

Design of Household elements, tools and devices. Design of furniture, Design of Industrial Products. Element design for the physically and mentally disabled people.

Economic Factor and Anthropometrics Effecting Design: Product value, design for safety, reliability and environmental considerations, economic analysis, human considerations in product design, anthropometry.

Product Development (Assignment) : Product development from concept to product designing for function, production, handling, use and maintenance -Selection of the projects is based on the possibility of user interaction leading to innovation. Projects end with a comprehensive presentation through working/mock up models, design drawing and a report.

### **References:**

1. Chitale & Gupta (2005), Product Design & Manufacturing, PHI; 3rd edition, ISBN-10: 8120326369.
2. Ulrich & Eppinger (2005), Product Design And Development; T M H, ISBN-10: 007229647X.
3. N. F. M. Roozenburg, J. Eekels (2008), Product Design, Fundamentals and Methods; Willey Publications.
4. M. Baxter, Product Design (1995), Practical Methods for the Systematic Development of New Products; Chapman & Hall.
5. P. H. Hill (1970), The Science of Engineering Design; Holt, Rinehart and Winston, N.Y.
6. Time Saver Standards for Interior Design.
7. Andrew Alpern (1982), Handbook of Speciality Elements in Architecture; McGrawhill Co., USA.

8. Francis D.K.Ching (1987), Interior Design Illustrated; VNR Publications, New York.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### AR 1806 b: Behavioural Architecture

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1806 b	PE	Gr II	Behavioural Architecture	3	3	50	100			150

**Course Objectives:** To study the relationship between environment and behaviour and its relevance to architectural design. To impart knowledge about this relatively new field, born out of the synthesis between architecture and behavioural psychology. Understanding of the multiplicity of living patterns, activities, geometric patterns in space and designing for the same. Knowledge about the behavioural design process, techniques and design contexts.

### Module I



Introduction: Definition of terms: environment, behaviour, Environmental Behaviour Studies; Origins; Principles; Relevance; Scope; Focus areas  
Difference from other branches of psychology, Designing for pattern and activities, Archetypal activities/Archetypal spaces: planning of public spaces with reference to age groups and activities.

### **Module II**

Environment and Response-Individual (environmental perception, spatial cognition, comfort, anthropometrics); Social (proxemics, territoriality, crowding, privacy); Environmental cues and behaviour. Building Systems-Room use, geometry & meaning, hidden behavioural assumptions, adjacencies, vertical bypass& horizontal bypass, various stages in the design of building subsystems.  
Building - Behavioural Interface- Geometry of spaces, their meaning & connotations, Social organization of buildings, Behavioural assumptions in the planning of new towns and neighbourhoods, borrowed space.

### **Module III**

Behavioural Design-Process organization chart, affinity matrices, pictograms: behavioural design process model, design context, activity/adjacency relationship, evaluation chart, Area use frequency program, simultaneous use, community utilization map, occupancy load profile, defensible space, EDRA etc.

### **Module IV**

Urban Environment-Patterns of activity in time and space, the ecology of a neighbourhood park and playground, cross-cultural issues, social & psychological issues in the planning of new towns, environmental perceptions and migration, awareness and sensitivity to open spaces, environmental cognition.

### **References:**

1. Burnette, C. (1971). *Architecture for human behaviour*; Philadelphia Chapter: AIA.
2. Canter, D. and Lee, T. (1974). *Psychology and the built environment*; New York: Halstead Press.
3. Christopher, A. et al. (1977). *A Pattern Language*; New York: Oxford University Press.
4. Clovis, H. (1977). *Behavioural Architecture*; McGraw Hill.
5. Lynch, K. (1973). *The image of a city*; Cambridge: MIT.
6. Sanoff, H. (1991). *Visual Research Methods in Design*; New York: John Wiley & Sons.
7. Zeisel, J. (1984). *Enquiry by design: Tools for Environment-Behaviour Research*; Cambridge University Press.

8. Zeisel, J. and Eberhard, J. P. (2006). *Inquiry by Design, Environment/Behaviour/Neuroscience in Architecture, Interiors, Landscape and Planning*; New York: W. W. Norton & Company.
9. Canter, D. V., & Lee, T. (1974). *Psychology and the built environment*; Architectural Press.
10. Gifford, R. (2013). *Environmental psychology: Principles and practices*; (5th ed.). Optimal Books.
11. Groat, L. N., & Wang, D. (2013). *Architectural research methods*; John Wiley & Sons.
12. Hall, E. T. (1966). *The hidden dimension* (Vol. 609). Garden City; NY: Doubleday.
13. Kopec, D. (2012). *Environmental psychology for design*; (2nd Ed.). New York, NY: Fairchild Books.
14. Lawson, B. (2007). *Language of space*; Routledge.
15. Rapoport, A. (1990). *The meaning of the built environment: A nonverbal communication approach*; University of Arizona Press.
16. Zeisel, J. (1984). *Inquiry by design: Tools for environment-behaviour research*.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

### AR 1806 c: Contemporary Process in Architecture

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs /w	Marks				Total
							CA	W	J	P/V	
	AR 1806 c	PE	Gr II	Contemporary Process in Architecture	3	3	50	100			150

**Course Objectives:** To educate students on the philosophies/ideologies of various individuals of the 19th and 20th century leading to the ideation and realization of differential built environments and to explore the relationship between thought process and realization

### **Module I**

Introduction to philosophical thought, understanding philosophy in the context of the individual, society, economic and political environment. Relationships between individual and collective philosophy and ideation.

### **Module II**

Directions of turn of the century architects-Eric Mendelsohn, Peter Behrens, Gerrit Rietveld, Hans Scharoun, Antonio Gaudi and others  
Modern western and architectural philosophy in the 20th century in Europe and the United States Frank Lloyd Wright, Walter Gropius, le Corbusier, Mies van der Rohe, Alvar Aalto, Buckminster Fuller and others

### **Module III**

Asian thinkers of the 20th century-Geoffrey Bawa, Kenzo Tange, Kisho Kurokawa, Toyo Ito and others  
Contemporary Indian architectural thinking of the last five decades -Indian masters including Joseph Allen Stein, Laurie Baker, Balakrishna Doshi, Charles Correa, Achyut Kanvinde and others.

### **Module IV**

Contemporary international practices, the digital age, creative thinkers- among them Frank Gehry, Zaha Hadid, Tadao Ando, Shigeru Ban, Norman Foster, Santiago Calatrava, Herzog and de Meuron, Fantasia and visionary architecture and their proponents. Neo Liberalism/Neo capitalism and architecture .Blob Architecture, Dynamic architecture, Neo futurism, Tropical modernism, Sustainable Architecture.

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### **References:**

1. Juhani Pallasmaa (2011), The Embodied Image: Imagination and Imagery in Architecture; John Wiley & Sons.
2. Gaston Bachelard (2013), The Poetic of Space; Beacon Press.
3. Charles Correa (2010), A Place in the Shade; Penguin India.
4. Jyotsna Prakashan (2015), Laurie Baker: Truth in Architecture; Atul Deulgaonkar Publisher.
5. William J R Curtis (2015), Le Corbusier: Idea and Forms; Phaidon Press.



C T E R - VIII	AR	PE	Gr II	Smart/Intelligent Building	3	3	50	10			15
	1806 d							0			0

**Course Objective:** The course provides a detailed exposure to students in the new and emerging field of Smart/Intelligent Buildings.

### Module I

Introduction to smart/ intelligent buildings, Smart buildings: definition and services, Integration System, Interfacing: System ,BAS Building Automation System, Types of smart building services- Energy consumption & management Energy efficiency, Security, Convenience & comfort, Safety, Assisted living, Communications, Entertainment, Lifestyle support.

### Module II

Characteristics of smart home: Communications network, intelligent controls, to manage the system, Sensors for information, Smart features. Key requirement for smart buildings: Key infrastructure required Smart home network, Interoperability, Reliability, Security.

### Module III

Building Management systems (BMS) - need, advantages, functions. Reducing energy costs through BMS, Integrated Building Management system, intelligent car parking Management, fire detection and Alarm systems.

### Module IV

CC TV based Surveillance Systems. Security, Access control and biometrics. Burglar Alarm and Intrusion Prevention System. Intelligent Lifts and Escalators. HVAC control systems, Water control, Energy saving devices ,Harnessing Solar Energy.

### References:

1. Er.V.K.Jain (2016), Automation Systems in Smart Green Buildings; Khanna Publishers.
2. Maurice Eyke (1988), Building Automation Systems-A practical Guide to Selection and Implementation; Oxford, BSP Professional.
3. Mike Constant & Peter Tunbull (1994), The Principles and Practice of Closed Circuit Television; Paramount Publishing.
4. Atkins B. (2007), Intelligent Building; Springer.
5. Atkins B. (2009), Total Facilities Management; Springer.
6. Carlson R. A. and Giandomenico R. A. (2010), Understand Building Automation System; Amazon.

7. Merz H. (2012), Building Automation; Springer.
8. Wang S. (2009), Intelligent Building and Building Automation; Taylor & Francis, (4th Ed.).
9. [http://europa.eu/legislation\\_summaries](http://europa.eu/legislation_summaries)
10. [http://ec.europa.eu/information\\_society/activities/sustainable](http://ec.europa.eu/information_society/activities/sustainable)
11. [http://en.wikipedia.org/wiki/Smart\\_building](http://en.wikipedia.org/wiki/Smart_building)
12. <http://www.dvgbc.org/event/bright-green-buildings>

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

**AR 1807 a: Energy Efficient Architecture**

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1807a	PE	Gr II	Energy Efficient Architecture	3	3	50	100			150

**Course Objectives:** To inform about the need to use alternative sources of energy in view of the depleting resources. To create awareness of future trends in the design of sustainable built environment. To inform about the importance of day lighting and natural ventilation in building design. To provide familiarity with simple and passive design considerations. and climate change.

### Module I

Passive design: Significance of energy efficiency in the contemporary context. Simple passive design considerations involving site conditions, building orientation, plan form and building envelope. Heat transfer and thermal performance of walls and roofs.

### Module II

Passive heating: Direct gain. Thermal storage of wall and roof. Roof radiation trap. Solarium. Isolated gain. Passive cooling: Evaporative cooling. Nocturnal radiation cooling. Passive desiccant cooling. Induced ventilation. Earth sheltering. Wind tower. Earth air tunnels. Day lighting and Natural Ventilation.

Daylight factor. Day light analysis. Daylight and shading devices. Types of ventilation. Ventilation and building design.

### Module III

Contemporary and future trends, Areas for innovation in improving energy efficiency such as photo voltaic cells, battery technology, thermal energy storage, recycled and reusable building materials, nanotechnology, smart materials, energy conservation building code. Smart technologies

### Module IV

Introduction to Biophilic Design: Biophilia and Biophilic design. Principles and benefits of biophilic design. Energy effectiveness of biophilic architecture. Biophilic buildings connect people with nature-Patterns of biophilic design.

### References:

1. 'Manual on Solar Passive Architecture', IIT Mumbai and Mines New Delhi, 1999.

2. Arvind Krishnan et al (2001), Climate Responsive Architecture A Design Handbook for Energy Efficient Buildings; Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Majumdar M (2000), Energy-efficient Building in India; TERI Press.
4. Givoni .B (1994), Passive and Low Energy Cooling of Buildings; Van Nostrand Reinhold, New York.
5. Fuller Moore (1993), Environmental Control Systems; McGraw Hill Inc, New Delhi.
6. Sophia and Stefan Behling (1996), Sol power The Evolution of Solar Architecture; Prestel, New York.
7. Patrick Waterfield (2011), The Energy Efficient Home: A Complete Guide; Crowood press Ltd.
8. Dean Hawkes (2002), Energy Efficient Buildings: Architecture, Engineering and Environment; W.W. Norton & Company.
9. David Johnson and Scott Gibson (2008), Green from the Ground Up: Sustainable, Healthy and Energy Efficient Home Construction; Taunton Press.
10. Frederick Law Olmsted, 14 Patterns of biophilic design: Improving health & well-being in the built environment; Terrapin.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.



## AR 1807 b: Advanced Building technology

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1807 b	PE	Gr II	Advanced Building Technology	3	3	50	100			150

**Course Objective:** To familiarize the students with the advanced building technologies and structural systems

### Module I

Structures in Architecture, Loads on structures. Different types and characteristics.

Introduction to Limit state method and practicing design of structural elements slabs, beams, columns and foundations.

### Module II

Industrial Structures in Steel. Multi Storied / Tall Structures / Towers. Examples and case studies.

### Module III

Large Span Construction-flat slabs-shell structures, folded plates, portal frames space frame & trusses, tensile structures. Examples and case studies.

### Module IV

Pre-fabricated construction & Pre-engineered building. New Material in Construction. Cold form sections, FRP. Earth Quake resistant construction practices and design. Behaviour of structures during earthquakes. Retrofitting of buildings.

### References:

1. Agarwal, P. and Shrikhande, M. (2010). *Earthquake Resistant Design of Structures*; PHI Learning Pvt Ltd.
2. Bureau of Indian Standards. (1993). *Code of practice for ductile detailing of RC structures subjected to Seismic forces*. IS: 13920.
3. Bureau of Indian Standards. (2002). *Criteria for Earthquake Resistant Design of*
4. *Structures - General Provisions and Buildings*. IS: 1893 (Part 1). Bureau of Indian Standards. (2002). *Repair and Seismic strengthening of buildings -*
5. *Guidelines*. IS: 13935. Day, R. W. (2002). *Geotechnical Earthquakes Engineering Hand Book*; New Delhi: Tata McGraw-Hill.
6. Hayder, A. R. (2014). *Strengthening Design of Reinforced Concrete with FRP*; CRC Press.
7. Kumar, K. (2009). *Basic Geotechnical Earthquake Engineering*; New Delhi : New Age International Publications.
8. Okamoto, S. *Introduction to Earthquake Engineering*. University of Tokyo Press.
9. The Associated Cement Companies Ltd. *Guidelines for Earthquake Resistant Non Engineered Construction*.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

<b>University Examination</b>	
Duration of Examination	3hrs
Maximum Marks	100
<b>Question Paper Pattern</b>	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

## AR 1807 c: Smart Cities

SEMESTER -VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1807 c	PE	Gr II	Smart Cities	3	3	50	100			150

**Course Objectives:** To provide an insight to the recent concept of smart cities. To understand how the smart cities uses different types of electronic methods and sensors to collect data and how these data are used to manage resource and services efficiently.

### Module I

Definition of Smart city, objectives, Need for smart cities, Evolution of smart cities, Key elements of smart city.

### Module II

Smart city principles- learning, participatory governance, digital inclusion, intelligent buildings, energy and environment efficiency, sustainable cities, carbon emissions , Online web-based learning system, integrated approach, livable cities, Online information services. Improving lives and livelihoods of residents.

### Module III

Smart Infrastructure: Facilities for entertainment, safety, security, & education, availability of water and electricity, public transport. Energy efficiency techniques using 3R's concept. Social infrastructure like parks, gardens, community halls for interaction in compactness, Employment opportunities, Efficiency, sustainability, and livable.

### Module IV

Components of smart cities: Smart people, Smart economy, Smart governance, Smart mobility, Smart environment, Smart living, ICT & E-Governance in smart cities ,Green buildings ,Green urban planning Green energy, Renewable energy, Waste water management ,sanitation .  
Benefits of Smart cities, Case studies of Smart cities of India.

### References:

1. Smart city Mission Statement and Guidelines by ministry of Urban development, Government of India.
2. Smart Cities in India (2015), Smarter Solutions for better tomorrow; Conference-Delhi.
3. [http:// smartcitiesofindia.in/](http://smartcitiesofindia.in/)
4. Binti Singh, Manoj Parmar, Smart City in India: Urban Laboratory, Paradigm or Trajectory.
5. Luca Mora and Mark Deakin (2019), Untangling Smart Cities: From Utopian Dreams to Innovation Systems for a Technology-Enabled Urban Sustainability; Elsevier.

NO	Split-up Continuous Assessment Marks	Percentage
1	Class works/Assignments	60
2	Tests(Minimum 2)	30
3	Attendance	10
	Total	100

University Examination	
Duration of Examination	3hrs
Maximum Marks	100
Question Paper Pattern	
PART A- 40 Marks	8 Short questions, 2 Questions from each module, 5 Marks each, Answer all Questions.
PART B -60 Marks	2 Questions from each module, 15 Marks each, Answer any one full Question from each module.

**AR 1807 d :( Online Course)**

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1807 d	PE	Gr II	Online course approved by the institution	3	3	50	100			150

**Course Objective:** To provide flexibility in teaching and learning system

Note:

1. Students can enroll for any one online certified course with prior approval of the University / Institution.
2. The transfer of credits/marks shall be based on course equivalence as approved by the university norms.

### **AR 1808: Architectural Travel Studies**

SEMESTER - VIII	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
	AR 1808	OE	Gr III	Architectural Travel Studies	2	2	50			50	100

#### **Course Objectives:**

The course is aimed at travel to cities and site of historic/social or cultural significance in order to observe, evolve drawing skills appreciate the place and undertake basic documentation

Develop knowledge, awareness and understanding of contexts of architectural development from a theoretical and historical standpoint. Summarize writings and sketches, photographs with content capturing the architectural, cultural, social, physical, economic dimensions of various travel locations.

Develop Sketches and critical writings of observations during the travel process .To consolidate the course contents by acquainting students not only with professional practice but also the culture and context of a region.

#### **Module I**

Discussion of experience of observations, Basic documentation of way of life.

#### **Module II**

Basic documentation of proportion and elements (Drawing and or photography), Record of materials and technology

### **Module III**

Interviews with community.

### **Module IV**

To prepare sketches and reports with photographs recording the physical, social, cultural and, historic context.

Note: The institution shall conduct study tour at the end of semester 7 (refer 5.2 of regulations) as part of this subject.

<b>NO</b>	<b>Split-up Continuous Assessment Marks</b>	<b>Percentage</b>
1	Class works/Assignments/report	90
2	Attendance	10
	Total	100

<b>Practical/Viva voce</b>	
Maximum Marks	50
<ol style="list-style-type: none"><li>1. The institution shall conduct the evaluation of the study tour reports/portfolio and conduct Viva voce at the end of the semester.</li><li>2. Students shall submit the portfolio/reports etc consisting of the assignments done for the subject during the course period, as per the instructions from the head of the architectural institution/ department, latest before noon on the previous working day of the commencement of the practical evaluation/viva voce</li><li>3. Two members of the faculty appointed by the head of the institution shall conduct the evaluation and Viva voce.</li></ol>	

## **SEMESTER IX**



## AR 1901: Professional Training

SEMESTER - IX	Course no	Course code	Group code	Course title	Credits	Days	Marks				Total
							CA	W	J	P/V	
	AR 1901	PAEC	Gr IV	Professional Training	15	100	400		600		1000

**Course Objective:** To equip students with a practical approach to implement building projects, basic knowledge about construction industry, project management techniques needed for managing and coordinating building projects in a professional manner.

The other objective of the practical training is to expose the students to working in real life projects. The students are expected to work under the supervision of experienced architects registered with the Council of Architecture to understand how various components related to architecture are applied. As part of their practical training, the students are expected to work on presentation/ working drawings, specifications and quantity estimation. The students are also expected to familiarize themselves with coordination of structural and services drawing with architectural drawings. It is desired that the students undertake site visits and understand construction practices.

### Submissions at the end of Training

At the end of the practical training, the students are required to present all the works, which in the form of drawings. The students are also required to submit a report describing various concepts learnt during training, experiences of site visit and estimation / costing activities etc. Training attendance log sheets shall

also be submitted as part of the report. The report requires to be submitted for internal assessment and jury/Viva voce (Refer manual).

<b>NO</b>	<b>Split-up of Marks</b>	<b>Marks</b>
	As per evaluation committee (Refer Manual )	400

<b>Jury</b>	
Maximum Marks	600
1. Two examiners appointed by the university shall conduct the jury/viva voce evaluation at the end of the semester as per the manual.	
2.Students shall submit the portfolio/reports etc consisting of the projects done for the subject during the training period, as per the instructions from the head of the architectural institution/ department, latest before noon on the previous working day of the commencement of the practical evaluation/viva voce	

## **SEMESTER X**

## AR 11001: Architectural Design Thesis

SEMESTER	Course no	Course code	Group code	Course title	Credits	Hrs / w	Marks				Total
							CA	W	J	P/V	
1	AR 11001	PC-3	Gr Ic	Architectural Design Thesis	15	30	500		500	1000	

### Course Objectives:

To educate the student to independently handle and present all aspects of an architectural design, from its evolution to final solution in totality. To understand the importance of the evolutionary stages of a design process and various techniques required for a successful presentation of an architectural design.

To develop in students the ability to handle specific aspects / thrust area of design relevant to the topic like structure, climate responsiveness, vernacular, architecture theory/ philosophy, low cost construction techniques, parametric design and simulation, universal design, disaster management, green and intelligent buildings, advanced construction, services and materials etc. and form it as the basis of designing the thesis project proposal.

### Introduction

The multiple challenges of 'built environment' offer unlimited scope for the choice of an architectural design thesis. The selection of the thesis subject may result either from issue/s involved, or from the challenges of design, or the inherent and acquired aptitude of a student, which he/she wishes to perfect and present. The variety of the intentions give students the choice to select the topic of the thesis from a purely hypothetical to a 'live' programme, as long as the topic can result in tangible 'built environment' solution.

The design solution shall be in the form of drawings and models of the concept and design and shall further include the presentation of at least one specific aspect relevant to the selected topic in complete detail.

The report, in duplicate, shall be submitted in bound form together with prints/photographs of all the drawings and model/s. All relevant / pertinent drawings, sketches, models from previous stages to be put up for the jury to show evolution of design. (Refer manual)

<b>NO</b>	<b>Split-up of Marks</b>	<b>Marks</b>
	As per manual	500

<b>Jury</b>	
Maximum Marks	500