

SEMESTER III

Course Category	SUBJECT CODE	SUBJECT NAME	THEORY / PRACTICAL	SCHEME OF TEACHING						SCHEME OF EVALUATION						EXAM HRS	
				Lectures (L)	Tutorials (T)	Studio / Practical (SP)	Total (Hrs)	TOTAL CREDITS	CIA			ESE			TOTAL		
									UT	TA	AT	TOTAL	Theory (T)	PRACTICAL / VIVA			TOTAL
														A	B	A+B	
SEMESTER III																	
PC	AR1301	ARCHITECTURAL DESIGN - III	THEORY	2	3	0	5	6	24	8	8	40	60	0	60	100	12
BS & AE	AR1302	BUILDING CONSTRUCTION & MATERIALS-III	THEORY	1	0	0	1	2	24	8	8	40	60	0	60	100	3
BS & AE	AR1303	ARCHITECTURAL STRUCTURE - III	THEORY	1	1	0	2	2	24	8	8	40	60	0	60	100	3
PC	AR1304	ARCHITECTURAL DRAWING - III	THEORY	1	1	3	5	4	24	8	8	40	60	0	60	100	3
PC	AR1305	VISUAL ARTS- III	THEORY	1	0	2	3	2	24	8	8	40	60	0	60	100	3
PC	AR1306	HISTORY OF ARCHITECTURE & CULTURE -II (HINDU ARCH.)	THEORY	1	1	0	2	2	24	8	8	40	60	0	60	100	3
BS & AE	AR1307	BUILDING SERVICES - I (WATER SUPPLY & SANITATION)	THEORY	1	1	0	2	2	24	8	8	40	60	0	60	100	3
PC	AR1301P	ARCHITECTURAL DESIGN - III (VIVA VOCE)	PRACTICAL	0	0	2	2	1	0	0	0	0	50	50	50	-	
BS & AE	AR1302P	BUILDING CONSTRUCTION & MATERIALS-III (VIVA VOCE)	PRACTICAL	0	0	3	3	1	0	0	0	0	50	50	50	-	
ECPE	AR1351	ELECTIVE - III	PRACTICAL	1	0	1	2	2	0	0	0	50	0	50	50	100	-
PC	AR1352	ARCHITECTURAL RESEARCH - II	PRACTICAL	1	0	2	3	2	0	0	0	50	0	50	50	100	3
PAEC/ PAECC	AR1353	NTCC -II (SUMMER ASSIGNMENT)	PRACTICAL	0	0	0	0	1	0	0	0	50	0	50	50	100	-
				TOTAL				30	27	TOTAL						1100	

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COURSE CODE:AR1301	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ARCHITECTURAL DESIGN-III	2	3	0	5	6	40	60	0	100	12
COURSE CATEGORY-PC										

SUBJECT OBJECTIVE

- To explore the interrelationship between human behavior and space in a small environment, including, volume of space, shape, form, function and materials.
- To understand architectural form, space and related qualities, exploration through fenestrations and facade treatment, material and expression.
- To assimilate the modifying spatial qualities of indoor & outdoor spaces due to varying configurations.

LEARNING OUTCOME

- The students will be trained to understand the various issues which arise while designing a double storied RCC building.
- Students are encouraged to understand the interrelationship between human behavior and space in a detached residential building for a small joint family.
- They are expected to explore through their design exercise, volume of space, shape, form, function and material sensitivity.

Module-1

Introduction:

The students are expected to design a low rise building in a specific site, for a small Indian joint family in urban setting. The projects investigate the study of built form, function, activity, and its relationship to the site and surroundings, material, and construction technology.

Introduction of short span structural systems that inspire form oriented built forms.

Module-2

Introduction to design considerations:

Introduction to design considerations for natural light, ventilation, etc surrounding physical environment in creation of simple multi-cellular architectural forms.

Analysis of the selected settlement with relationship to human scale, activity, space & form & other parameters pertaining to spatial aspects.

Module-3

Design Exercises:

Lecture on interpreting spatial configuration for specific design programme. Configuration of spaces preferably on single floor organized on basis of functional, geometric and visual order.

SUGGESTED STUDIO EXERCISE

1. **Time problems** like LIG Houses (1DAY)
2. **Minor Problems** like design of college canteen, petrol pump to be structural system based. (1 WEEK)
3. **Major Problems (2 IN NUMBER)** like Design of buildings like Farm house, Tourist Cottages, neighborhood shopping centre etc.
4. Study tours to relevant urban destinations for primary documentation.

REFERENCE BOOKS

1. Ching, Francis D.K. Form Space & Order.
2. Rappoport, Amos. House Form & Culture.
3. Oliver, Paul. Shelter & Form.

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4. Fathy, Hasan. Natural energy & vernacular architecture.
5. Housing projects by Geoffery Bawa, Charles Correa, B.V. Doshi among others
6. Antoniadis, C. Anthony, "Epic Space: Towards roots of Western Architecture", John Willey & Sons, 1992
7. Schulz, N. C. (1985), The concept of dwelling. New York : Rizzoli International Publications.
8. Unwin S. (2010). Twenty Buildings every Architect should understand. New York : Routledge

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COURSE CODE:AR1302	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-BUILDING CONSTRUCTION&MATERIAL-III										
COURSE CATEGORY-BS&AE	1	0	0	1	2	40	60	0	100	3

SUBJECT OBJECTIVE

- To acquaint the students to usage of building materials such as Variety of Stone, Surface finishing, Painting and Polishing& Roof coverings (conventional).
- To familiarize the students with construction techniques for use of the above materials in building works.
- To familiarize the student with the basic building construction practices on site/yard.

LEARNING OUTCOME

- The students would be familiarized with vernacular terminology as prevalent in this part of the country.
- The emphasis will have knowledge of construction details as applicable to Indian climatic conditions

SECTION – A, BUILDING MATERIALS AND SCIENCES

Module-1

Stone:

Classification, Availability, Characteristics and Uses.

Surface:

(Wall)Finishing & Painting and Polishing

Types and application of Plasters, Jointing and Pointing, Cladding.

Preparation of variety of surfaces, Application of various coats.

Finishes – Lime / Colour wash, Dry distemper, Oil bound distemper, Cement paints, Acrylic emulsions, Synthetic enamels, Wall textures etc.

Polishes and Varnishes.

Module-2

Roof Coverings (Conventional):

Clay Tiles (Country, Allahabad, Mangalore tiles etc.), Stone Slating, Shingles, Thatch.

LIST OF ASSIGNMENTS (Market Surveys, Seminars & Report)

1. To study the availability, constituents, properties, manufacturing processes, storage, transportation and applications of above mentioned materials.
2. To visit stone quarries and glass, ceramic, paints etc. Factories for better understanding and submit report.
3. To construct examples of brick& stone masonry works in construction yard.

WORKSHOP/CONSTRUCTION YARD PRACTICE & SITE EXPOSURE

Module-3

Workshop/Construction Yard Practice:

Practicing in construction yard by making the examples of stone masonry works, plastering, jointing, pointing and painting, timbering of shallow trenches and door samples.

Site Exposure to building construction practices on site of various items of work from foundation to roof and finishes.

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13. M. Gambhir, NehaJamwal, Building Materials Products, Properties and Systems, Tata McGraw Hill Publishers, New Delhi, 2011.
14. R.K.Gupta, Civil Engineering Materials and Construction Practices, Jain brothers, New Delhi, 2009.
15. National Building Code of India (Latest Edition), Bureau of Indian Standards.
16. Engineering Materials-Deshpande.
17. Engineering Material-Roy Chowdary
18. Designing with models – Criss. B. Mills.
19. Morris, M., "Architecture and the Miniature: Models", John Wiley and Sons, 2000.
20. Mills, Criss B., "Designing with Models: A Studio Guide to Making and Using Architectural Models", Thomson and Wadsworth, 2000.
21. Raghuwanshi, B.S., "A Course in Workshop Technology - Vol. I and II", Dhanpat Rai and Co, 2001.

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COURSE CODE:AR1303	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-STRUCTURES - III										
COURSE CATEGORY-BS&AE	1	1	0	2	2	40	60	0	100	3

SUBJECT OBJECTIVE

- To understand the analysis of indeterminate structures and their application in structural design and analysis.

LEARNING OUTCOME

- The students will familiarize with the effects of transverse forces such as shear force & bending moment in beams; determination of SF & BM in simple beams under different loading.

Module-1

Introduction to Structure Analysis

Introduction, Determinate Structures, Indeterminate structures

Module-2

Elastic Theorems & Energy Principals

Introduction, Potential energy, General principles, Principles of superposition.

Module-3

Fixed & Continuous Beams and Portal Frames

Introduction, Analysis of continuous beams and portal frames, Reactions at the supports, Effects of sinking of supports.

Module-4

Fixed & Continuous Beams and Portal Frames (continued)

Analysis of continuous beams and portal frames by 3M equation, Slope deflection method, Moment distribution method

REFERENCE BOOKS

1. Nautiyal B. D., "Introduction to Structural Analysis", B.H.U.
2. Punmia P. C., "Strength of Materials & Mechanics of Structures".
3. Khurmi R. S., "Strength of Materials".
4. Senol Utku, "Elementary Structural Analysis".
5. Rama Armarutham S., "Strength of Materials".
6. C.K. Wang, "Theory of Structures".

Presentation drawing of small building (residence) through Site Plan, ground floor plan, terrace plan, 4 side elevation and 2 section etc., using **AUTOCAD** or **PHOTOSHOP**, incorporating sciography for creating depth in building.

REFERENCE BOOKS

1. Bernard Alkins -147, Architectural Rendering, Walter Foster Art Books, 1986.
2. Francis Ching, Architectural Graphics, Van Nostrand and Reinhold Company, NY 1975
3. IH. Morris, Geometrical Drawing for Art Students -Orient Longman, Madras, 2004.
4. Peter Schiessl : Corel DRAW 2020 - Training Book with many Exercises
5. Robin Whalley : Photoshop Layers: Professional Strength Image Editing

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COURSE CODE:AR1305	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-VISUAL ARTS- III	1	0	2	3	2	40	60	0	100	3
COURSE CATEGORY-PC										

SUBJECT OBJECTIVE

- To develop an appreciation of Indian Arts & Crafts among the Students.
- To strengthen the skill of architectural rendering.
- To develop the skills to design smaller elements of building based on Indian Arts.

LEARNING OUTCOME

- Students will be able to present their work in different media and present works of masters of Modern Architecture.

MODULE-1

Indian Art:

History of Indian Art Lectures on outline History of Indian Art, from earliest times to Mauryan Period.

Module-2

Indian Art (Mughal Period):

History of Indian Art Gupta Period to Mughal Period.

Module-3

Indian Art (British Period):

History of Indian Art Company Style (British Period).

Module-4

Exercises:

Design of various objects

Designing of gate, grill, railing, jaali, soffit treatment, fascia treatment, column pediment, pedestal in suitable materials and period.

REFERENCE BOOKS

1. ABC of Indian Art- J.F.BLACKER.
2. A concise History of Indian Art - ROY C. CRAVEN.
3. Maurya and Post Maurya Art- NIHAR RANJAN RAY
4. The Story of Indian Art- S.K. Bhattacharya

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COURSE CODE:AR1306	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- HISTORY OF ARCHITECTURE & CULTURE -II (HINDU ARCH.)										
COURSE CATEGORY-PC	1	1	0	2	2	40	60	0	100	3

OBJECTIVES:

- To gain knowledge of the development of architectural form with reference to technology, style and character in various aspects of Hindu, Buddhist & Jain architecture.
- To comprehend and analyze spatial character, scale, and structure through historical and traditional built heritage.
- To comprehend and relate to the theoretical basis of historical and traditional Hindu architecture.

LEARNING OUTCOME

- To provide an understanding of the evolution of, Indian Architecture in its various stylistic modes characterized by technology, ornamentation and planning practices.
- 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.

Module-1

Hindu Architecture- Indo-Aryan:

The evolution of the temple form, evolution of the shikhara in north India. The three schools of architecture-the Gujarat, the Khajuraho, and the Orrisan styles. Comparison in spatial attributes, scale and detail.

Module-2

Hindu Architecture Dravidian:

The evolution of the vimana and the contributions of the Chalukyas, the Pallavas, the Pandyas and the Cholas. The contributions of the Nayaks to the temple cities. The city morphology, spatial diversity and planning criteria.

Module-3

Hindu Theory:

Hindu philosophy and its imprint in temples/traditional houses and other built structures. Mandala and the geometric grid in temple plans. The proportional theory in temple elevation.

Module-4

Buddhist Architecture:

The Buddhist philosophy and its imprint in built space. Typology of lats, eddicts, stupas, viharas, and chaityas, both in rock-cut or otherwise. The techniques used for rock-cut spaces and free standing built masses. The spatial and functional connotations.

Module-5

Jain Architecture :

The temple cities of Palitana, Mount Abu and Girnar.
The Jain philosophy and its imprint in built form.
The Jain mandalas.

REFERENCE BOOKS

1. K.V,Soundra Rajan, Indian Temple Styles: the personality of Hindu Architecture.

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2. Giles Henry Rupert Tillotson (ed.), Paradigms of Indian architecture: Space & Time in Representation & Design, Psychology Press, 1998.
3. Adam Hardy, Indian temple Architecture- form & transformation, Abhinav Publications, 1995.

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COURSE CODE:AR1307	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- BUILDING SERVICES - I (WATER SUPPLY & SANITATION)	1	1	0	2	2	40	60	0	100	3
COURSE CATEGORY-BS&AE										

SUBJECT OBJECTIVE

- 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.

LEARNING OUTCOME

- Students will be able to understand principles of water supply and sanitation
- To familiarize the student with plumbing bye laws as per BIS.

Module-1

Water Supply:

Water Supply Introduction, types of sources, yield & spacing of wells, intakes, pumping and transportation of water. Treatment of water, qualities of potable water. Domestic water distribution system, reservoirs, supply system layouts, Pipe appurtenances, pumps, pumping plants, overhead tanks, water demand calculations. Building service connection, Ferrules, Water meters. Layout of domestic water piping systems, joints, fittings and valves. Cold & hot water lines in buildings, Water supply to high rise buildings: problems encountered & systems adopted.

Module-2

Sanitary Engineering:

Purpose and Principles of sanitation, collection and disposal of various kinds of refuse from buildings. Garbage and sewage disposal. Methods of carrying refuse, systems of refuse disposal, their principles. Plumbing definitions and related terms, plumbing systems (one pipe, two pipe etc), House drainage system, Drainage of sub-soil water. Inspection chambers, Manholes, Sub-drains, culverts, ditches and gutters, drop inlets and catch basins, roads and pavements, storm overflow/regulators. Sanitary appliances, Traps their variety, Pipes and joints, Sanitary pipes works below and above ground level.

Module-3

Plumbing:

Basic principles of Plumbing, need, scope, terminology. Specifications and installation of sanitary fittings like wash basins, water closets, urinals, bidets, sinks, etc in buildings. Uses of gate valve, float valve, flap valve, ball valve, flush valve, etc, different types of taps, faucets, stop cocks, bib cocks, 'P', 'Q', 'S', floor/bottle traps used in buildings.

Module-4

Design of Plumbing Systems:

Design of Plumbing Systems 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.

REFERENCE BOOKS

1. The construction of building by Barry-vol.-5
2. Water supply and Sanitation by Charanjit Shah
3. Water supply & sanitary Engineering by S.C.Rangawala
4. Water supply & sanitary Engineering by S. K.Hussain

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

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COURSE CODE:AR1351(1)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-III	1	0	1	2	2	50	0	50	100	
COURSE CATEGORY-ECPE										

ART/ PERFORMING ARTS PROJECT-III

SUBJECT OBJECTIVE

- To embed stronger and more enduring means of evoking architecture and culture.

LEARNING OUTCOME

- Students will perform different Co-curricular activities in coordination with the stream of architecture being taught in their respective semesters.

MODULE

Exercises on topic of Architectural interest like debate ,skits ,extempore, theatrical exercises individually or in groups to develop their communication skills, using theater as a medium. It will also train the students towards team building.

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COURSE CODE:AR1351(2)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-III										
COURSE CATEGORY-ECPE	1	0	1	2	2	50	0	50	100	-

ARCHITECTURAL COMPETITIONS-III

SUBJECT OBJECTIVE

- To provide a wide range of design solution for creating interest in role of architecture in national and international design competitions.

LEARNING OUTCOME

- Understanding of Contemporary Architecture.
- Development of idea of Team Work.
- The student will learn to formulate architectural concept and learn to work in time frame scenario.

MODULE

Students will participate in different national and international competitions (preferably on projects upto the scale as mentioned in the syllabus of the Architectural Design of that year)- introduced by Architects, Architectural, colleges, firms and forums NGO's. Council of Architecture, NASA, Zonal NASA, etc.

The students will formulate the scheme under the guidance of faculty mentors and prepare basic design layout and competition requirements.

The students will have hands on practice of the rendering techniques.

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COURSE CODE:AR1351(3)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-III	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

FOREIGN LANGUAGE-III (FRENCH)

SUBJECT OBJECTIVE

- To explain the students to apply their knowledge of possessive & demonstrative adjectives in the present and near future tense, in conversation- using different groups of verbs.

LEARNING OUTCOME

- After completing these modules, the students will be capable of constructing sentences with possessive and demonstrative adjectives in French. In addition they will be proficient in formulating meaningful sentences as they will be capable of applying their knowledge of all the irregular verbs they have learnt during the session. They will also have an idea of French culture by studying about various French festivals.

MODULE

- About oneself, Revision of earlier modules.
- Family tree The classroom Lifestyle ,My daily routine
- At home At the university Personal activities Preparations to attend a party
- At the bus-stop Letter to a friend French culture
- The life and family of Paul Lenoir Evening Plans
- Festivals of France

REFERENCE BOOKS

1. A Propos - A1, Livre de l'élève et Cahier d'exercices
2. Apprenons la grammaire ensemble, Dictionnaire Larousse, Mon livre de français - 2, 450 exercices de grammaire
3. Collins 3 in 1 French grammar, vocabulary & verbs
4. Notes prepared by French faculty members

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COURSE CODE:AR1351-04	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-III	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

SCALE AND PROPORTION

SUBJECT OBJECTIVE

- To Understand scale and proportions in respect to Architecture through the scale of measurements and proportions of the human body .

LEARNING OUTCOME

- Students will be able to visualize architectural elements in respect to scale and proportion.

MODULE

Scale, its importance in architecture and its types.

Importance of Proportion in Architecture.

The Golden Ratio in Art and Architecture.

Le Corbusier's Modulor System.

Anthropometry (study of the size and proportions of the human body), The sizes and shapes of building elements and components in respect to the human dimensions.

Case Studies and exercises in relevance to scale and proportion, and its documentation.

REFERENCE BOOKS

- "Neufert Architect's Data", Blackwell Publishing.
- Donald Watson and Michael J. Crosbie, "Time - Saver Standards for Architectural Design, Technical Data for Professional Practice", McGRAW - HILL
- Scale and Proportion by Steve Metzger

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COURSE CODE:AR1351-05	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-III										
COURSE CATEGORY-ECPE	1	0	1	2	2	50	0	50	100	-

RURAL ARCHITECTURE

SUBJECT OBJECTIVE

- To create awareness about vernacular Housing Techniques used in Rural areas.
- To create a knowledge base about the Government Initiatives and Interventions in the field of Rural Development

LEARNING OUTCOME

- Upon the completion of the course the student will understand issues and Concerns of Rural Housing and have the knowledge about various Government Schemes, Programmes for Rural areas.

MODULE

Rural house types from various states in India.

Low-Cost Construction Materials, Technology and Services used in various parts of the country for Rural Housing.

Use of Locally available Materials in various regions. Community based Rural Planning.

Understand rural institutions and Organizations - rural banks, co-operatives, marketing mass media and communication, micro-finance, SHG and rural credit access.
Case Studies.

REFERENCE BOOKS

1. S.N. Prajapati, "Rural Development in India"
2. Manie Ahuja, "Rural Development: Indian Context"
3. GPH Panel of Experts, "Rural Development Programmes (MRD)"
4. B.D.Sharma, "Rural Development and Policies"
5. Vinod Kumar, "Rural Development", ABD Publishers
6. B.K.Pandey, "Rural Development -Towards Sustainability"
7. P. Gopinadhan Pillai, "Rural Development in India", Neha Publishers and Distributors, 2008

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COURSE CODE-AR1351(6)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- ELECTIVE - III										
COURSE CATEGORY-ECPE	1	0	1	2	2	50	0	50	100	-

TENSEGRITY STRUCTURES

OBJECTIVES

- To develop greater perception of complex spatial structures .
- To understand the details of tensile & compression structures & forces in action.

LEARNING OUTCOME

- Students will be able to understand the fabrication or construction process of Tensegrity structures.

Module

Introduction and Concept

Introduction to 3D truss system, History of Tensegrity, Tension and Compression members, solid section bars , string and cable elements, concepts of compression and tension.

Characteristics and Benefits

Stable self equilibrated state, components, continuous tension & discontinuous compression, boundary surface of Tensegrity structures, stabilization of structure & efficiency, Tensegrity simplex, mechanical behavior.

Structural Applications & Case Studies

Applications of Tensegrity structures, Case studies & significant examples.

REFERENCE BOOKS

1. René Motro : Tensegrity: Structural Systems for the Future
2. Buntara S. Gan : Computational Modeling of Tensegrity Structures: Art, Nature, Mechanical and Biological Systems
3. Mauricio C. de Oliveira and Robert E. Skelton :Tensegrity Systems

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COURSE CODE:AR1352	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ARCHITECTURAL RESEARCH-II	1	0	2	3	2	50	0	50	100	3
COURSE CATEGORY-PC										

SUBJECT OBJECTIVE

- To understand basic principles of any research with special reference to architectural research and applications.

LEARNING OUTCOME

- Students will be able to understand referencing and techniques.

MODULE

Detailed Referencing:

Introduction to Styles of Referencing.

Technical Writing Referencing Techniques.

Manage resources, insert citation, bibliography.

Book Review:

Review of book and its presentation.

REFERENCE BOOKS

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.

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COURSE CODE:AR1353	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- NTCC – II (SUMMER ASSIGNMENT)	0	0	0	0	1	50	0	50	100	—
COURSE CATEGORY-PAEC/PAECC	0	0	0	0	1	50	0	50	100	—

OBJECTIVES

- To prepare students to integrate theory and practice from courses to field works in the form of a architectural planning project.

LEARNING OUTCOME

- The student will able to develop and improve their planning concepts and ideas through critical thinking
- Understand inception, scheduling, execution and dissemination in the context of live architectural planning through field works.

Module

- The Students are addressed in a common briefing session about the Summer Project which introduces them to the problem, issues, requirements, timeline and deliverables for the projects going to be introduced in the upcoming semester
- The students are introduced to the project on a holistic level and briefed about the study area and its characteristics. Then they are briefed about rules of social and ethical behavior to be followed while collecting data from primary as well as secondary sources. Each student is allotted a particular aspect of planning to focus on during the course of the project.
- The student is responsible for his/her individual aspect and has to submit a report on the same at the end of the project. Based on the student's interest and relevance of the same in varied planning applications, the student works on the aspect in a professional manner as per the practical applications of the same. The integration of the various aspects allotted to students culminate towards the entire project report and dissemination of the project.

Guidelines for Project Report

The report has to be not less than 15 pages or greater than 45 pages. The report has to be spiral bound. The maps should be properly scaled and labeled with necessary legends and detailing.

Language	English
Paper Size	A4
Margin	The left and right margin of 1.25 inches. The top and bottom margin of 1.00 inch
Typing	On both sides of the page. The text will follow line spacing of 1.5 lines and double justified.
Arrangement of Contents	Every NTCC Project Report should have three parts: the pre pages, the main text and the reference material. The following is the order: <ol style="list-style-type: none"> 1. Preliminary Pages: <ol style="list-style-type: none"> a. Title page b. Declaration c. Faculty Guide Approval Page d. Acknowledgement e. Table of Contents 2. Text: Chapters & sub-sections 3. Area Context, Data Collection, Analysis, Conclusions, Recommendations & Proposals 4. Reference Materials: Appendix

Tables & Figures	These shall be placed immediately after the paragraph that contains it. Each table & figure has to be numbered consecutively within chapters.
References	These have to be listed alphabetically. Retrievable data must be listed in references. Personal interviews/ raw data shall not appear in the reference list.
Appendices	Contains supplementary of illustrative material on explanatory data to be incorporated in main document as per the order of appearance in the document.

The Break up (components and their weightage) of continuous internal assessment are given as under :

S.No.	Title	CIA (MM 50)
1.	Design Detailing	5
2.	Final Report	5
3.	Presentation	5
4.	Case Studies & Literature Review	5
5.	Plans (key plans /measured drawings/schematic plans,etc.)	10
6.	Field Visit (supported by images)	10
7.	Presentation & Communication	10

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SEMESTER IV

Course Category	SUBJECT CODE	SUBJECT NAME	THEORY / PRACTICAL	SCHEME OF TEACHING					SCHEME OF EVALUATION						EXAM HRS		
				Lecture (L)	Tutorial (T)	Studio / Practical (SP)	Total (Hrs)	TOTAL CREDITS	EIA			EII				Total	
									CT	EA	AI	TOTAL	Theory (T)	PRACTICAL /VIVA			TOTAL
SEMESTER IV																	
PC	AR1401	ARCHITECTURAL DESIGN - IV	THEORY	2	3	0	5	0	24	8	8	40	60	0	60	100	12
BS & AE	AR1402	BUILDING CONSTRUCTION & MATERIALS-IV	THEORY	1	0	0	1	2	24	8	8	40	60	0	60	100	3
BS & AE	AR1403	ARCHITECTURAL STRUCTURE - IV	THEORY	1	0	2	3	2	24	8	8	40	60	0	60	100	3
BS & AE	AR1404	CLIMATOLOGY	THEORY	1	4	0	2	2	24	8	8	40	60	0	60	100	3
PC	AR1405	HISTORY OF ARCHITECTURE & CULTURE-III (ISLAMIC ARCH.)	THEORY	1	2	0	3	3	24	8	8	40	60	0	60	100	3
BS & AE	AR1406	BUILDING SERVICES - II (ELECTRICAL & LIGHTING)	THEORY	2	1	0	3	3	24	8	8	40	60	0	60	100	3
PC	AR1401P	ARCHITECTURAL DESIGN - IV (VIVA VOCE)	PRACTICAL	0	0	2	2	1	0	0	0	0	50	50	50		
BS & AE	AR1402P	BUILDING CONSTRUCTION & MATERIALS -IV (VIVA VOCE)	PRACTICAL	0	0	3	3	1	0	0	0	0	50	50	50		
ECPE	AR1451	ELECTIVE - IV	PRACTICAL	1	0	1	2	2	0	0	0	50	0	50	50	100	
PC	AR1452	ARCHITECTURAL RESEARCH - III	PRACTICAL	1	0	2	3	2	0	0	0	50	0	50	50	100	3
PAEC/ SEC	AR1453	COMPUTER STUDIO -I (AUTO CAD 2D & 3D)	PRACTICAL	1	0	2	3	2	0	0	0	50	0	50	50	100	
PAEC/ PAECC	AR1454	NTCC-III(EDUCATIONAL TOUR / DOCUMENTATION-WORKSHOP)	PRACTICAL	0	0	0	0	1	0	0	0	50	0	50	50	100	
							TOTAL	30	27				TOTAL	1100			

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COURSE CODE:AR1401	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ARCHITECTURAL DESIGN IV										
COURSE CATEGORY-PC	2	3	0	5	6	40	60	0	100	12

SUBJECT OBJECTIVE

- Understanding basic principles of grouping of units or buildings.
- Understanding architecture as with focus on the use of local materials and construction techniques.
- Understanding role of built (mass) and open spaces (void) in the overall design configuration.

LEARNING OUTCOME

- The students will be enabled to employ and integrate clustering of buildings and creation of open spaces.
- The students will understand designing to the context of vernacular architecture.

Module-1

Introduction and study:

Understanding user generated factors for grouping; security, segregation, convenience, privacy, sharing, user-density etc. Study of mass and space within a cluster; length: width: height ratios of built mass and open spaces and their relationship.

Module-2

Analysis:

Understanding dynamics of public buildings; activities of visitors and regular users. Providing for daily/regular, monthly, annual events and activities. Relating space and individual; human scale and urban scale. Societal aspirations for aesthetics and form. Role of building services, construction methods, bye-laws, codes (NBC etc.) on building and site design. Exercises on studies for grouping of activities in a public building

Module-3

Design:

Understanding vernacular architecture as an appropriate demonstration of geography and culture responsive architecture. Study of traditional designs and practices and upgrading same for use in contemporary situations.

Design of a simple building for public activity, in a non-urban setting, (i.e. without urban regulatory controls).

SUGGESTED STUDIO EXERCISES

1. **Time problems** like MIG Houses. (1DAY)
2. **Minor/Short Problems** like design of Panchayati bhawan, small forest resort, primary health centre, old age home. (1 WEEK)
3. **Major Problems** like Design of buildings like School, Community training centres.
4. Study tours to relevant destinations for documentation of vernacular architecture.

REFERENCE BOOKS

1. Ching, Francis D. K. "Architecture : Form, Space and Order", John Wiley and Sons Inc.
2. Lidwell, William, Holden, Kestina, Butler, Jill, "Universal Principles of Design", Rockport - Publications, Massachusetts.
3. Ahmet Hadrevic, "Structural Systems in Architecture", Book Serj Publishing, South Karolina.
4. Vernacular Traditions: Contemporary Architecture, Ashok Lall

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COURSE CODE:AR1402	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- BUILDING CONSTRUCTION&MATERIAL-IV										
COURSE CATEGORY-BS&AE	1	0	0	1	2	40	60	0	100	3

SUBJECT OBJECTIVE

- To acquaint the students to usage of building materials such as Timber products, Glass, Ceramics and Adhesives.
- To familiarize the students with construction techniques for use of the above materials in building works.
- To familiarize the student with the basic building construction practices on site/yard.

LEARNING OUTCOME

- The students would be familiarized with vernacular terminology as prevalent in this part of the country.
- The emphasis will be construction details as applicable to Indian conditions.

SECTION – A, BUILDING MATERIALS AND SCIENCES

Module-1

Timber Products:

Variety of Plywood, Ply-board, Block board, Particle board, Wood wool cement board, Fiberboard, Compressed straw board, Cement fiberboard, Mineral fiber board, Veneers, Laminates etc.

Module-2

Glass & Ceramics:

Glass - Translucent, Transparent and Special glasses, Glass bricks.

Patch fittings for glazed partitions and shutters.

Ceramics - Terracotta, Faience, Fireclay, Stoneware, Earthenware, Vitreous China, Porcelain.

Adhesives:

Natural Adhesives – Animal, Casein, Bituminous.

Thermoplastic Adhesives – Polyvinyl Acetate.

Thermosetting Adhesives & Plastics - Urea Formaldehyde, Phenol

Formaldehyde, Melamine Formaldehyde, Resorcinol Formaldehyde, Epoxide Resins.

Rubber Adhesive.

LIST OF ASSIGNMENTS (Market Surveys, Seminars & Report)

1. To study the availability, constituents, properties, manufacturing processes, storage, transportation and applications of above mentioned materials.
2. To visit timber products, adhesives factory etc. for better understanding and submit report.

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WORKSHOP/CONSTRUCTION YARD PRACTICE & SITE EXPOSURE

Module-3

Workshop/Construction Yard Practice:

Practicing in construction yard / workshop by making the examples of partitions and paneling samples, Timbering of shallow trenches.

Site Exposure Exposure to building construction practices on site of various items of work from foundation to roof and finishes.

SECTION – B, BUILDING CONSTRUCTION TECHNOLOGY

Module-4

Door(Timber Products):

Types and details of Flush door shutter with finishes.

Door(Operational Mechanism):

Complete understanding of operational mechanism (automatic and manual) of variety of Sliding door shutters, Sliding-folding door shutters and Revolving doors shutters.

Partition:

Terminology, Partitioning methods with use of different materials e.g. Timber and Timber Products, Clay and Terracotta Brick / Block, Pre-cast Concrete Block, Wood Wool Cement Board, Compressed Straw Board, Glass and Glass Brick.

Module-5

Panelling(Timber & Timber Products):

Terminology, Panelling methods with use of materials e.g. Timber and variety of timber products.

Brick Work TemporaryConstructions:

Shoring (Raking, Flying and Needle).
Underpinning.

LIST OF ASSIGNMENTS

1. To study the various tools, equipments used in roof laying works.
2. To construct examples of partition and panelling in construction yard / workshop.
3. To survey construction work on site and submit report.

CONSTRUCTION PLATES

1. To understand the application of variety of flush door shutters and their details.
2. To understand the application of variety of sliding door shutters and their details.
3. To understand the application of variety of sliding folding door shutters and their details.
4. To understand the application of partitions in building interiors with using timber, timber products and glass etc. along with their details.
5. To understand the application of panelling in building interiors with using timber and timber products along with their details.
6. To understand the application of temporary construction in buildings.

REFERENCE BOOKS

1. McKay, W.B., "Building Construction Volume I, II, III and IV", Longmans, 1955.
2. Ching, Francis D. K. and Adams, Cassandra, "Building Construction Illustrated", Wiley and Sons, 2000.

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3. The Construction of Buildings – Barry Volume I, II, III and IV
4. Chudley, Roy, "Construction Technology", Longman, 2005.
5. Building Construction_Mitchell (Elementary and Advanced)
6. Rangwala, S. C., "Building Construction", Charotar Publishing House, 2007
7. Building Construction-Bindra &Arora.
8. Punmia B. C., Jain A. J., and Jain A.J., Building Construction, Laxmi Publications, 2005.
9. Mitchell's Structure & Fabric-II
10. Principle & Practices of Heavy Construction: Smith & Andres
11. Don A.Watson, Construction Materials and Processes, McGraw Hill Co.
12. Building Materials by SC Rangwala: Charotar Pub. House, Anand
13. M. Gambhir, Nehajamwal, Building Materials Products, Properties and Systems, Tata McGraw Hill Publishers, New Delhi, 2011.
14. R.K.Gupta, Civil Engineering Materials and Construction Practices, Jain brothers, New Delhi,2009.
15. National Building Code of India (Latest Edition), Bureau of Indian Standards.
16. Engineering Materials-Deshpande.
17. Engineering Material-Roy Chowdary
18. Designing with models – Criss. B. Mills.
19. Morris, M., "Architecture and the Miniature: Models", John Wiley and Sons, 2000.
20. Mills, Criss B., "Designing with Models: A Studio Guide to Making and Using Architectural Models", Thomson and Wadsworth, 2000.
21. Raghuwanshi, B.S., "A Course in Workshop Technology - Vol. I and II", Dhanpat Rai and Co, 2001.

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COURSE CODE:AR1403	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-STRUCTURES - IV	1	0	2	3	2	40	60	0	100	3
COURSE CATEGORY-BS&AE										

OBJECTIVES:

- To understand the basic principles of R.C.C. structures and soil mechanics and their application in structural design and analysis.

LEARNING OUTCOME

- The student will have the knowledge about reinforced cement concrete and its applications in buildings and will be aware of the methods of designing various structural members using reinforced cement concrete.

Module-1

Design Methods

Introduction to Working stress method. Introduction to Limit state method.

Module-2

Singly & Doubly Reinforced Beams and Flanged Beams

Introduction, Bending of beam assumption, Moment of resistance, Modes of failure, Maximum depth of neutral axis, Limiting Values of tension steel & moment of resistance. Requirement of good detailing of reinforcement.

Module-3

Shear and Development Length

Introduction, Shear stress, Diagonal tension Shear reinforcement, Development length, Anchorage bond, Flexural bond.

Module-4

Slabs

Introduction, Design of One way and Two way slab using limit state method.

Module-5

Elements of Soil Mechanics

Elementary Soil Mechanics Classification of Soil, Properties of Soil, Safe bearing capacity, Active & Passive earth pressure.

REFERENCE BOOKS

1. Nautiyal B. D., "Introduction to Structural Analysis", B.H.U.
2. Punmia P. C., "Strength of Materials & Mechanics of Structures".
3. Khurmi R. S., "Strength of Materials".
4. Senol Utku, "Elementary Structural Analysis".
5. Rama Armarutham S., "Strength of Materials".
6. Neelam Sharma, "Reinforced Concrete"
7. IS 456:2000
8. N. Krishna Raju, "Renforced Concrte : Limit State Method"
9. KR Arora, "Soil Mechanics And Foundation Engineering"

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COURSE CODE: AR1404	SCHEME OF TEACHING					SCHEME OF EVALUATION					
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs	
COURSE NAME-CLIMATOLOGY	1	1	0	2	2	40	60	0	100	3	
COURSE CATEGORY-BS&AE											

SUBJECT OBJECTIVE

- To 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.

LEARNING OUTCOME

- The students will be acquainted with the concept of climate as a significant determinant of built form and have a understanding of the climate controlling devices.

Module-1

Climatology:

Role of climate with respect to shelter and importance of Building climatology, Tropics, climatic zones, macro and micro-climate, Elements of climate and climatology data needed for planning of buildings, change of seasons, distribution of global pressure belts & wind movements.

Human Comfort:

Human heat balance and thermal comfort, Thermal stress index, effective temperature and bio climatic analysis and chart, Interrelationship of climatic elements and psychometric chart.

Module-2

Climate types:

Climate types all over the world.

Tropical climate: climate zones, their characteristics & responses of the traditional / vernacular.

Micro Climate & Site Climate.

Module-3

Solar Radiation:

Calculation of solar radiation on building surfaces, solar charts; azimuth, altitude, incidence Design and application of shading devices, sun machines and their uses; Opaque building elements and heat transfer through this elements, solar gain factor and sol-air temperature.

Wind:

study of diurnal and seasonal variations, heating and cooling, effect of topography: effect of wind on location of industrial areas, airports and other land-uses and road patterns, Air movement in and around buildings, wind eddies, size and position, effect of wind on design and siting of buildings. Requirement, size & position of openings, Air-flow pattern inside & outside buildings.

Module-4

Day-light:

Glare, amount of light, sky as a source of light and day-light factor, effect of size and shape of openings in different planes with and without obstructions.

Orientation and Application of Climatic Principles:

Siting of buildings with respect of sun, wind and view; Climatic design of indigenous shelters in response to different climatic zones in India; Use of landscape elements, evaporative cooling, ground cooling, cavity walls, topography; Ventilation of roof spaces and controlled ventilation.

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Module-5

Rating systems:

Example of climate-responsive building-projects from India and abroad.

Brief introduction of rating systems for climate responsive buildings such as LEED, GRIHA and others.

Broad understanding of strategies and codes related to energy efficient and climate responsive considerations in buildings and built up areas.

REFERENCE BOOKS

1. Koenigsberger, O. Tropical climate.
2. Krishan, Arvind. Climate Responsive Architecture.
3. "Manual of Tropical Housing and Building: Climate Design", O.H. Koenigsberger et.al., Madras: Orient Longman, 1984.
4. Lam, W. M. C. (1986). Sun-lighting as Form-giver for Architecture. New York : Van Nostrand Reinhold
5. Kukreja, C. P. (1982). Tropical Architecture. New Delhi : McGraw-Hill.

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COURSE CODE:AR1405	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- HISTORY OF ARCHITECTURE & CULTURE -III (ISLAMIC ARCH.)										
COURSE CATEGORY-PC	1	2	0	3	3	40	60	0	100	3

OBJECTIVES:

- Understanding of the period in terms of its location, climate as well as the socio-cultural, historical, economic and political influences of the time.
- Study of the building 'types' and the development of architectural form and character based on the developments in construction and technology exemplified through specific building examples that identify the works of the period.
- Understanding the intentions of the period and architects as a solution to the need or demands of the period.

LEARNING OUTCOME

- The study must enable students to do a comparative evaluation of developments in a chronological manner along the timeline and across different geographies.
- The students will learn the chronological evolution and impacts of geographic, climatic, geological, religious, political and socio-cultural backgrounds of medieval architecture – in relationship to materials and techniques of construction.

Module-1

Introduction:

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

Module-2

The Sultanate Style:

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

Module-3

Provincial Architecture:

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

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

Module-4

Mughal Architecture:

The architecture of the Timurids in India- Babur, Hamayun, Akhbar, Jahangir and Shahjahan.

The proportions, structure systems, landscape, materials, scale and distinct features. The Oudh architecture, which was a blend of the Mughal style and the British features, in Lucknow and its environs. The manzils, baghs, kothis, imambaras, karbalas: their planning, materials and techniques.

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Module-5

Colonial Architecture:

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

REFERENCE BOOKS

1. Islamic Architecture in India, Satish Grover, Galgotia Publishing Company, 1996.
2. Percy Brown, "Indian Architecture (Islamic Period)", D. B. Taraporevala Sons and Co. Private Ltd., Bombay, India, 1995.

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COURSE CODE:AR1406	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME - BUILDING SERVICES - II (ELECTRICAL & LIGHTING)										
COURSE CATEGORY-BS&AE	2	1	0	3	3	40	60	0	100	3

SUBJECT OBJECTIVE

- To understand the basic principles of physics of electricity and light.
- To make them enable to draw the electrical layout with appropriate cross section of wires and illuminance calculations for residences.
- To know the characteristics and applications of the different types of modern lamps and luminaires.
- To familiarize the student with electrical bye laws as per NEC/BIS.

LEARNING OUTCOME

- To develop the understanding of important Services in buildings, definitions and terms used, functioning and their applications in building
- A fair understanding of space requirements and distribution of electrical service provisions.
- The understanding of lighting principles and different electric light sources available.

Module-1

Fundamental Electrical Concept :

Fundamental principles of Electricity, voltage, amperage, wattage.

Space and facility requirement for provision of electrical supply from State electricity mains for small scale projects. Study of Consumer control assembly, electrical load based on thumb rules, wiring systems, various electrical fittings and appliances. Load calculation and wiring diagrams.

(System of supply & distribution; Methods of wiring - joint box and Loop-in; Systems of wiring – Batten, Capping and Casing, conduits Open and concealed. Circuits – Series and parallel, Simple circuits.)

Wiring Material and Lighting Accessories:

Wires and cables – materials, types, sizes, specifications, Main switch, M.C.B, Distribution Board, Meter, Fuse and types of fuses; Guidelines for installation of light fittings.

Lighting accessories-switches, Ceiling rose, socket outlets, plugs, lamp holders.

Architectural concepts and provision of Power transmission and supply for medium scale buildings , LT&HT lines, Indian Electricity Act.

Study of sub stations, transformers, feeders, circuit breakers, bus bars, types of conductors, method of earthing, lightening arresters, electrical load, standby generators, Automatic relays etc.

Module-2

Distribution system:

Study of sub stations, transformers, feeders, circuit breakers, bus bars, types of conductors, method of Earthing, lightening arresters, electrical load, standby generators, Automatic relays etc.

Conceptual understanding of Electric supply and distribution for residences, group housing projects, High rise buildings, Institutional campus and other building typologies in medium scale.

Principles of light and Illumination –

Definitions and design concerns- Electromagnetic radiation, waves, nature of vision, Units of light, flux, solid angle, luminous intensity –utilization factor – depreciation factor, brightness, glare, Visual tasks, Factors affecting visual tasks.

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Module-3

Electric light sources:

Brief description, characteristics and application of different types of lamps, methods of mounting and lighting control. Classification of luminaries. Market survey for different types of Luminaires-manufacturers' data on luminaries.

Module-4

Lighting design:

Lumen method and point by point method for lighting design. Study of spectral energy distribution, Luminous efficiency- color temperature – color rendering, Additive, subtractive color, lighting tasks and their application areas.

Lighting concepts and tasks for different building typologies / spaces in small and medium scale.

Module-5

Electrical layout:

Electrical layout for a residence and electrical layout for one of the medium sized building/layout based on thumb rule calculations and indexing at conceptual level. Lighting design concept and layout of a small space based on the identification of the lighting tasks.

REFERENCE BOOKS

1. National Building Code of India.
2. National Electrical Code.
3. Raina K.B. & Bhattacharya S.K., Electrical Design estimating and costing, New Age International (P) Limited, New Delhi, 2004.
4. Rudiger Ganslandt & Harald Hofmann, Handbook of Lighting -Design, Druckhaus Maack, Lüdenscheid, 1992.
5. Kevin Kelly & Kevin O'Connell, Interior Lighting Design - A Student's Guide.

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COURSE CODE:AR1451(2)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-IV										
COURSE CATEGORY-ECPE	1	0	1	2	2	50	0	50	100	-

ARCHITECTURAL COMPETITIONS-IV

SUBJECT OBJECTIVE

- To provide a wide range of design solution for creating interest in role of architecture in national and international design competitions.

LEARNING OUTCOME

- Understanding of Contemporary Architecture.
- Development of idea of Team Work.
- The student will learn to formulate architectural concept and learn to work in time frame scenario.

MODULE-1

Students will participate in different national and international competitions (preferably on projects upto the scale as mentioned in the syllabus of the Architectural Design of that year)- introduced by Architects, Architectural, colleges, firms and forums NGO's, Council of Architecture, NASA, Zonal NASA, etc.

The students will formulate the scheme under the guidance of faculty mentors and prepare basic design layout and competition requirements.

The students will have hands on practice of the rendering techniques.

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COURSE CODE:AR1451(3)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-IV										
COURSE CATEGORY-ECPE	1	0	1	2	2	50	0	50	100	-

FOREIGN LANGUAGE-IV (FRENCH)

SUBJECT OBJECTIVE

- To strengthen the students' current communication skills in oral and written, to enrich their vocabulary and formulations using tenses and situation-related glossary and to provide them with a basic knowledge of French cuisine.

LEARNING OUTCOME

- Students will be able to describe one's location in countries and cities, comparing the seasons of France and India, giving suggestions, advice or instructions, narrating events in the past, writing e-mails & messages, buying food products in a market, ordering meals in a restaurant and describing French cuisine.

MODULE

- A visit to France Visiting different places
- It's spring time!
- Let's participate in the class, Teacher giving orders / instructions in a class
- Classmates giving suggestions to each other
- Reunion of old friends , It's been a long time... (using passé composé) Recent activities
- Cuisine of France, French eating habits, French meals
- 'Shopping for food' and 'Ordering a meal in a restaurant'
- Asking questions at a market or in a restaurant
- Let's keep in touch! Writing e-mails to your family / friends
- Accepting and refusing invitations through short messages

REFERENCES BOOKS

- Christine Andant, Catherine Metton, Annabelle Nachon, Fabienne Nugue,
 - A Propos - A1, Livre de l'élève et Cahier d'exercices.
- Mon livre de français-3
- Apprenons la grammaire ensemble
- 450 Exercices de grammaire - Niveau Débutant
- Collins 3-in-1 French Grammar, Vocabulary & Verbs
- Webster's French for verbs
- Dondo -Modern French course
- A compilation of French texts and exercises made by faculty members.

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COURSE CODE:AR1451-04	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-IV	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

ERGONOMICS

SUBJECT OBJECTIVE

- To expose the students to the requirements of designing for the human comfort in accordance with anthropometry.

LEARNING OUTCOME

- The students will have knowledge of ergonomics and its applications in design including designing for the physically challenged and the elderly.

MODULE

Human being in the manmade world and importance of ergonomics, Gross human anatomy, Ergonomics for children at workplace old people.

Introduction to Anthropometrics, static and dynamic anthropometrics, importance of furniture to human and designed form, muscles and work physiology.

Built environment for the physically handicapped, Ramp, toilets and corridor design, Spatial requirements for wheel chair movement.

Design issues in the design of old age homes, Criteria to be considered when designing for the visually impaired.

Controls and Displays, psycho psychological aspects of Design, Occupational hazards in work environment, Visual stress, Postural Stress, Stress due to commuting.

REFERENCE BOOKS

1. Chaira, J. D. and Callender, J. H. (1987). Time Savers Standards for Building Types. Singapore : McGraw-Hill.
2. Crosbie, M. J. and Watson, D. (2005). Time Savers Standards for Architectural Design: Technical data for Professional Practice. 8th Ed. The McGraw-Hill Company.

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COURSE CODE:AR1451-05	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-IV	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

TRADITIONAL ART & CRAFT-I

SUBJECT OBJECTIVE

- To Appreciate and understand art, craft and architecture as manifestation of a broader cultural and intellectual milieu to which it belongs and evolves from.

LEARNING OUTCOME

- The students will be able to develop an understanding of the various art forms and craft movements.
- Fine tune the aesthetic sense and critically appreciate art.

MODULE

Introduction to traditional art, craft and culture of different states of India.

Traditional painting-Madhubani painting, Thanjavur painting, Pattachitra painting, miniature painting, tribal arts etc.

Traditional sculpture and crafts-terracotta, metal casting, woodwork, tapestry, Furniture and other fabric based craft.

REFERENCE BOOKS

1. Handmade. In India by Aditi Ranjan and M.P. ranjan.
2. Art and Craft of India byllayCooper and jaan Gillow.

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COURSE CODE:AR1451-06	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-IV	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

DESIGN OF BUILDING ELEMENTS

SUBJECT OBJECTIVE

- To impart knowledge about this relative relation of the building elements to the behavior of the building as a whole.

LEARNING OUTCOME

- The students will be able to develop an understanding of the multiplicity of different elements to the patterns, activities, geometric patterns in space and designing for the same.
- To students will gain knowledge about the design process step by step, techniques and design contexts.

MODULE

An introduction to different design elements their need and definitions, the principles involved in designing.

Design elements within buildings, site planning, parking, approach to plinth levels, corridors, entrance and exit, windows, stairways, toilets(public toilet, toilet booth), signage, floor materials.

Design elements outside the building – kerb at footpath, road crossing. Details in ramps, guide rails, dimensions of wheel chairs, accessibility in public buildings, signage, audio visual facilities etc.

REFERENCE BOOKS

- Introduction to Architecture by Ching and James F Eckler
- Elements of Architecture by Rem Koolhaas
- Architectura: Elements of Architectural Style by Miles Lewis

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COURSE CODE:AR1452	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ARCHITECTURAL RESEARCH-III	1	0	2	3	2	50	50	0	100	3
COURSE CATEGORY-PC										

SUBJECT OBJECTIVE

- To Understand basic principles of any research with special reference to architectural research and applications.

LEARNING OUTCOME

- Students will be able to present their work and understand the current market and the industry standard through surveys and will be able to present the same through different presentation modes.

MODULE

Introduction:

Aspects of Analysis of an Architectural project.

Technical Writing :

Critical Appreciation of a Project: Analyzing on the basis of site, Built Form and Space, Spatial Organization, Materials and Techniques, Elements and Special Characteristics, Activity Pattern.

Book Reviews :

Review of Book with presentation of the précis.

REFERENCE BOOKS

1. Raman Meenakshi and Sharma Sangeeta, "Technical Communications – Principles and Practices", Oxford University Press, New Delhi.
2. Fundamentals of Design

[Handwritten signatures and initials in blue ink, including names like 'Ramesh', 'Anil', and 'Mukul', along with various scribbles and marks.]

COURSE CODE-AR1453	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-COMPUTER STUDIO-I (AUTOCAD 2D & 3D)	1	0	2	3	2	50	0	50	100	-
COURSE CATEGORY- PAEC/SEC										

SUBJECT OBJECTIVE

- To Impart skills of Computer Aided Design & Simulation in decision making in Architectural design
- To impart skills of presentation technique using computer as a tool

LEARNING OUTCOME

- The students will Understand CAD as a basic tool for Architectural Design.

Module 1

AutoCAD 2D:

Introduction to AutoCAD as 2D drafting tool.

CAD 2D Vector UCS generation, creation of different entities, dimensioning, Blocks, Array, Layers, line types, Colours.

Digital drawings tools, drawing lines and shapes, modifying lines and shapes, drawing with accuracy and speed.

Module 2

Drawings:

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.

Module 3

AutoCAD 3D:

3D modelling using AutoCAD

Introduction to 3D-modelling technique using AutoCAD.

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 modeling: Revolve, Shell, Taper, Loft, Path extrusion and sweep.

REFERENCE BOOKS

1. "Mastering AutoCAD 2010 and AutoCAD LT 2010", George Omura, Wiley, 2009.
2. Mastering AutoCAD 2017 and AutoCAD LT 2017, George Omura & Brian C. Benton
3. 100 CAD Exercises - Learn by Practicing!: Learn to design 2D and 3D Models by Practicing with these Artes Jason.

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COURSE CODE: AR1454	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- NTCC – III (EDUCATIONAL TOUR / DOCUMENTATION + WORKSHOP)										
COURSE CATEGORY- PAEC/PAECC	0	0	0	0	1	50	0	50	100	—

OBJECTIVES

- To prepare students to integrate theory and practice from courses through educational tours/documentation & workshops.

LEARNING OUTCOME

- The student will be able to develop and improve their planning concepts and ideas through critical thinking
- Understand inception, scheduling, execution and dissemination in the context of live architectural planning through educational tours/documentation & workshops.

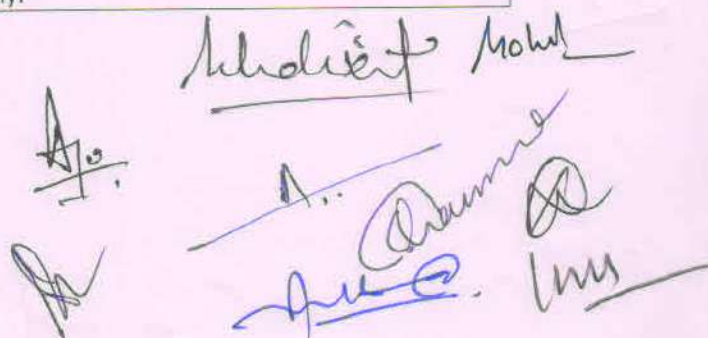
Module

- An exposure to be given to students of the cultural heritage buildings, buildings of importance to the nation and society, urban and rural areas and their precincts.
- The students are introduced to the planning aspects of buildings of importance, their functional and aesthetic characteristics via discussions of the tour guide/ coordinator of workshop.
- Preparation of Educational tour reports / Workshop reports by the group /groups of students.

Guidelines for Educational tour Report/ Workshop Report

The report has to be not less than 50 pages. The report has to be spiral bound. The drawing and sketches should be properly scaled and labeled with necessary legends and detailing.

Language	English
Paper Size	A4
Margin	The left and right margin of 1.25 inches. The top and bottom margin of 1.00 inch
Typing	On both sides of the page. The text will follow line spacing of 1.5 lines and double justified.
Arrangement of Contents	Every NTCC Project Report should have three parts: the pre pages, the main text and the reference material. The following is the order: 1. Preliminary Pages: a. Title page b. Declaration c. Necessary Approvals Page d. Acknowledgement e. Table of Contents 2. Text: Chapters: (Building /area wise) & sub-sections 3. Area Context, Data Collection, Analysis, Conclusions, Recommendations & Proposals 4. Reference Materials: Appendix
Tables & Figures	These shall be placed immediately after the paragraph that contains it. Each table & figure has to be numbered consecutively within chapters.
References (if	These have to be listed alphabetically.



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any)	Retrievable data must be listed in references. Personal interviews/ raw data shall not appear in the reference list.
Appendices (if any)	Contains supplementary of illustrative material on explanatory data to be incorporated in main document as per the order of appearance in the document.

The Break up (components and their weightage) of continuous internal assessment are given as under :

S.No.	Title	CIA (MM 50)
1.	Introduction & aim of Educational Tour/Workshop	5
2.	Necessary Approvals	5
3.	Case Studies/ Historical Background of the place or building	10
4.	Photographs of details, sketches, Plans (key plans /measured drawings/schematic plans, etc.)	20
5.	Learning outcomes/conclusions drawn	10

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SEMESTER V

Course Category	SUBJECT CODE	SUBJECT NAME	THEORY / PRACTICAL	SCHEME OF TEACHING						SCHEME OF EVALUATION						EXAM HRS	
				Lectures	Tutorials	Studio Projects (OSP)	Workshops	TOTAL PRACTICALS	VIA				VIVA		TOTAL		
									CT	TA	AT	TOTAL	Theory (%)	PRAC. (AL. VIVA)			DO. M.
SEMESTER VI																	
PC	AR1601	ARCHITECTURAL DESIGN - VI	THEORY	2	3	0	5	0	24	8	8	40	60	0	60	100	12
BS & AE	AR1602	BUILDING CONSTRUCTION & MATERIALS-VI	THEORY	1	0	0	1	2	24	8	8	40	60	0	60	100	1
BS & AE	AR1603	ARCHITECTURAL STRUCTURE - VI	THEORY	1	1	0	2	2	24	8	8	40	60	0	60	100	1
PC	AR1604	SPECIFICATIONS, COST ESTIMATION & BUDGETING	THEORY	1	2	0	3	3	24	8	8	40	60	0	60	100	1
PC	AR1605	WORKING DRAWING	THEORY	1	0	2	3	2	24	8	8	40	60	0	60	100	1
EC/PE	AR1606	THEORY OF DESIGN	THEORY	1	0	2	3	2	24	8	8	40	60	0	60	100	1
BS & AE	AR1607	BUILDING SERVICES - IV (ACOUSTICS)	THEORY	2	0	0	2	1	24	8	8	40	60	0	60	100	1
PC	AR1601P	ARCHITECTURAL DESIGN - VI (VIVA VOCE)	PRACTICAL	0	0	1	1	1	0	0	0	0	0	50	50	50	-
BS & AE	AR1602P	BUILDING CONSTRUCTION & MATERIALS - VI (VIVA VOCE)	PRACTICAL	0	0	1	1	1	0	0	0	0	0	50	50	50	-
ECPE	AR1651	ELECTIVE - VI	PRACTICAL	1	0	1	2	2	0	0	0	50	0	50	50	100	-
PAEC/ SEC	AR1652	COMPUTER STUDIO -III (3DS MAX, REVIT ADVANCED)	PRACTICAL	1	0	2	3	2	0	0	0	50	0	50	50	100	-
PAEC/ PAEC C	AR1653	NTCC-V(EDUCATIONAL TOUR + DOCUMENTATION+WORKSHOP)	PRACTICAL	0	0	0	0	1	0	0	0	50	0	50	50	100	-
				TOTAL	10	27										1100	

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COURSE CODE:AR1501	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ARCHITECTURAL DESIGN-V	2	3	0	5	6	40	60	0	100	12
COURSE CATEGORY-PC										

SUBJECT OBJECTIVE

- To understand the role of climate and environment as a context in shaping building design.
- To comprehend the interpretation of prescribed environmental directions / norms for a given place in building forms.
- Learn building on sloping sites or with unique topography.

LEARNING OUTCOME

- The student will be able to recognizing the relevant building techniques & materials suitable for different regions & explore their applicability in design.

Module-1

Understanding climatic zones:

Lecture on the varied climate zones especially in the Indian sub-continent including examples of environment responsive designs. Establishing design criteria for various climate types.

Module-2

Design of climate responsive buildings:

Designing a multi-functional building in a typical climate zone utilizing the developed design criteria.

Design on sloping site:

Design exercise on sloping terrain with specific orientation & climatic conditions.

Module-3

Design Exercises:

Introduction of long span structural systems that inspire form oriented built forms like cultural complex, museums.

SUGGESTED STUDIO EXERCISES

1. **Time problems** like HIG residence (1DAY)
(Studies of various climates, establishing climatic responsive architecture, design on sloping site responses)
2. **Minor/Short Problems** design of multi-functional building like studio cum residences, club, college hostel, commercial complex etc (1 WEEK)
3. **Major Problems** design on sloping site with unique topography for structures complex or cultural complex, museums etc.
4. Study tours to relevant destinations for documentation of vernacular architecture.

REFERENCE BOOKS

1. Krishan, Arvind Climate Responsive Architecture.
2. Brown, G.Z. Sun Wind & Light.
3. Olgay, V. Design with Climate.
4. Yeang, Ken. Designing with Nature: The Ecological basis for Architecture Design.
5. Works of Architects like Hasan Fathy, B.V. Doshi, Charles Correa, Ken Yeang, among others to understand responses of varied designers to the existing environment.

Handwritten signatures and initials in blue ink, including names like "Mudrit", "Kishu", "A. D.", "Dharma", "A. S.", and "I. M.", along with a small sketch of a building or structure.

COURSE CODE:AR1502	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-BUILDING CONSTRUCTION&MATERIAL-V	1	0	0	1	2	40	60	0	100	3
COURSE CATEGORY-BS&AE										

SUBJECT OBJECTIVE

- To acquaint the students to usage of building materials such as Metals (Ferrous), Floorings.
- To understand the use of these building materials in building works.
- To understand the use of the metal doors/windows in existing and new construction.
- To familiarize the student with the building construction practices on site.

LEARNING OUTCOME

- Students will be able to explore on various building materials and construction techniques based on the performing standards and codes, wherein application of each material would be discussed in detail, both in the context of historical and contemporary methodology.
- Students will be able to know usage of new technology/materials.

SECTION – A, BUILDING MATERIALS AND SCIENCES

Module-1

Metals (Ferrous):

Ferrous-Iron (Pig, Cast & Wrought).

Variety of Mild Steel sections – Sheets (plain & corrugated), Flats, Bars (round & square), Angles (Equal and Unequal), R.S. Sections (I beams, Channels, Tees).

Hollow Tubular sections available for application in building industry.

Stainless steel and Alloys.

Metals (Non-Ferrous):

Non Ferrous – Copper & Copper based alloys (Brass & Bronze), Tin, Cadmium, Chromium, Zinc, Lead and Nickel. Metal Coatings – Electroplating, Anodizing.

Module-2

Floor& Floor Finishes:

Brick, Cement Concrete, Stone, Terrazzo, Chequered Tile, Ceramic Tile, Vitrified Tiles, Wooden.

Reinforced Brick Work:

Types, Mixing, Curing, Water Cement Ratio, Qualities and Workability.

LIST OF ASSIGNMENTS (Market Surveys, Seminars & Report)

1. To study the availability, constituents, properties, manufacturing processes, storage, transportation and applications of above mentioned materials.
2. To visit assembly workshops/shops etc. for better understanding and submit report.



 A collection of handwritten signatures in blue and black ink, including names like 'Mehdiert', 'Molul', 'Daimie', 'Aue', and 'Muy'.

WORKSHOP/CONSTRUCTION YARD PRACTICE & SITE EXPOSURE

Module-3

Workshop/Construction Yard Practice:

Practicing in construction yard / workshop by making the examples of metal joinery, fixing of flooring, fixing of dado, door samples.

Site Exposure- Exposure to advanced building construction practices on site of various items of work from foundation to roof and finishes.

SECTION – B, BUILDING CONSTRUCTION TECHNOLOGY

Module-4

Structural Steel Works:

Typical metal joinery - Mechanical (riveted & bolted), Soldering and Brazing and welding.

Detailing of structural steel work – Beam to Column joint, Beam to Beam joint, Column Splice, Column Base, Roof Truss to Column Joint.

Steel Stairs.

Doors & Windows(Metals):

Mild steel L and Z section, Pressed steel section.

Shutters (Operational Mechanisms):

Complete understanding of operational mechanism (automatic and manual) of variety of Rolling shutters and Collapsible shutters.

Module-5

Reinforced Brickwork:

Reinforced brick piers, lintels, slabs and projections.

Floor/Dado/Skirting:

Complete process of laying of floor and skirting - Brick, Cement Concrete, Mosaic and Terrazzo floors.

Laying and fixing of Stone slabs, Chequered Tile, Ceramic tiles, Vitrified tiles and Wooden (parquet and plank) on subfloors and walls.

LIST OF ASSIGNMENTS

1. To study the various tools, equipments used in structural steel works.
2. To construct examples of structural steel works in construction yard.
3. To survey construction work on site and submit report. To construct examples of reinforced brickwork and Variety of flooring in construction yard.

CONSTRUCTION PLATES

1. To understand the application of structural steel works in buildings.
2. To understand the application of metal doors and windows in buildings.
3. To understand the application of metal shutters (Rolling) in buildings.
4. To understand the application of metal shutters (Collapsible) in buildings.
5. To understand Reinforced brick piers, lintels, slabs and projections.
6. To understand laying of above mentioned floors and fixing of above tiles on floors and walls.

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REFERENCE BOOKS

1. McKay, W.B., "Building Construction Volume I, II, III and IV", Longmans, 1955.
2. Ching, Francis D. K. and Adams, Cassandra, "Building Construction Illustrated", Wiley and Sons, 2000.
3. The Construction of Buildings – Barry Volume I, II, III and IV
4. Chudley, Roy, "Construction Technology", Longman, 2005.
5. Building Construction_Mitchell (Elementary and Advanced)
6. Rangwala, S. C., "Building Construction", Charotar Publishing House, 2007
7. Building Construction-Bindra &Arora.
8. Punmia B. C., Jain A. J., and Jain A.J., Building Construction, Laxmi Publications, 2005.
9. Mitchell's Structure & Fabric-II
10. Principle & Practices of Heavy Construction; Smith & Andres
11. Don A.Watson, Construction Materials and Processes, McGraw Hill Co.
12. Building Materials by SC Rangwala: Charotar Pub. House, Anand
13. M. Gambhir, NehaJamwal, Building Materials Products, Properties and Systems, Tata McGraw Hill Publishers, New Delhi, 2011.
14. R.K.Gupta, Civil Engineering Materials and Construction Practices, Jain brothers, New Delhi, 2009.
15. National Building Code of India (Latest Edition), Bureau of Indian Standards.
16. Engineering Materials-Deshpande.
17. Engineering Material-Roy Chowdary
18. Designing with models – Criss. B. Mills.
19. Morris, M., "Architecture and the Miniature: Models", John Wiley and Sons, 2000.
20. Mills, Criss B., "Designing with Models: A Studio Guide to Making and Using Architectural Models", Thomson and Wadsworth, 2000.
21. Raghuwanshi, B.S., "A Course in Workshop Technology - Vol. I and II", Dhanpat Rai and Co, 2001.

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COURSE CODE:AR1503	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-STRUCTURES-V										
COURSE CATEGORY-BS&AE	1	1	0	2	2	40	60	0	100	3

SUBJECT OBJECTIVE

- To understand the various structural elements and their application in structural design and analysis by LIMIT STATE METHOD.

LEARNING OUTCOME

- The students will familiarize with analysis of structural elements and exposed to practical aspects of design.

Module-1

Analysis and Design of R.C.C. Slab

Analysis and Design of one way, two way and flat slabs and detailing of its reinforcement.

Module-2

Analysis and Design of R.C.C. Beam (Continuous)

Analysis and Design of R.C.C. continuous beam and detailing of its reinforcement.

Module-3

Analysis & Design of R.C.C. Column

Introduction, Effective height of column, Assumptions, Minimum eccentricity, Analysis and design of short R.C.C. column under pure axial load as well as under axial load and bending moment and detailing of its reinforcement.

Module-4

Analysis and Design of R.C.C. Stairs

Introduction, Type of stairs, Effective span of stairs, Loading on stairs, Analysis and design of stairs (dog legged with waist slab) and detailing of its reinforcement.

Module-5

Portal Frames and Reinforcement

Detailing of Structural Elements

REFERENCE BOOKS

1. Ashok K. Jain , "Reinforced Concrete" Limit State Design.
2. M.L. Gambhir, "Fundamentals of Reinforced Concrete Design".
3. P.C. Varghese., "Advanced Reinforced Concrete Design".
4. Dr. B.C. Punmia; Er. Ashok Kumar Jain; Dr. Arun K.Jain "R.C.C.Designs
5. Neelam Sharma , " Reinforced Concrete"
6. IS 456:2000
7. N. Krishna Raju, " Reinforced Concrcte : Limit State Method"








COURSE CODE:AR1504	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs.
COURSE NAME-INTERIOR DESIGN										
COURSE CATEGORY-EC/PE	1	0	2	3	2	40	60	0	100	3

SUBJECT OBJECTIVE

- To initiate students into theory and practice of Interior Design.
- To familiarize students with modern materials and techniques useful for furniture and interior design.
- To appreciate early interventions in design of furniture

LEARNING OUTCOME

- Understanding Interior as basic for design with respect to Function, comfort and aesthetics.

Module-1

Introduction to Interior Design :

Definitions related to interior design, review of enclosing elements like walls, floors, ceilings, openings, staircases, furniture & design elements such as color, light textures in interior spaces. Principles of interior design.

Module-2

History of Interior Design:

Introduction to history of Interior & Furniture Design
Study of furniture of great contemporary masters.

Module-3

Materials and Finishes:

Study of Materials, Finishes & their applications in Furniture & other Interior Elements
An in-depth understanding of the characteristics and workability of various materials used in interiors. Modern Interiors with respect to Materials Ceiling, Panelling, Furniture etc.

Module-4

Modular Furniture and Interior elements:

Understanding innovation in Furniture & Interior Design
Modern materials, Modular furniture, Fittings & fixtures.

Details of Interior landscaping

Module-5

Space Designing:

Analysis & Design of spaces with furniture.
Analyzing existing designs of selected furniture on basis of ergonomics, user type, economics, material, joinery and maintenance to ascertain their suitability. Design furniture for specific use complying to the aforementioned formulated design criteria. Build scaled models of the designed furniture for better understanding of working and materials.

REFERENCE BOOKS

1. Corky Binggeli, "Interior Design Illustrated", 3rd Edition Francis D.K. Ching,
2. Joseph De Chiara, Julius Panero, Martin Zelnik, "Time-Saver standards for interior design and Space planning",
3. John F. Pile, "A history of interior Design"
4. Bridger May, Curt Sherman, "Architecture and Interior Design through the 18th Century : An

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- Integrated History Buie Harwood",
5. Susie Mckellar Penny Sparke, "Interior Design and Identity"
 6. Corky Binggeli, "Building Systems for Interior Designers"
 7. Pandya, Yatin. Elements of spacemaking.
 8. Massey, Anne. Interior design since 1900.

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COURSE CODE:AR1505	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- HISTORY OF ARCHITECTURE & CULTURE -IV (WESTERN ARCH.)										
COURSE CATEGORY-PC	1	2	0	3	3	40	60	0	100	3

OBJECTIVES:

- 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, Indian Architecture in its various stylistic modes characterized by technology, ornamentation and planning practices.

LEARNING OUTCOME

- The study must enable students to do a comparative evaluation of developments in a chronological manner along the timeline and across different geographies.
- The students must be enabled to appreciate tangible and intangible aspects of heritage associated with history.

Module-1

Greek and Roman Architecture:

Classical orders as constituent element of Architecture. Column Orders and the articulation of temples. Classification of temples. Study of important acropolis, agora, temples, theatres, tombs and house forms.

Study of important forums, temples, basilicas, thermaes, theatres, amphitheatres, circuses, tombs, triumphal arches, palaces, houses and villas.

Module-2

Early Christian Architecture:

Development of early church from Roman basilica. The concept of center and path of Christianity manifested through centralized and longitudinal church. Study of different basilica churches in Italy.

Rise of Byzantine Era- Centralization in Byzantine churches. Centrality and interiority of both crossdomed and cross in square planned church. Indistinct exterior of churches and the domed 'heavenly' interior. Construction of dome over polygonal compartments through the use of pendentives. Study of important churches in Italy.

Module-3

Romanesque Architecture:

Massiveness and verticality of medieval churches. Combination of the five towered structures and longitudinal basilica. Gradual integration of tower from early to later examples.

Gradual flow of Romanesque era into Gothic Architecture. Integration of wall and vault.

Ribbed vault and the dissolution external wall to allow light. Study of important cathedrals and churches from Italy and France.

Module-4

Renaissance Architecture:

Break with medieval churches for sources from Roman antiquity. Spatial centralization through simple addition of independent spatial elements. Use of elementary geometrical forms unified through symmetry and simple mathematical ratios. Reintroduction of anthropomorphic Classical Orders. Study of palazzos and development of centralized church form through specific examples from Italy.

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Mannerism Conflict and tension in Mannerism in place of harmony and order of Renaissance. Dynamic interplay of contrasting elements as against static addition of independent units of Renaissance church. Interplay between manmade and nature in villas. Dynamism of urban spaces. Centralized longitudinal and the elongated central church plans. Study of important villas, churches and urban spaces in Italy.

Module-5

Baroque Architecture:

Dynamism and systemization of Baroque architecture. Vitality and spatial richness with underlying systematic organization. Space as constituent element of architecture, as a complex totality and indivisible figure, comprising of interacting spatial elements based on inner and outer forces. Sensitivity to effects of texture, color, light and water. Study of important urban spaces and churches in Italy and Germany.

REFERENCE BOOKS

1. Sir Banister Fletcher, A History of Architecture, University of London, The AntholonePress, 1996.
2. Spiro Kostof - A History of Architecture - Setting and Rituals, Oxford UniversityPress, London, 1985.
3. Leland M Roth; Understanding Architecture: Its elements, history and meaning; Craftsman House; 1994
4. Pier Luigi Nervi. General Editor - History of World Architecture - Series, Harry N.Abrams, Inc.Pub., New York, 1972.
5. S.Lloyd and H.W.Muller, History of World Architecture - Series, Faber and Faber Ltd., London, 1986.
6. Gosta,E.Samdstp, Man the Builder, Mc.Graw Hill Book Company, New York, 1970.
7. Webb and Schaeffer; Western Civilisation Volume I; VNR: NY: 1962
8. Vincent Scully: Architecture; Architecture – The Natural and the Man Made: Harper Collins Pub: 1991.
9. Christian Norberg-Schulz, Meaning in Western Architecture, Praegur, 1975
10. Kenneth Frampton, Modern Architecture: A Critical History, Thames and Hudson, Ltd. 2007. Coplestone, T. and Lloyd, S.(1971).
11. World Architecture: An Illustrated History. London : Verona Printed.
12. Watkin, D. (2005). A History of Western Architecture. 4th Ed. London :Laurence King Publishing.

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COURSE CODE:AR1506	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- BUILDING SERVICES - III (MECH. HVAC & F.F.)	2	1	0	3	3	40	60	0	100	3
COURSE CATEGORY-BS&AE										

SUBJECT OBJECTIVE

- To develop the understanding of important Services in buildings, definitions and terms used, functioning and their applications in building.

LEARNING OUTCOME

- The students will get familiar with the fundamentals of air conditioning, firefighting and vertical Transport systems & their integration with architectural design.

Module-1

Introduction:

Introduction to Electro-mechanical means of vertical transportation in buildings, requirements, occupancy, load etc.

Study of elevators and escalators on the basis of quality and quantity of service, various components, standard space requirements, various types, construction details and architectural implications.

Module-2

Types of Lifts & Escalators:

Working of lifts with details of lift section describing various parts of lifts -Definitions regarding lifts such as average travel lift carrying capacity, rated load, rated speed, RTT etc.

Installation requirements and the information to be provided by the architect for the installation - Grouping of lifts and design standards of a lift lobby.

Function and working of Escalators:

The emphasis shall be on the drawing of the correct plan and section of the lift and the lift well showing various parts and how to group them in a building core for the various functions they perform.

Module-3

Air-conditioning:

Detailed studies of Natural and Artificial ventilation. Refrigeration cycle, systems of air conditioning: Unit, split, package, Direct expansion, Chilled water System, Ducting & air conditioning layout, fittings and fixtures, chilling plants, cooling towers, air handling units, Calculation of AC loads. Air distribution systems, ducts and ducting layouts, – VAV & VRV Systems.

Design criteria for selecting the Air conditioning system for small and medium sized buildings and layouts with emphasis on space requirement, orientation of the building and energy conservation measures

Module-4

Fire Fighting & Standards:

Fire, causes of fire and spread of fire, fire fighting, protection & fire resistance, equipment & methods of fighting fire, Code of fire safety, fire regulations.

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 etc.

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Introduction to firefighting systems.

Fire detection, Fire sprinklers, Fire extinguishers and Fire Hydrants system.

Their system of working and design calculations.

REFERENCE BOOKS

1. Mitchell's Building Construction: Environment & Services, Peter Burberry, 8th Edition, 1997, Longman.
2. Mechanical and Electrical Equipment for Buildings, B. Stein and J. Reynolds, 10th Edition, 2005, Wiley & Sons Inc.
3. The Building Systems Integration Handbook, R Rush, 1991, American Institute of Architects.
4. Building Services: A Guide to Integrated Design: Engineering for Architect, RP Parlour, 2008, Integral Publishing.
5. Understanding Buildings: A Multi-disciplinary Approach, E Reid, MIT.
6. William H. Severns and Julian R. Fellows, "Air-conditioning and Refrigeration", John Wiley and Sons, London, 1988.
7. A.F.C. Sherratt, "Air-conditioning and Energy Conservation", The Architectural Press, London, 1980.
ASHRAE Publications.
8. National Building Code of India (Latest Edition), Bureau of Indian Standards.
9. Willim, J. McG. (1971). Mechanical & Electrical Equipment for Buildings.
10. Sawhney, G. S. (2006). Fundamentals of Mechanical Engineering: Thermodynamics, Mechanics and Strength of Materials. New Delhi : Prentice Hall of India.
11. F. Hall , "Building Services and Equipment, Volume 1,2 & 3", Routledge; 3rd edition 1994 2.
12. "National Building Code for India", Bureau of Indian Standards, Latest Edition
13. John E. Flynn and Jack A. Kremers, "Architectural Interior Systems" , Van Nostrand Reinhold; 3 Sub edition, 1992
14. P. N. Ananthanarayan, "Basic Refrigeration and Air Conditioning" , Tata McGraw-Hill Education , 2013
15. Strakosch, George R. "Vertical transportation: elevators and escalators", John Wiley & Sons Inc, 1983.
16. Lechner, Norbert, "Heating, cooling, lighting: Sustainable design methods for architects", John wiley & sons, 2014.

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COURSE CODE:AR1551(1)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-V	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

ART/ PERFORMING ARTS PROJECT-V

SUBJECT OBJECTIVE

- To embed stronger and more enduring means of evoking architecture and culture.

LEARNING OUTCOME

- Students will perform different cultural activities in coordination with the stream of architecture being taught in their respective semesters.

MODULE

Exercises on topic of Architectural interest like debate, skits, extempore, theatrical exercises individually or in groups to develop their communication skills, using theater as a medium. It will also train the students towards team building.

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COURSE CODE:AR1551(2)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-V	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

ARCHITECTURAL COMPETITIONS-V

SUBJECT OBJECTIVE

- To provide a wide range of design solution for creating interest in role of architecture in national and international design competitions.

LEARNING OUTCOME

- Understanding of Contemporary Architecture.
- Development of idea of Team Work.
- The student will learn to formulate architectural concept and learn to work in time frame scenario.

MODULE

Students will participate in different national and international competitions (preferably on projects upto the scale as mentioned in the syllabus of the Architectural Design of that year)- introduced by Architects, Architectural, colleges, firms and forums NGO's. Council of Architecture, NASA, Zonal NASA, etc.

The students will formulate the scheme under the guidance of faculty mentors and prepare basic design layout and competition requirements.

The students will have hands on practice of the rendering techniques.

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COURSE CODE:AR1551(3)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-V	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

FOREIGN LANGUAGE-V (FRENCH)

SUBJECT OBJECTIVE

- To enable students to acquire more vocabulary, to use all negative expressions, adjectives, new tenses, to understand more advanced texts and start describing any situation using Past Tense, Imparfait, present progressive, and future tenses and also to enable them to identify and talk about famous monuments of France

LEARNING OUTCOME

- After completing these modules, the students will be able to communicate using negative expressions in French, describe past and future incidents or any situation in any given tense using correct form of adjectives. The student is able to talk about famous monuments of France and communicate with a receptionist for booking a room in a hotel.

MODULE

- Childhood memories: a text using imparfait.
- Conjugation and usage of passé composé with verb 'avoir'
- Conjugation and usage of passé composé with verb 'être'.
- A memorable celebration - difference between passé composé and imparfait
- Expressing one self using future tense.
- Future plans: conjugation and usage of simple future tense (exceptional verbs).
- Describing continuous actions in present
- A foreigner in France - using different negative expressions.
- Hotel reservations.
- Usage and placement of COD and COI in different cases
- Description of famous monuments of France
- All forms of describing words.
- Using more than one adjective with a noun.

REFERENCES BOOKS

- A Propos- A1(by Christine Andant, Catherine Metton, Annabelle Nachon, Fabienne Nugue)
- Mon livre de français (levels are mentioned in the attached document)
- Apprenons la grammaire ensemble
- 450 exercices de grammaire
- Collins 3-in-1 French Grammar, Vocabulary & Verbs
- A compilation of French texts and exercises made by faculty members.

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COURSE CODE:AR1551-04	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-V	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

GRAPHIC DESIGN II

SUBJECT OBJECTIVE

- To understand various aspects of design in graphics. Understand presentation skills, logos and ad making with Computer graphics.

LEARNING OUTCOME

- Develop use of graphics as tool of presentation and 3D visualization in architectural works

MODULE

Study fundamentals of graphic design, history, career options, works of prominent designers & the graphic design process.

Study of tools of graphic expression. Study of styles of expression, developing manual presentation skills.

Computer graphics. Study overview of current packages, their potentials & applications such as, adobe series, Corel draw, flash etc.

Exercises on design of books, posters, promotional materials, stationery, trade marks & corporate logos. Evolve comprehensive corporate identity program Developing environmental graphics / signage Brand promotion, packaging design & ad making for both the print & electronic media.

REFERENCE BOOKS

- The Elements of Graphics Design by Alex W WIGHT
- Rendering with pen n Ink
- Dictionary of Graphic design and designers, Thames and Hudson

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COURSE CODE-AR1551-05	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-V	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

TRADITIONAL ART & CRAFT-II

SUBJECT OBJECTIVE

- To introduce the various art forms and architecture that exist from ancient to modern times and to sensitize the students towards the moral, aesthetical, cultural, political contexts and potential of art & architecture.

LEARNING OUTCOME

- The student will develop understanding of cultural expression in art and craft as resultant of socioeconomic and political roots of society.
- The student will understand various art and craft movements resulting into manifestations of architectural forms.

MODULE

Introduction of Traditional art and Craft of European and other countries.

Study of pottery, ceramic, wood work, metal casting, mural, traditional painting and study of traditional sculpture at global level.

Mainly the traditional arts and crafts of European countries, Egypt, Arabian country, China, Korea, Japan, Tibet and Thailand.

Modern art movements.

REFERENCE BOOKS

- Arts and crafts by Asim k. Dasgupta,
- Dictionary of art by Jean turner,
- Arnold Dana , art history- very short introduction by Oxford press.

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COURSE CODE:AR1551-06	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-V	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

BIO-MIMICRY ARCHITECTURE

SUBJECT OBJECTIVE:

- To understand 'Biomimicry' and 'Biophilia'
- Reconnect with nature: learning to observe nature by function
- To understand and explore how biology can be integrated with design
- To examine how the 'biomimicry approach' can influence sustainable designs and innovations

LEARNING OUTCOME

- Students Will be able to drive abstractions from nature's solutions into design generation concepts
- Will be able to develop advanced skills on the use of creative design methods by examining the nature

MODULE

Understanding Biomimicry : theory and case studies

Approaches, Principles and levels of Biomimicry

Patterns of Biophilia

Integrating Biology in Design: the design process along with design exercise to realize the process of discovering biological inspiration and its application and its relevance to sustainability

REFERENCE BOOKS

1. Michael Pawlyn, "Biomimicry in Architecture", 2011, RIBA Publishing, London.
2. Dora Lee, "Biomimicry: Inventions Inspired by Nature", 2011, Kids Can Press, Toronto, Canada.
3. Stephen R. Kellert, "Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life, 2011, John Wiley & Sons, New Jersey.
4. Stephen R. Kellert, "Nature by Design: The Practice of Biophilic Design", 2018, Yale Univ.Press.
5. Benjamin R. Krueger, "Biomimicry: Nature as Designer", 2016, CreateSpace Independent Publishing Platform

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COURSE CODE:AR1552	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ARCHITECTURAL RESEARCH-IV	1	0	2	3	2	50	50	0	100	3
COURSE CATEGORY-PC										

SUBJECT OBJECTIVE

- Understanding basic principles of any research with special reference to architectural research and applications.
- To understand the basic methodology of writing a technical paper.

LEARNING OUTCOME

- To be able to write a technical paper of about 2000 words.

MODULE 1

Introduction:

Anatomy of a technical paper- parts of a technical paper; its chronology.

Module-2

Technical Writing:

Intent of the paper.

Structuring the paper; formulating a synopsis.

Identifying sources- categorization into direct and indirect; sequencing them in order of significance.

Referencing.

Module-3

Writing a technical paper :

Writing a paper of 2000 words in following stages:

Synopsis with clear heads of Intent, Background, Aims and Objectives, Scope, Methodology.

Structuring the body of the paper in detail.

Ascertaining Primary and Secondary Sources.

Utilizing the sources to reach to the desired objectives.

Editing the paper

REFERENCE BOOKS

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

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COURSE CODE:AR1553	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- COMPUTER STUDIO-II (REVIT BASIC,SKETCH UP DETAILED)										
COURSE CATEGORY- PAEC/SEC	1	0	2	3	2	50	0	50	100	-

SUBJECT OBJECTIVE

- To: Impart skills of Revit and Sketch up and other advance software according to the industry standard.

LEARNING OUTCOME

- The students will understand Revit and Sketchup as a basic tool for Architectural Design, Presentation,structure and MEP.

Module 1

Introduction:

Introduction to BIM concepts and Revit Architecture, Revit Interfaces, constraints and interconnected relationship between views into BIM.

Creation of first project

Module 2

Introduction to Revit view controls.

Setting view properties and using Visibility/Graphic overrides.

Exploring 3D view navigation controls.

Introduction to view creation.

Module 3

Tools:

Using design and constraints.

Methods for selecting and manipulating content.

Introduction to editing tools.

Exploring the concept of Categories, Families,Types and Instances.

Accessing family libraries and loading families into a project.

Introduction to sketching and sketched features.

Module 4

Sketchup:

Introduction to Sketchup.

Navigating the interface, manipulating objects, drawing, leveraging organizational tools.

Working with materials and textures.

Creating camera views. Selecting,moving and scaling objects.

Using the line tools for drawing.

Module 5

Tools:

Creating rectangles, outlines, circles and freehand shapes.

Creating 3D text.

Use of measuring and labeling tools.

Organizing drawings with groups and layers.

Creating components and using components from the library.

Creating and applying materials.

Working with Textures.

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Rendering and animating drawings.

REFERENCE BOOKS

1. Sketchup for Architects(English,Paperback,Mirinda Earl Rustia)
2. Autodesk Revit 2017 Architecture Fundamentals
3. Autodesk Revit 2018 Architecture Basics

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COURSE CODE:AR1554	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- NTCC – IV (SUMMER ASSIGNMENT)	0	0	0	0	1	50	0	50	100	—
COURSE CATEGORY-PAEC/PAECC										

OBJECTIVES

- To prepare students to integrate theory and practice from courses to field works in the form of a architectural planning project.

LEARNING OUTCOME

- The student will able to develop and improve their planning concepts and ideas through critical thinking
- Understand inception, scheduling, execution and dissemination in the context of live architectural planning through field works.

Module

- The Students are addressed in a common briefing session about the Summer Project which introduces them to the problem, issues, requirements, timeline and deliverables for the projects going to be introduced in the upcoming semester
- The students are introduced to the project on a holistic level and briefed about the study area and its characteristics. Then they are briefed about rules of social and ethical behavior to be followed while collecting data from primary as well as secondary sources. Each student is allotted a particular aspect of planning to focus on during the course of the project.
- The student is responsible for his/her individual aspect and has to submit a report on the same at the end of the project. Based on the student's interest and relevance of the same in varied planning applications, the student works on the aspect in a professional manner as per the practical applications of the same. The integration of the various aspects allotted to students culminate towards the entire project report and dissemination of the project.

Guidelines for Project Report

The report has to be not less than 15 pages or greater than 45 pages. The report has to be spiral bound. The maps should be properly scaled and labeled with necessary legends and detailing.

Language	English
Paper Size	A4
Margin	The left and right margin of 1.25 inches. The top and bottom margin of 1.00 inch
Typing	On both sides of the page. The text will follow line spacing of 1.5 lines and double justified.
Arrangement of Contents	Every NTCC Project Report should have three parts: the pre pages, the main text and the reference material. The following is the order: <ol style="list-style-type: none"> 1. Preliminary Pages: <ol style="list-style-type: none"> a. Title page b. Declaration c. Faculty Guide Approval Page d. Acknowledgement e. Table of Contents 2. Text: Chapters & sub-sections 3. Area Context, Data Collection, Analysis, Conclusions, Recommendations & Proposals 4. Reference Materials: Appendix

Tables & Figures	These shall be placed immediately after the paragraph that contains it. Each table & figure has to be numbered consecutively within chapters.
References	These have to be listed alphabetically. Retrievable data must be listed in references. Personal interviews/ raw data shall not appear in the reference list.
Appendices	Contains supplementary of illustrative material on explanatory data to be incorporated in main document as per the order of appearance in the document.

The Break up (components and their weightage) of continuous internal assessment are given as under :

S.No.	Title	CIA (MM 50)
1.	Design Detailing	5
2.	Final Report	5
3.	Presentation	5
4.	Case Studies & Literature Review	5
5.	Plans (key plans /measured drawings/schematic plans,etc.)	10
6.	Field Visit (supported by images)	10
7.	Presentation & Communication	10

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SEMESTER VI

Course Category	SUBJECT CODE	SUBJECT NAME	THEORY / PRACTICAL	SCHEME OF TEACHING					SCHEME OF EVALUATION							EXAM HRS	
				Lecture (L)	Tutorial (T)	Practical (P)	Field (F)	TOTAL CREDITS	CIA				ESE				Total
									SA	TA	AI	TOTAL	Theory (T)	PRACTICAL (VIVA)	ORAL		
SEMESTER VI																	
PC	AR1601	ARCHITECTURAL DESIGN - VI	THEORY	2	3	0	3	0	24	8	8	40	60	0	60	100	12
BS & AE	AR1602	BUILDING CONSTRUCTION & MATERIALS-VI	THEORY	1	0	0	1	2	24	8	8	40	60	0	60	100	3
BS & AE	AR1603	ARCHITECTURAL STRUCTURE - VI	THEORY	1	1	0	2	2	24	8	8	40	60	0	60	100	3
PC	AR1604	SPECIFICATIONS, COST ESTIMATION & BUDGETING	THEORY	1	2	0	3	3	24	8	8	40	60	0	60	100	3
PC	AR1605	WORKING DRAWING	THEORY	1	0	2	3	2	24	8	8	40	60	0	60	100	3
EC/PE	AR1606	THEORY OF DESIGN	THEORY	1	0	2	3	2	24	8	8	40	60	0	60	100	3
BS & AE	AR1607	BUILDING SERVICES - IV (ACOUSTICS)	THEORY	2	1	0	3	3	24	8	8	40	60	0	60	100	3
PC	AR1601P	ARCHITECTURAL DESIGN - VI (VIVA VOCE)	PRACTICAL	0	0	2	2	1	0	0	0	0	0	50	50	50	
BS & AE	AR1602P	BUILDING CONSTRUCTION & MATERIALS -VI (VIVA VOCE)	PRACTICAL	0	0	3	3	1	0	0	0	0	0	50	50	50	
ECPE	AR1651	ELECTIVE - VI	PRACTICAL	1	0	1	2	2	0	0	0	50	0	50	50	100	
PAEC/SEC	AR1652	COMPUTER STUDIO-III (3DS MAX, REVIT, ADVANCED)	PRACTICAL	1	0	2	3	2	0	0	0	50	0	50	50	100	
PAEC/PACC	AR1653	NTCC-VI(EDUCATIONAL TOUR / DOCUMENTATION+WORKSHOP)	PRACTICAL	0	0	0	0	1	0	0	0	50	0	50	50	100	
				Total		30		27				100%		1000			

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COURSE CODE:AR1601	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ARCHITECTURAL DESIGN-VI										
COURSE CATEGORY-PC	2	3	0	5	6	40	60	0	100	12

SUBJECT OBJECTIVE

- To understand the constraints of multifunctional units in an urban setting with respect to social norms, climate and client's expectations.
- To understand design limitations due to authority guidelines and making drawings / details necessary for final execution of a project.
- To integrate services and structure system in the design project.

LEARNING OUTCOME

- The students will be able to design for simple and multi-use, single and multiple floors with parameters of building byelaws.

Module-1

Introduction :

Acquainting with the various ways of designing a group housing in urban context i.e. low/medium rise- high density; high rise - high density etc.

Module-2

Study and Analysis:

Through literature studies and case studies analyze the constraints, typologies and interventions in housing throughout India and the rest of the world.

Module-3

Design Proposal:

Design of a housing project incorporating varied formats of grouping on an actual site with specific bye-laws and regulations.

Module-4

Proposal:

Integration of Services and Structure Development of the housing proposal to the stage integrating services, structure and other infrastructural facilities necessary for the final execution of the project and making relevant drawing for the same.

SUGGESTED STUDIO EXERCISES

1. **Time problems** like multi level parking, common infrastructure support facility for housing like club, etc.(1DAY)
2. **Minor/Short Problems** design of row houses, semi detached, detached and duplex residences etc (1WEEK)
3. **Major Problems** design of Housing for specific socio economic group.
4. Study tours to relevant destinations for documentation of vernacular architecture.

REFERENCE BOOKS

1. Ching, Francis D. K. "Architecture: Form, Space and Order", John Wiley and Sons Inc.
2. Lidwell, William, Holden, Kestina, Butler, Jill, "Universal Principles of Design", Rockport - Publications, Massachussets.
3. Correa, Charles, "The New Landscape",
4. Joglekar & Das, S.K, "Contemporary Indian Architecture: Housing and Urban Development", HUDCO, 1995

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5. Rewal, Raj, "Humane Habitat at Low Cost", Architectural Research Cell, 2000.
6. Steele, James, "The Complete Works of Balakrishna Doshi: Rethinking Modernism for the Developing World", Super Book House, Mumbai, 1990.
7. Alexander, Christopher, "Pattern language", Oxford University Press, 1977

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COURSE CODE:AR1602	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- BUILDING CONSTRUCTION&MATERIAL-VI										
COURSE CATEGORY-BS&AE	1	0	0	1	2	40	60	0	100	3

SUBJECT OBJECTIVE

- To acquaint the students to usage of building materials such as Metals (Non -Ferrous), Additives & Admixtures and Construction Equipments.
- To understand the use of these building materials in building works.
- To introduce and familiarize the students with the various temporary construction works required for RCC construction works.

LEARNING OUTCOME

- Students will be able to explore on various building materials and construction techniques based on the performing standards and codes, wherein application of each material would be discussed in detail, both in the context of historical and contemporary methodology.
- Students will be able to know usage of new technology/materials.
- To familiarize the student with the building construction practices on site.

SECTION – A, BUILDING MATERIALS AND SCIENCES

Module-1

Gypsum & Asbestos Products Introduction:

Gypsum Board, Suspended Ceiling (Board & Tiles), Gypsum Plaster, Components and Accessories, Jointing and Finishing. Understanding of various Asbestos Cement products available for application in building industry

Module-2

Additives & Admixtures:

Various additives and admixtures – Cementitious (crystalline) systems, Integral systems, Proprietary systems, Cementitious Coating system.

LIST OF ASSIGNMENTS (Market Surveys, Seminars & Report)

1. To study the availability, constituents, properties, manufacturing processes, storage, transportation and applications of above mentioned materials.
2. To visit assembly workshops/shops etc. for better understanding and submit report.

Module-3

Workshop/Construction Yard Practice:

Practicing in construction yard by making the examples of components covered under 'Building Construction Technology'.

Site Exposure- Exposure to advanced building construction practices on site of various items of work from foundation to roof and finishes

SECTION – B, BUILDING CONSTRUCTION TECHNOLOGY

Module- 4

Partitions & False Ceilings (Gypsum Board) :

Construction details of Metal Stud Partition (single layer). Construction details of Suspended Ceilings

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Doors, Windows & Partitions (Aluminium):

Doors Frames and Shutters. Windows Frames and Shutters. Partitions Framework & fixing with other suitable materials.

Module-5

Temporary Constructions:

Centering, Shuttering and scaffolding

R.C.C. – I (Formwork & Laying)-

Foundations - Isolated, Combined, Cantilever, Eccentric footing.
Grillage and Raft foundation. Pile foundations – details of pile, varieties of piles, pile caps.
Understanding of steel reinforcement types, laying, bending and binding.

R.C.C. – II (Formwork & Laying)-

Columns, Lintel, Projections/Chujjas and Beams.
Understanding of steel reinforcement types, laying, bending and binding.

R.C.C. – III (Formwork & Laying)-

Slabs - Simply supported, Continuous & Cantilevered.
Staircases – Waist and Folded slab.
Understanding of steel reinforcement types, laying, bending and binding.

LIST OF ASSIGNMENTS

1. To study the various tools, equipments used in RCC and temporary construction works.
2. To construct examples of RCC works in construction yard.
3. To survey construction work on site and submit report.

CONSTRUCTION PLATES

1. To understand the application of Aluminium Doors and Windows.
2. To understand the application of Partitions in Aluminium framework with other suitable panel materials.
3. To understand the application of temporary construction in buildings.
4. To understand the construction of RCC Foundations along with its' steel works.
5. To understand the construction of RCC Columns, Lintels, Projections and Beams along with its' steel works.
6. To understand the construction of RCC Slabs & Staircases along with its' steel works.

REFERENCE BOOKS

1. McKay, W.B., "Building Construction Volume I, II, III and IV", Longmans, 1955.
2. Ching, Francis D. K. and Adams, Cassandra, "Building Construction Illustrated", Wiley and Sons, 2000.
3. The Construction of Buildings – Barry Volume I, II, III and IV
4. Chudley, Roy, "Construction Technology", Longman, 2005.
5. Building Construction_Mitchell (Elementary and Advanced)
6. Rangwala, S. C., "Building Construction", Charotar Publishing House, 2007
7. Building Construction-Bindra & Arora.
8. Punmia B. C., Jain A. J., and Jain A.J., Building Construction, Laxmi Publications, 2005.
9. Mitchell's Structure & Fabric-II

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10. Concrete: Microstructure, Properties and Materials P. Kumar Mehta
11. Properties of Concrete A. M. Neville
12. Concrete Admixture Handbook: Properties, Science & V. S. Ramchandran Technology
13. Principle & Practices of Heavy Construction: Smith & Andres
14. Don A. Watson, Construction Materials and Processes, McGraw Hill Co.
15. Building Materials by SC Rangwala: Charotar Pub. House, Anand
16. M. Gambhir, NehaJamwal, Building Materials Products, Properties and Systems, Tata McGraw Hill Publishers, New Delhi, 2011.
17. R.K.Gupta, Civil Engineering Materials and Construction Practices, Jain brothers, New Delhi, 2009.
18. National Building Code of India (Latest Edition), Bureau of Indian Standards.
19. Engineering Materials-Deshpande.
20. Engineering Material-Roy Chowdary
21. Designing with models – Criss. B. Mills.
22. Morris, M., "Architecture and the Miniature: Models", John Wiley and Sons, 2000.
23. Mills, Criss B., "Designing with Models: A Studio Guide to Making and Using Architectural Models", Thomson and Wadsworth, 2000.
24. Raghuwanshi, B.S., "A Course in Workshop Technology - Vol. I and II", Dhanpat Rai and Co, 2001.
25. Testing of Concrete in Structures J H Bungey and S. G. Millard

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COURSE CODE:ARI603	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME -STRUCTURES-VI										
COURSE CATEGORY-BS&AE	1	1	0	2	2	40	60	0	100	3

SUBJECT OBJECTIVE

- To understand the structural behavior of various structural elements.
- To understand the analysis and design of R.C.C. structures and their use in building industry by LIMIT STATE METHOD.
- To understand the analysis and design of Steel structures and their use in building industry by LIMIT STATE METHOD.

LEARNING OUTCOME

- The students will familiarize with analysis of structural elements and exposed to practical aspects of design.

Module-1

Analysis & Design of R.C.C. Foundation & Footing:

Introduction, Type of foundation, Depth of foundation, Theory & design of axially loaded isolated square footing and detailing of its reinforcement. Pile foundation - Introduction, classification and its application.

Module-2

Analysis and Design of R.C.C. Retaining wall:

Introduction, Types of retaining walls, Analysis and Design of cantilever retaining walls and detailing of its reinforcement.

Module-3

Steel Structures I :

Riveted & Bolted Connection, Welded Connection, Design of Tension members, Design of Compression member.

Module-4

Steel Structures II:

Design of beam, Understanding Plate Girder & its use in building structure, Grillage foundation and its components. Types of roof trusses and nomenclature of its members.

REFERENCE BOOKS

1. S.S Bhavikatti " Steel Structures by Limit State Method as Per I.S. 800-2007
2. Neelam Sharma , " Reinforced Concrete "
3. IS 456:2000
4. N. Krishna Raju, " Renforced Concrete : Limit State Method "
5. SK Duggal, "Steel Structures : Limit state method "
6. IS 800:2007
7. IS Handbook no. 1: Steel Table
8. Ashok K. Jain , "Reinforced Concrete" Limit State Design.
9. M.L. Gambhir, "Fundamentals of Reinforced Concrete Design".
10. P.C. Varghese., "Advanced Reinforced Concrete Design".
11. Dr. B.C. Punmia; Er. Ashok Kumar Jain; Dr. Arun K.Jain "R.C.C.Designs"
12. S.S Bhavikatti " Steel Structures by Limit State Method as Per I.S. 800-2007

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COURSE CODE:AR1604	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-SPECIFICATIONS, COST ESTIMATION & BUDGETING										
COURSE CATEGORY-PC	1	2	0	3	3	40	60	0	100	3

SUBJECT 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.

LEARNING OUTCOME

- The students will get familiarize with the commonly used methods of preparing estimates of Architectural Projects.

Module-1

Introduction:

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 to prepare an estimate (Drawings/ specification/ rates), complete 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-2

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-3

Costing:

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 schedule of rates. Deriving construction cost as per BOQ. Exercises in estimation using different methods, for small or medium size buildings.

Module-4

Specifications :

Introduction, importance and scope. Principles and practices. Types of specifications, Correct form and sequence of clauses for writing specifications, impact on costing. Study and uses of standard specifications viz; drafted by C.P.W.D. Writing detailed specifications for various building materials eg. Bricks, Aggregates (fine & coarse), Cement, Reinforcement, Timber, Glass and Paints. General abbreviations used in specifications.

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Module-5

Specifications:

Writing detailed specifications for various items of work eg. Earthwork in foundation, Cement concrete, Reinforcement cement concrete work, Brick work in cement mortar, Damp proof course, Wood works (door & windows), Glazing, Plastering (cement & sand), Flooring (cement concrete & tiles), Distemping (dry & oil bound), Painting on wood & iron work, Water proof cement painting, Brick bat coba terracing.

REFERENCE BOOKS

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. UBS Publishers Distributors Ltd.
4. Chakraborty, M. Estimation, Costing and Specifications, Laxmi Publications
5. Kohli, D.D and Kohli, R.C. (2004) A Text Book of Estimating and Costing, S.Chand & Company Ltd.
6. Brook, Martin. (2004) Estimating and Tendering for Construction Work, 3rd edition, Elsevier.
7. Ashworth, A. (1999) Cost studies of buildings, Pearson Higher Education

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COURSE CODE:ARI605	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- WORKING DRAWING										
COURSE CATEGORY-PC	1	0	2	3	2	40	60	0	100	3

SUBJECT OBJECTIVE

- To introduce Working drawings and their significance in the construction of buildings.
- To teach students the essential components of working drawings, notations, drawing standards, strengthen the students' knowledge about preparing working drawings for various building elements.

LEARNING OUTCOME

- To understand and making drawing/ details necessary for final execution of a project.
- To integrate all services and structure system in the working drawing project.

MODULE- 1

Introduction to working drawings: shop drawings / vendor drawings.

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

Making complete set of working drawings for the residence or any other project designed by the student with necessary information with schedule and all specifications.

The Working Drawings to include:

- a. Developing Key plans, General Arrangement Plans, Part plans, Roof Plan / Terrace Plan and the like.
- b. Excavation drawings, Foundation drawings, Center-line drawings, Floor Plans, Sections, Elevations.
- c. Basic internal electrical and plumbing drawings.

MODULE- 2

Service Drawings:

Services Drawings Making complete set of services drawings for the above said project. The drawings to incorporate services details complete with schedule and all specifications.

The Services Drawings to include:

1. Electrical Layout.
2. Plumbing Layout.
3. Sanitary Layout.
4. Drainage Layout.
5. Rain Water Disposal / Harvesting Layout and Details.
6. Toilet details.
7. Kitchen / Pantry Details.

MODULE- 3

Working Drawings:

Working Details Making complete set of working details for the above said project. The drawings to incorporate details complete with schedule and all specifications.

The Working Details to include:

1. Doors and Windows Drawings and Details.
2. Staircase Details including railings.
3. Details of Grills, Parapet or railings.
4. Typical wall section showing foundation, DPC, skirting, sill, lintel, slab and terracing details.

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MODULE-4

Working drawing details:

Various formats for working drawing preparation, various types of vendor drawings, such as aluminum composite panels, steel doors, fire rated doors, curtain wall systems, aluminum windows, etc.

MODULE-5

Finishing Drawings Making complete set of finishing drawings for the above said project. The drawings to incorporate finishing details complete with schedule and all specifications. The Finishing Details to include:

1. Doors and Windows Frame and Shutter details.
2. Flooring & Skirting pattern and fixing details.
3. Dado / Wall tile pattern and fixing details.
4. Wall Cladding pattern and fixing details.
5. Plaster Pattern with Colour schemes.

REFERENCE BOOKS

1. Building and Construction Authority. (2005). CONQUAS-21. Singapore : The BCA Construction Quality Assessment System.
2. Jefferis, A. and Madsen, D.A. (2005). Architectural Drafting and Design. 5th Ed. New York : Thomson Delmar Learning.
3. Jeong, K-Y. (2010) Architecture Annual. Seoul : Archiworld Co.
4. Joe, B. (Ed). (2002). Details in Architecture: Vol. I-V. Victoria : The Images Publishing group.
5. Osamu, A. W., Linde, R. M. and Bakhoun, N. R. (2011). The professional practice of architectural working drawings. 4th Ed. Hoboken : John Wiley & Sons.
6. Weston, R. (2004). Plans Sections Elevations – Key buildings of the twentieth century. London : Laurence King Publishing.

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COURSE CODE:AR1606	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-THEORY OF DESIGN										
COURSE CATEGORY- EC/PE	1	0	2	3	2	40	60	0	100	3

OBJECTIVES:

- To Understand about post Renaissance period followed by 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.
- To Understand the intentions of the period and architects as a solution to the need or demands of the period.

LEARNING OUTCOME

- The students will be able to study the different building and the development of architectural form and character based on the developments in construction and technology exemplified through specific building examples that identify the works of the period.

Module-1

Picturesque and Neo- classical architecture:

Purity and structural honesty of antiquity preferred over ornamentation and exaggeration of Baroque. Representation of ancient Roman monuments in imaginary compositions. Archeological purism and importance of pictorial values in historical settings. Recreation of antique Roman simplicity and splendor for modern living. Study of important palaces and public buildings in Britain and France.

Module-2

Enlightenment and Modern Architecture :

Belief in creation of 'new' and 'ideal' world through return to fundamentals, 'true' and 'original' values. Art revolutions important to the era.

Social intentions and search for ideal world. Expressions of construction and technology. Equating technology and progress with present. Functionalism and functional appropriateness. Thoughts and works of frank Lloyd Wright, Walter Gropius, Le Corbusier, Mies van der Rohe, Alvar Aalto, Louis Kahn, Dutch De Stijl, Italian futurists and Russian Constructivists.

International style: Oversimplification of the modern Movement into functional, steel and glass, cubes. Monotonous functionalist abstractions and Modernism as a style. Disenchantment of modern cities and fall of modern Movement.

Module-3

Post Modern Architecture:

Post Modern Architecture as a revision of Modern architecture and resistance to functional containers of 60's. Objective, representational and emphasis on content. Pluralistic and differing trends.

Historicism:

Rooted to place and history. Regards of expression: ornaments, symbolism and context with irony and humour, exemplified through the works of James Stirling, Michael Graves, Charles Moore, Arata Isozaki.

Module4

Neo- Modern:

Disregard historical imaginary to recapture ideas for modern architecture of 20's. Hi-tech metal abstractions of Richard Rogers, Normal Foster, showing structure and equipment as implied ornament. References of Russian Constructivists. The early works of New York Five including later

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works of Richard Mies as complicated, exaggerated and sophisticated revival of the modern grid and Corbusier's geometry. Synthesis of Hi-Tech and Historicism in the works Aldo Rossi, Mario Botta, Cesar Pelli.

Module-5

Deconstructive:

Narrative and representational. Sources in Russian Constructivism. Non perfection in the works of Frank Gehry, Peter Eisenman, Bernard Tschumi, Daniel Libeskind, questioning traditional purity of form, geometry and structure.

REFERENCE BOOKS

1. Kenneth Frampton, "Modern Architecture; A Critical History" by, Tames and Hudson
2. Willam Jr. Curtis, "Modern Architecture since 1900", Phaidol
3. Sir Banister Fletcher, A History of Architecture, University of London, The Antholone Press, 1996.
4. Spiro Kostof - A History of Architecture - Setting and Rituals, Oxford University Press, London, 1985.
5. Leland M Roth; Understanding Architecture: Its elements, history and meaning; Craftsman House; 1994
6. Pier Luigi Nervi, General Editor - History of World Architecture - Series, Harry N. Abrams, Inc. Pub., New York, 1972.
7. S. Lloyd and H.W. Muller, History of World Architecture - Series, Faber and Faber Ltd., London, 1986.
8. Gosta, E. Samdstrp, Man the Builder, Mc.Graw Hill Book Company, New York, 1970.
9. Webb and Schaeffer; Western Civilisation Volume I; VNR: NY: 1962
10. Vincent Scully; Architecture; Architecture - The Natural and the Man Made: Harper Collins Pub: 1991.
11. Charles Jencks, "The language of Post Modern Architecture".
12. Heinrich Clotz, "History of Post Modern Architecture".
13. Marvin Trastctenberg, " Architecture from Prehistory to Post modernism"

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COURSE CODE:AR1607	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- BUILDING SERVICES-IV (ACOUSTICS)										
COURSE CATEGORY-BS&AE	2	1	0	3	3	40	60	0	100	3

SUBJECT OBJECTIVE

- It shall deal with the physics and perception of sound, the characteristics of sound and vibration in spaces, and their influence in the development of holistic design concepts.

LEARNING OUTCOME

- To make them enable to apply the knowledge in various buildings.
- To get familiarized with sound system equipments, available in market.
- To familiarize the student with laws as per National Building Code of India/BIS.

Module-1

Building Acoustics Introduction :

Characteristics of audible sound – Propagation, Velocity, Frequency, Pitch, Quality/timbre, Loudness and Intensity. Behavior of audible sound in enclosures – Reflection, Absorption, Diffraction and Transmission of sound.

Common acoustical defects and recommended remedies– Echo, Sound foci, Dead spots, Sound shadows, Resonance, Insufficient loudness, External noise and Reverberation. Sabine's expression for calculation of Reverberation time. Absorbents and absorption coefficient.

Noise control:

Noise and its types, Noise pollution. Sources of indoor noise, Indoor noise levels, Planning and design against indoor noise. Sources of outdoor noise, Traffic noise levels, Planning and design against outdoor (traffic & buildings in built-up area) noise. Identification of various sources of noise and recommendations to control them in various types of buildings e.g. – Residential, Educational, Hospital, Office, Hotels & Hostels, Industrial, Laboratories & Test houses, Miscellaneous buildings etc.

Module-2

Constructional measures for sound insulation of buildings :

Materials, Hollow & composite wall construction, Floors & Ceilings. Properties of good acoustical materials. Sound system – Sound reinforcement system, Public address system. Familiarization and understanding of sound system equipment specification e.g. Amplifiers, Microphones, Speakers, Mixers, Conference systems and accessories.

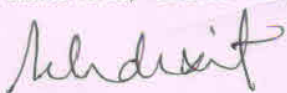
Module-3



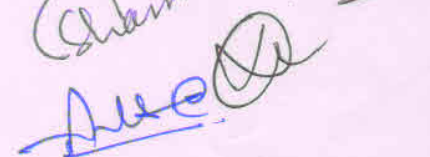
Acoustical design principles and factors:

Acoustical design principles for Auditoriums, Cinema halls, Conference rooms etc. and factors viz. Site selection & planning, Dimensions, Shape, Seats & seating arrangements, Treatment of interior surfaces, Reverberation & sound absorption.

Acoustical Design:

The understanding the audio needs and layout for projects e.g. Auditoriums, Cinema halls, Conference rooms etc.



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Module-4

Field / Market Surveys:

Familiarization and understanding of sound system equipment available in market manufactured by various brands e.g. Amplifiers, Microphones, Speakers, Mixers, Conference systems and accessories.

REFERENCE BOOKS

1. National Building Code of India.
2. National Electrical Code.
3. K. A. Siraskar, Acoustics in Building Design, Orient Longman Ltd., 1972.
4. S. Kandaswamy, Architectural Acoustics and Noise Control, Allied publishers Pvt. Ltd., 2005.
5. Catalogues of leading Audio equipments agencies e.g. Philips, Ahuja etc.
6. Vigran, T. E. (2008). Building Acoustics. 1st Ed. Taylor & Francis.
7. Harold, B. M. and Goodfriend, L. Acoustics for Architects. Reinhold.
8. Eagan, D. M. (2002). Concepts in Architectural Acoustics.
9. Cox, T. J. and D'Antonio, P. (2009). Acoustic Absorbers and Diffusers. 2nd Ed. Taylor & Francis
10. Barron. M. (2009). Auditorium acoustics and architectural design. 2nd Ed. Taylor & Francis.
11. Smith, B. J., Peters, R. J. and Owen, S. (1982). Acoustics and Noise Control. New York : Longman

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COURSE CODE:AR1651(1)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-VI	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

ART/ PERFORMING ARTS PROJECT-VI

SUBJECT OBJECTIVE

- To embed stronger and more enduring means of evoking architecture and culture.

LEARNING OUTCOME

- Students will perform different cultural activities in coordination with the stream of architecture being taught in their respective semesters.

MODULE

Exercises on topic of Architectural interest like debate ,skits ,extempore, theatrical exercises individually or in groups to develop their communication skills, using theater as a medium. It will also train the students towards team building.

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COURSE CODE:AR1651(2)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-VI	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

ARCHITECTURAL COMPETITIONS-VI

SUBJECT OBJECTIVE

- To provide a wide range of design solution for creating interest in role of architecture in national and international design competitions.

LEARNING OUTCOME

- Understanding of Contemporary Architecture.
- Development of idea of Team Work.
- The student will learn to formulate architectural concept and learn to work in time frame scenario.

MODULE

Students will participate in different national and international competitions (preferably on projects upto the scale as mentioned in the syllabus of the Architectural Design of that year)- introduced by Architects, Architectural, colleges, firms and forums NGO's. Council of Architecture, NASA, Zonal NASA, etc.

The students will formulate the scheme under the guidance of faculty mentors and prepare basic design layout and competition requirements.

The students will have hands on practice of the rendering techniques.

COURSE CODE:AR16S1(3)	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- ELECTIVE-VI										
COURSE CATEGORY-ECPE	1	0	1	2	2	50	0	50	100	-

FOREIGN LANGUAGE-VI (FRENCH)

SUBJECT OBJECTIVE

- To enable students to describe events or things, express wishes, ask questions politely in French, and are able to compare two objects or situations.

LEARNING OUTCOME

- The students will be able to describe events using appropriate adjectives. Categorize the shops in France and be able to converse with a shop keeper. They will be able to express their wishes and desires in a polite manner. They will also be capable to report events, orders and actions. Ability to translate from French to English will be enhanced as vocabulary will be enriched.

MODULE

- Talking about people/objects/places
- Comparing two people/objects
- Comparing possessions and habits
- Describing events & people; the most / least...
- Describing Actions- Formation & usage of adverbs
- Culture & civilization : Shopping in France
- Culture & civilization : Shops- vocabulary & dialogues
- Expressing wishes/polite requests/suggestions & advice
- Expressing a possibility
- Expressing a hypothetical situation
- Usage of Some/ Any/ It /One – 'en'
- Situation / Movement- 'y'
- Reporting actions & events
- Reporting Exclamations/Orders/Questions

REFERENCE BOOKS

- A Propos - A1, Livre de l'eleve et Cahier d'exercices by Christine Andant, Catherine Metton, Annabelle Nachon, Fabienne Nugue
- Harrap's French-English-French Dictionary by Langers
- Get Ready (Writing Skills) by Goyal Saab Publishers
- Tech French by Goyal Saab Publishers
- Mon livre de français 4 by VK publications
- Apprenons la grammaire ensemble by Saraswati House pvt. Ltd
- Notes prepared by French faculty members

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COURSE CODE:AR1651-04	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-VI	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

FURNITURE DESIGN

SUBJECT OBJECTIVE

- To enable the students to understand the design attributes & the construction techniques and basics of furniture making in interior works.
- To understand fundamental aspects and cultural considerations of Furniture Design from Ancient to modern times

LEARNING OUTCOME

- The students will be able to understand the construction techniques and process of basic furniture making in interior works.
- Be able to focus on customized and made to order furniture used as latest trends in interiors and Use of furniture to reinforce interiors and to develop additive interest among students.

MODULE

Analyzing furniture forms and designing furniture forms scientifically based on ergonomics, material design and working parameters and visual perception of furniture as a single form and as a system in a given interior space.

Measurement drawing of a piece of a furniture-plan, elevation, sections and detail drawings on proper scale. Design of a simple object having some moving components like a folding stool or chair.

Preparing execution/shop drawings of furniture, down to the last detail, specifying materials, construction process and including pre & post construction precautions.

Modular aspect and approach towards all types of furniture, cost criteria of design furniture for lower income group in the society.

REFERENCE BOOKS

1. Neuferts Architects Data , Ernst Neufert
2. Time Saver Standards for Interior Design, Joseph Chiara
3. A Visual Dictionary of Architecture, Francis D.K. Ching
4. Creative Interiors (Design of Enclosed Space), Shashi Jain
5. Interior design illustrated , Francis D.K. Ching

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COURSE CODE:AR1651-05	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-VI										
COURSE CATEGORY-ECPE	1	0	1	2	2	50	0	50	100	-

PRODUCT DESIGN

SUBJECT OBJECTIVE

- To give students practical understanding of the product design lifecycle, beginning from idea generation to prototyping and commercialization.
- To equip students to comprehend human dimensions and body movement to arrive at a usable product.

LEARNING OUTCOME

- The students will be able to create new products that stimulate business and contribute to the upkeep of the welfare of communities.

MODULE

A brief introduction to product designing and its various elements.

History of product design, role of product designers. Introduction to applied anthropometry, human activities, their nature and application of human factors data.

Understanding of product development cycle and phases. Information input and processing, the visual display, process of seeing, visual discrimination, quantitative and qualitative visual display. Understanding form, color, symbols, user specific criteria, material, technology, recyclability and packaging. Multiple utility oriented approach to product design.

Design of household elements kitchen racks, cabinets, Brand products etc.

Designing industrial products- watch, automobile headlights etc.

REFERENCE BOOKS

1. The Design of Everyday Things by Don Norman
2. Product Design and Development by Karl Ulrich and Steven D. Eppinger

Handwritten signatures:
 Indiraj
 Sharme
 Mohit

COURSE CODE:AR1651-06	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME-ELECTIVE-VI	1	0	1	2	2	50	0	50	100	-
COURSE CATEGORY-ECPE										

PATTERN LANGUAGE

SUBJECT OBJECTIVE

- To educate students about the good design practices or patterns of useful organization within a field of expertise.

LEARNING OUTCOME

- With the completion of the syllabus the student will be well versed in the pattern language of the architectural field which is acclaimed nationally and internationally.

MODULE

A brief introduction to the subject enabling a student to make a design for almost any kind of building, or any part of the built environment. Understanding "languages," which, like the languages we speak, allow to articulate and communicate an infinite variety of designs within a formal system which gives them coherence.

VEHICLE & PEDESTRIAN

Parallel road, shopping street, promenade, looped local roads, green streets, network of path and cars, raised walk, bike paths and racks, shielded parking, mini parking lots, car connection, path and goals, path shapes.

HOUSING & NEIGHBORHOOD

Household mix, degree of publicness, house cluster, row houses, children in the city, corner grocer, entrance room, the flow through rooms, short passages, staircase as a stage, six foot balcony, open stairs.

OPEN SPACES

Common land, connected play, local sports, street café, bus stop, food stands, public outdoor room, courtyard which live.

BUILDING FRAME & OPENING

Structure follows social spaces, efficient structure, staircase volume, windows overlooking life, perimeter beam, column space, duct space, dormer windows, natural doors and windows, window sill, low doorway,

PUBLIC WORK SPACES

Flexible office space, communal eating, small work groups, reception, place to wait, bulk storage, sunny place, arcades, roof gardens,

REFERENCE BOOKS

- A Pattern Language by Christopher Alexander.

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 Akhilesh
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COURSE CODE:AR1652	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- COMPUTER STUDIO-III (3DSMAX,REVIT ADVANCE)										
COURSE CATEGORY- PAEC/SEC	1	0	2	3	2	50	0	50	100	-

SUBJECT OBJECTIVE

- To enable students to understand and apply skills and information to build comprehensive Building Information Models (BIM) using appropriate Digital software and Media.

LEARNING OUTCOME

- Students gain knowledge on the implementation of BIM concepts and Understanding lifecycle of a building from planning, design, construction and operations.
- About BIM for building energy performance, simulation, construction and administration.

Module 1

BIM:

Energy simulation for conceptual BIM models using massing- Detailed modeling using design elements- Rapid energy modeling and simulation with software. Conceptual Energy Analysis features to simulate performance. To produce energy consumption, carbon neutrality and renewable potential reports.

Module 2

4D modeling BIM:

Introduction and theoretical information on the following topics- Model based Cost Estimating- Challenges in cost estimating with BIM - Cad geometrics verses BIM element description- Visual data models - Material substitutions and value engineering- detailed estimates and take- off sheets- XML and automated cost estimate- project phasing and management- 4D modeling BIM for project lifecycles.

Module 3

Introduction to 3D Max:

Create interior walkthroughs for small spaces such as bedroom, office etc. by adding scenes, furniture, texture, finishes with lighting effect and camera angles. Create building exterior walkthroughs by adding scenes, trees, human figures, cars, sun light effect and camera angles.

Module 4

Exercises:

Making Three- dimensional photorealistic rendered architectural models for any one of the architectural design assignments completed in previous semesters and to create walkthrough of the same.

REFERENCE BOOKS

1. BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors.
2. Building Information Modeling For Dummies
3. BIG BIM, little BIM: The Practical Approach to Building Information Modelling.
4. The BIM Manager's Handbook: Guidance for Professionals in Architecture, Engineering, and Construction.

COURSE CODE:AR1653	SCHEME OF TEACHING					SCHEME OF EVALUATION				
	L/S	T	P/V	HOURS	CREDIT	CIA	ESE	P/V	TOTAL	Hrs
COURSE NAME- NTCC – V (EDUCATIONAL TOUR /DOCUMENTATION + WORKSHOP)										
COURSE CATEGORY-PAEC/PAECC	0	0	0	0	1	50	0	50	100	—

OBJECTIVES

- To prepare students to integrate theory and practice from courses through educational tours/documentation & workshops.

LEARNING OUTCOME

- The student will be able to develop and improve their planning concepts and ideas through critical thinking
- Understand inception, scheduling, execution and dissemination in the context of live architectural planning through educational tours/documentation & workshops.

Module

- An exposure to be given to students of the cultural heritage buildings, buildings of importance to the nation and society, urban and rural areas and their precincts.
- The students are introduced to the planning aspects of buildings of importance, their functional and aesthetic characteristics via discussions of the tour guide/ coordinator of workshop
- Preparation of Educational tour reports / Workshop reports by the group /groups of students

Guidelines for Educational tour Report/ Workshop Report

The report has to be not less than 50 pages. The report has to be spiral bound. The drawing and sketches should be properly scaled and labeled with necessary legends and detailing.

Language	English
Paper Size	A4
Margin	The left and right margin of 1.25 inches. The top and bottom margin of 1.00 inch
Typing	On both sides of the page. The text will follow line spacing of 1.5 lines and double justified.
Arrangement of Contents	Every NTCC Project Report should have three parts: the pre pages, the main text and the reference material. The following is the order: 1. Preliminary Pages: a. Title page b. Declaration c. Necessary Approvals Page d. Acknowledgement e. Table of Contents 2. Text: Chapters: (Building /area wise) & sub-sections 3. Area Context, Data Collection, Analysis, Conclusions, Recommendations & Proposals 4. Reference Materials: Appendix
Tables & Figures	These shall be placed immediately after the paragraph that contains it. Each table

	& figure has to be numbered consecutively within chapters.
References (if any)	These have to be listed alphabetically. Retrievable data must be listed in references. Personal interviews/ raw data shall not appear in the reference list.
Appendices (if any)	Contains supplementary of illustrative material on explanatory data to be incorporated in main document as per the order of appearance in the document.

The Break up (components and their weightage) of continuous internal assessment are given as under :

S.No.	Title	CIA (MM 50)
1.	Introduction & aim of Educational Tour/Workshop	5
2.	Necessary Approvals	5
3.	Case Studies/ Historical Background of the place or building	10
4.	Photographs of details, sketches, Plans (key plans /measured drawings/schematic plans, etc.)	20
5.	Learning outcomes/conclusions drawn	10

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