UTTAR PRADESH TECHNICAL UNIVERSITY
LUCKNOW

SYLLABUS

Bachelor of Architecture

2nd Year (III & IV Semester)

(Effective from Session 2013-2014)

B. ARCH. SEMESTER – III
NAR – 301, ARCHITECTURAL DESIGN - III

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	0	5	30	70	**100**	75	25	**100**	**200**	6	6 + 3 HRS.

OBJECTIVES

- To familiarize students with a simplest residential unit.
- Understanding the use of traditional indigenous materials & construction systems in basic building forms.
- Comprehension of arrangement / organization of spatially/ functionally similar units resulting in varied outdoor spaces.
- To assimilate the modifying spatial qualities of indoor & outdoor spaces due to varying configurations.

Module-1	**Study**	Lecture on concept of vernacular & lessons to be learnt. Detailed study of a vernacular settlement remarkable for its spatial quality, material, and construction technology usage should be characteristic for that region.
Module-2	**Analysis**	Lectures on Elements of Space making like Floor, Wall, Door, Window, Column, Stairs, and Roof. Analysis of the selected settlement in light of their spatial roles and consequently the design considerations. Lectures on the spatial attributes of the resultant open & built of the vernacular and lessons to be learnt from the study & their juxtaposition. Analysis of the selected settlement with relationship to human scale, activity, space & form & other parameters pertaining to spatial aspects.
Module-3	**Design & Application through Case Studies**	Lecture on interpreting spatial configuration for specific design programme. Configuration / array of multiple repetitive units of preferably on single floor organized on basis of functional, geometric and visual order.

SUGGESTED STUDIO EXCERCISES

1. Detailed drawings for the settlements.
2. Analysis drawings on basis of selected parameters underlining lessons learnt.
3. Design of buildings like Residence, Panchayatbhawan, Ashrams, Hostels, Tourist Cottages, Primary School etc.
4. Study tours to relevant rural/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.
4. Fathy, Hasan. Natural energy & vernacular architecture.
5. Housing projects by GeofferyBawa, Charles Correa, B.V. Doshi among others.

B. ARCH. SEMESTER – III
NAR – 302, CONSTRUCTION & MATERIALS – III

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	0	4	25	50	**75**	50	25	**75**	**150**	6	3 HRS.

OBJECTIVES

- To acquaint the students to building materials such as Roof Coverings, Floorings,Variety of glassesCeramics, andHardware.
- ` 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.

SECTION – A, BUILDING MATERIALS AND SCIENCES

Module-1	**Roof Coverings (Conventional)**	Clay Tiles (Country, Allahabad, Mangalore tiles etc.), Stone Slating, Shingles, Thatch.
Module-2	**Floor& Floor Finishes**	Brick, Cement Concrete, Stone, Terrazzo,Chequered Tile, Ceramic Tile, Vitrified Tiles, Wooden.
Module-3	**Glass& Ceramics**	Glass - Translucent, Transparent and Special glasses, Glass bricks. Ceramics - Terracotta, Faience, Fireclay, Stoneware, Earthware, Vitreous China, Porcelain.
Module-4	**Hardware**	Hinges, Handles, Knobs, Bolts, L-drops, Locks, Stoppers, Stays, Silencers, Chain guards, Closers, Catchers, Knockers etc. in various materials. Patch fittings for glazedshutters.

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 tile, glass, ceramic, hardwareetc. factoriesfor better understanding and submit report.

WORKSHOP/CONSTRUCTION YARD PRACTICE & SITE EXPOSURE

Module-5	**Workshop/Construction Yard Practice**	Practicing in construction yard / workshop by making the examples of reinforced brickwork, variety of flooring, fixing of dado, timbering of shallow trenchesetc. and doorsamples.
Module-6	**Site Exposure**	Exposure to building construction practices on site of various items of work from foundation to roof and finishes.

LIST OF ASSIGNMENTS

1. To study the various tools, equipments used in floor finishing works.
2. To study the various tools, equipments used in glass works.
3. To construct examples of reinforced brickworkand variety of flooring in construction yard. Also, preparation of scaled model of door in workshop.
4. To survey construction work on site and submit report.

SECTION – B, BUILDING CONSTRUCTION TECHNOLOGY

Module-1	**Reinforced Brickwork**	Reinforced brick piers, lintels, slabs and projections.
Module-2	**Door (Timber)**	Types and details of Panelled door shutters and Mosquito proof doorshutter.
Module-3	**Window / Ventilator (Timber)**	Types of Windows / Ventilators and details of glazedwindow and ventilator shutters and frames.
Module-4	**Floor / Skirting**	Complete process of laying of floor and skirting - Brick, Cement Concrete, Mosaic and Terrazzo floors.
Module-5	**Floor/ Dado**	Laying and fixing of Stone slabs, Chequered Tile,Ceramic tiles, Vitrified tilesand Wooden(parquet and plank) on subfloors and walls.
Module-6	**Temporary Timbering**	Timbering of shallow trenches.

CONSTRUCTION PLATES

1. To understand Reinforced brick piers, lintels, slabs and projections.
2. To understand variety of Panelled door shutters and their detailsin timber.
3. To understand Mosquito proof door shutterand its details in timber and jaali.
4. To understand variety of windows& ventilatorsand the details of window frame and glazed shutter in timber and glass.
5. To understand laying of above mentioned floors and fixing of above tiles on floors and walls.
6. To understand Timbering of shallow trenches in various soil types.

APPROACH

- 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 climatic conditions.
- Site visits and market surveys will be an integral part of sessional work.

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

B. ARCH. SEMESTER – III
NAR – 303, ARCHITECTURAL STRUCTURES - III

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	1	0	15	35	**50**	50	0	**50**	**100**	3	3 HRS.

OBJECTIVES:

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

Module-1	**Fixed &Continuous Beams and Portal Frames**	Introduction, Analysis of continuous beams and portal frames, Reactions at the supports, Effects of sinking of supports.
Module-2	**Fixed &Continuous Beams and Portal Frames (continued)**	Analysis of continuous beams and portal frames by 3M equation, Slope deflection method, Momentdistribution method, Consistent deformation method.
Module-3	**Elastic Theorems & Energy Principals**	Introduction, Potential energy, General principles, Principles of superposition.

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”.

B. ARCH. SEMESTER – III
NAR – 304, ARCHITECTURAL DRAWING - III

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	2	2	15	35	**50**	50	0	**50**	**100**	6	3 HRS.

OBJECTIVES

- To develop greater perception of complex Architectural forms and buildings.
- To develop the skill of making perspectives of complex buildings and Rendering them in different media.
- To develop or upgrade an understanding about AutoCAD 3D, as an important tool for drafting, designing, analyzing and representation of the drawings in a desired manner.

SECTION – A, ARCHITECTURAL DRAWING (MANUAL)

Module-1 Shades and Shadows
Values in Shades and shadows.
Constructing plan shadows (point, line and plane).
Constructing shadows in elevations (point, line and plane).
Short –cut methods for Constructing shadows.
Presentation techniques in Sciography.

Module-2 Presentation
Introduction to different textures and finishes in plan and elevation.
Graphical representation of furniture, automobiles, human figure etc. in plans and elevation and 3-Dimension.
Preparation of presentationdrawings of small buildings, through Plans, Elevation, Section, Site plan etc., using various rendering techniques and media, incorporating sciography for creating three dimensioned effect.

SECTION – B, ARCHITECTURAL DRAWING (COMPUTER)

Module-1 Work with 3D Models
Launching AutoCAD 3D, Using application menus, Create 3D models, Modify 3D solids and surfaces , Create sections and 2D drawings from 3D models.

Module-2 Setting Up and Using the 3D Drafting Tool
Types of 3D drafting tools, 3D keyboard commands, Materials and textures, Reference other drawing files, Link and embed data (OLE), Work with data in other formats and exporting 3D model to various software's.

Module-3 Using and Exploring 3D Models
Specify 3D views, Define a 3D view with a camera, Create preview animations, Create motion path animations, Creating a simple 3D mesh, Editing faces and edges, Creating mesh surfaces, Converting meshes to solids, Editing surfaces.

Module-4 Effective Presentation
Layer management, Exporting 3D to work in other software. Plotting and publishing the drawing in modal space and paper space.

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. Introducing AutoCAD and AutoCAD LT - GeorgeOmura
5. Mastering AutoCAD – GeorgeOmura
6. AutoCAD 2013 and AutoCAD LT 2013 "BIBLE" - Ellen Finkelstein

B. ARCH. SEMESTER – III
NAR – 305, ARTS AND GRAPHICS - III

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	0	2	15	35	**50**	50	0	**50**	**100**	3	3 HRS.

OBJECTIVES

- 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.

SECTION – A, ARTS AND GRAPHICS

Module-1 History of Indian Art Lectures on outline History of Indian Art, from earliest times to Mauryan Period.

Module-2 History of Indian Art Gupta Period to Mughal Period.

Module-3 History of Indian Art Company Style (British Period).

SECTION – B, DESIGN

Module-4 Design of various objects Designing of gate, grill, railing, jaali, in suitable materials.

DRAWING PLATES

1. Rendering in different media, works of masters of Modern Architecture.
2. Rendering of interior and exterior perspectives of students own design projects.
3. Enlargement and rendering in Ink the Indian Decorative Motifs.
4. Designing and drawing of gate, grill,railing, jaali, in suitable materials.

LIST OF ASSIGNMENTS (Field Exercises & Workshop Activities)

1. To understand the techniques of fabrication and fixing details of gate, grill, railing, jaali, in suitable materials.

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

B. ARCH. SEMESTER – III
NAR – 306, ARCHITECTURAL SERVICES – II

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	1	0	15	35	**50**	50	0	**50**	**100**	2	3 HRS.

OBJECTIVES

- 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.

SECTION – A, ELECTRICAL

Module-1 Electrical

Introduction –
Terminology and architectural symbols (as per NBC/NEC) for electric installations in buildings.
Need to generate and save electricity, transmission and distribution of electricity (single and three phases), procuring service connection.
Familiarization to various lighting accessories, wires and cables, metering, distribution panels / boards etc. for single and three phase supply.
Guidelines for installation of fittings.
Design of simple electrical circuits –
Introduction to simple light and fan circuits.
System of connection of appliances and accessories e.g. series and parallel connection, joint box system, looping-in system.
Systems of wiring –
Basic considerations.
Various types of internal wiring systems e.g. cleat, casing and capping, batten and conduit (surface & concealed).
Protection of electrical installation and human life –
Basic considerations.
Protection against excess current, short circuit earth fault and protection against electric shock.
Introduction to various types of protection devices e.g. switches, fuses and circuit breakers.
Need for earthing of domestic fittings and appliances, earthing and its relation with soil resistivity, earth electrodes, earth wires.
Load assessment and selection of appropriate cross section of the conductor.

SECTION – B, ILLUMINATION

Module-2 Illumination

Introduction –
Terminology and unit.
Light and its characteristics – scattering, propagation, transmission, reflection, absorption, refraction and dispersion of light. Electromagnetic spectrum and visible radiation.
Illumination –
Types of illumination schemes e.g. Ambient,Task, Focal andDecorative etc. lighting.
Design considerations for illumination Schemes.
Methods for lighting calculation – Watts per square meter, Light flux and Point to point method.
Sources of light (Electrical)–
Familiarization and understanding ofelectrical sources of light e.g.

		Thermal radiators - Incandescent,Halogen. Discharge lamps– Low pressure (fluorescent, compact fluorescent, sodium, cold cathode neon), High pressure (mercury, metal halide, sodium). New technologies - LED, Fiberoptics. **Luminaries –** Types of Luminaries – Indirect, Semi-indirect, General diffusing, Semi-direct and Direct.

SECTION – C, APPLICATION

Module-3	**Electrical Drawing**	The understanding of electrical needs for individual spaces e.g. Living room, Dining room, Bed room, Kitchen, Toilet, Staircases, and Corridors etc. The electrical layout drawing for a residence.
Module-4	**Field / Market Surveys**	Familiarization to types of electrical luminaries available in market, manufactured by various brands e.g. Recessed mounted luminaries, Spot / Projectors, Surface mounted luminaries, Decorative luminaries, Pendant luminaries, Free-floor-standing luminaries, Uplights, Trunking lighting systens, Down Lights.

REFERENCE BOOKS

1. National Building Codeof 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.

B. ARCH. SEMESTER – III
NAR – 307, HISTORY OF ARCHITECTURE – II

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	1	0	15	35	**50**	50	0	**50**	**100**	3	3 HRS.

OBJECTIVES

- To inform about the development of Indian architecture and its contextual and traditional aspects.
- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in various aspects of Hindu 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.

Module-1	**Indus Valleycivilization**	Town planning principles, cultural ethos, economy exemplified with examples from Mohenjodaro and Harappa.
Module-2	**The Aryan civilization**	With its emphasis on the Vedic town plan, its motifs and patterns. The brick altars and their significance.
Module-3	**Buddhist Architecture**	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-4	**Buddhist Theory**	The Buddhist philosophy and its imprint in built space.
Module-5	**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-6	**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-7	**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-8	**Jain Architecture**	The temple cities of Palitana, Mount Abu and Girnar.
Module-9	**Jain Theory**	The Jain philosophy and its imprint in built form. The Jain mandalas.
Module-10	**Measured Drawing**	Measured Drawing of a historical precinct.

REFERENCE BOOKS

1. Stella Kramrisch, The Hindu temple, Volume 1 & 2, Motilal Banarsidass Publications, 1996.
2. Percy Brown, Indian Architecture (Buddhist and Hindu period), D.B.Taraporewala Sons & co Pvt. Ltd. 1965
3. Volwahsen, Andreas, Living Architecture
4. Satish Grover, The Architecture of India- Volume 2, Vikas, 1980.
5. Henri Stierlin, Anne Stierlin, Hindu India: from Khajuraho to the temple city of Madurai, Taschen, 1998.
6. James Fergusson, History of Indian & Eastern Architecture, 2007
7. C. Batley, Design Development of Indian Architecture, John murray, London, 1934.
8. A. Cunningham, Archaelogical Survey of India, Vol. I – XXIII, Simla, Calcutta, 1903-30.
9. M. Edwards, Indian temples & Palaces, Paul Hamlyn, London.
10. Christopher Tadgell, Indian & South Asia: The Buddhist & Hindu Tradition, Ellipses, 1998.
11. Surendra sahai, Indian architecture, Prakash books, 2006.
12. Ernest Binfield Havell, Indian Architecture, J. Murray, 1913.
13. Benjamin Rowland, The Art & Architecture of India: Buddhist, hindu, jain. Penguin books, 1953.
14. K.V,Soundra Rajan, Indian Temple Styles: the personality of Hindu Architecture.
15. Giles Henry Rupert Tillotson (ed.), Paradigms of Indian architecture: Space & Time in Representation & Design, Psychology Press, 1998.
16. Adam hardy, Indian temple Architecture- form & transformation, Abhivav Publications, 1995.

B. ARCH. SEMESTER – III
NAR – 308, RESEARCH - II

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	1	0	15	35	**50**	0	0	**0**	**50**	2	-

OBJECTIVES

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

Module-1	**Introduction**	Aspects of Analysis of an Architectural project
Module-2	**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.
Module-3	**Book Reviews**	Review of Book with presentation of the précis.

LIST OF ASSIGNMENTS

1. Review of an architectural book/books prescribed by subject teacher.
2. Report on ongoing architectural project.

REFERENCE BOOKS

1. Raman Meenakshi and Sharma Sangeeta, “Technical Communications – Principles and Practices”, Oxford UniversityPress, New Delhi.
2. Fundamentals of Design

B. ARCH. SEMESTER – III
NAR – 309, CLIMATOLOGY

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	1	0	10	15	**25**	25	0	**25**	**50**	2	3 HRS.

OBJECTIVES

- Acquainting the students with human thermal comfort as an essential function of a building, its analysis & use in Architecture.
- To familiarize students with the elements constituting climate and their role in creating responsive designs.
- Understanding the characteristics of varied tropical climates and expected responses of buildings in specific climate types
- To utilize existing traditional/vernacular/ historical structures in the city as case study to learn the various attributes of climate & the desirable responses.

Module-1	**Introduction to climate**	Importance of climate in architecture. Factors affecting climate. Elements of climate: solar radiation, temperature, wind, humidity & precipitation and their measurement.
Module-2	**Climate types**	Climate types all over the world. Tropical climate: climate zones, their charecteristics& responses of the traditional/ vernacular. Micro Climate & Site Climate.
Module-3	**Human thermal comfort**	Study of body's heat production & heat loss, comfort zone, bio-climatic chart, effective temperature isopleths etc. Various models of Thermal Comfort: Static &Adaptive Mode, thermal indices & their applicability.
Module-4	**Solar chart**	Understanding the solar position of a place, azimuth, altitude, incidence, using shadow angle protractor for designing shading devices.
Module-5	**Daylight**	Natural lighting, glare, day light factor & factors affectingday-lighting in various space types, principles of day-lighting in tropics.
Module-6	**Ventilation & Air Movement**	Requirement, size & position of openings, Air-flow pattern inside &outside buildings.
Module-7	**Orientation**	Orientation of buildings in relation to sun & wind.

LIST OF ASSIGNMENTS (Field Exercises & Drawings)

1. Understanding tools & instruments utilized for measurement of climatic elements using the climatology lab & meteorological department.
2. Documenting local case studies of vernacular/ traditional/ historical buildings for understanding their responses to prevailing climate.
3. Collecting data of temperature, humidity, radiation light & wind for specific cities and making solar charts, bio-climatic charts & Mahoney tables for the same.

REFERENCE BOOKS

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

B. ARCH. SEMESTER – III
AUC-001- *Human Value & Professional Ethics/*
AUC-002**-** *Cyber Security*

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	0	0	15	10	**25**	50	**-**	**75**	**75**	**-**	**-**

*Human values & Professional Ethics /Cyber Security will be offered as a compulsory audit course for which passing marks are 30% in End Semester Examination and 40% in aggregate.

B. ARCH. SEMESTER – IV
NAR – 401, ARCHITECTURAL DESIGN - IV

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	0	5	30	70	**100**	75	25	**100**	**200**	6	6 + 3 HRS.

OBJECTIVES

- 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.
- Recognizing the relevant materials & building techniques suitable for that region & explore their applicability in design.
- Learn building on sloping sites or with unique topography.

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.
Module-3	**Design on sloping site**	Design exercise on sloping terrain with specific orientation & climatic conditions.

SUGGESTED STUDIO EXCERCISES

1. Studies of various climates; responses of vernacular/ traditional in those conditions& establishing design criteria.
2. Design of multi-functional building like Motels, college, commercial complex, cultural complex, boarding school.
3. Design on sloping site with unique topography for structures like a simple guest house, tourist complex or museums.

REFERENCE BOOKS

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

B. ARCH. SEMESTER – IV
NAR – 402, CONSTRUCTION & MATERIALS – IV

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	0	4	25	50	**75**	50	25	**75**	**150**	6	3 HRS.

OBJECTIVES

- To acquaint the students to building materials such as Timber products, Surface finishing, Adhesives, Painting and Polishing.
- 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.

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 Surface(Wall) Finishing — Types and application of Plasters, Jointing and Pointing, Cladding.

Module-3 Adhesives — Introduction.
Natural Adhesives – Animal, Casein, Bituminous.
Thermoplastic Adhesives – Polyvinyl Acetate.
Thermosetting Adhesives & Plastics - Urea Formaldehyde, Phenol Formaldehyde, Melamine Formaldehyde, Resorcinol Formaldehyde, Epoxide Resins.
Rubber Adhesive.

Module-4 Painting and Polishing — 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.

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, paints, adhesivesfactory etc. for better understanding and submit report.

WORKSHOP/CONSTRUCTION YARD PRACTICE & SITE EXPOSURE

Module-5 Workshop/Construction Yard Practice — Practicing in construction yard / workshop by making the examples of plastering, jointing, pointing and painting etc. and partitions and paneling samples.

Module-6 Site Exposure — Exposure to building construction practices on site of various items of work from foundation to roof and finishes.

LIST OF ASSIGNMENTS

1. To study the various tools, equipments used in plastering, jointing and pointing works.
2. To study the various tools, equipments used in painting works.
3. To construct examples of partitionand panelling in construction yard / workshop.
4. To survey construction work on site and submit report.

SECTION – B, BUILDING CONSTRUCTION TECHNOLOGY

Module-1 Brick Work — Cavity walls.

Module-2 Roof Terracing — Complete process of laying of terracing with provisioning of Gola & Khurra etc. - Lime concrete, Mud phaska with brick tiles, Brick coba.

Module-3 Door (Timber Products) — Types and details of Flush door shutter.

Module-4	**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.
Module-5	**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-6	**Panelling (Timber & Timber Products)**	Terminology, Panelling methods with use of materials e.g. Timber and variety of timber products.

CONSTRUCTION PLATES

1. To understand the application Cavity walls in brick masonry and roof terracing with various details.
2. To understand the application of variety of Flush door shutters and their details.
3. To understand the application of variety of sliding door shutters and their details.
4. To understand the application of variety of sliding folding door shutters and their details.
5. To understand the application of partitions in buildinginteriors with using timber, timber products and glass etc. along with their details.
6. To understand the application of panelling in building interiors with using timber and timber products along with their details.

APPROACH

- 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.
- Site visits and market surveys will be an integral part of sessional work.

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.

B. ARCH. SEMESTER – IV
NAR – 403, ARCHITECTURAL STRUCTURES - IV

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	1	0	15	35	**50**	50	0	**50**	**100**	3	3 HRS.

OBJECTIVES:

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

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	**Slabs**	Introduction, Design of One way and Two way slab using limit state method.
Module-4	**Elements of Soil Mechanics**	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”.

B. ARCH. SEMESTER – IV
NAR – 404, ARCHITECTURAL DRAWING - IV

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	2	2	15	35	**50**	50	0	**50**	**100**	6	3 HRS.

OBJECTIVES

- To develop greater perception of complex Architectural forms and buildings.
- To develop the skill of making perspectives of complex buildings and Rendering them in different media.
- To develop the skills free hand sketching.
- To develop or upgrade an understanding about Autodesk Revit Architecture, as an important tool for drafting, designing, analyzing and representation of the drawings in a desired manner.

SECTION – A, ARCHITECTURAL DRAWING (MANUAL)

Module-1 Sciography
Shades and Shadows of objects and building elements cast on irregular surfaces, rendered in suitable medium.
Shades and shadows in perspective views for exteriors.
Shades and Shadows cast by point source of light in interiors.

Module-2 Perspective Drawing
Two-point exterior perspective views, using measure point method, of simple & medium sized buildings- isolated or in-group, showing shades and shadow using different media like-Pencil, Pen-Ink, Water Colour, Poster, and Airbrush etc.
One point perspective drawing of interiors rendered in different media.
Two point perspective drawing of interiors rendered in different media.
Introduction to short cut methods in perspective drawing.
Free hand perspective.
Other innovative methods of perspective presentation techniques should be encouraged.

SECTION – B, ARCHITECTURAL DRAWING (COMPUTER)

Module-1 Getting Started Revit Architecture
Introduction, Modifying the view, Common tasks, System options, File locations, Spelling options, Settings, Keyboard shortcuts, Levels and grids, Zooming, Steering wheels.

Module-2 Building the Model and Modify
Walls, Doors, Windows, Components, Architectural columns, Roofs, Ceilings, Floors, Openings, Model text, Model lines, Compound structure, Sloped surfaces, Stairs, Ramps, Railings, Adding and modify curtain wall. Attaching wall to roof, Modifying the entry deck, Modifying the roofs.

Module-3 Presentation
Dimensions, Keynotes, Tags, Symbols, Adding legend views, Creating a detail callout, Adding filled and masking regions, Using detail components, Creating sheet, Sheet properties

REFERENCE BOOKS

1. Interiors: Perspective in Architectural Design Graphic - SMA Publishing Co. Ltd.,Japan, 1967.
2. Ernest Norling, Perspective drawing, Walter Fostor Art Books, California, 1986.
3. Bernard Alkins - 147, Architectural Rendering, Walter Foster Art Books, 1986.
4. Rober W.Gill, Advanced Perspective, Thames and Hudson, London, 1974.
5. Autodesk Revit Architecture 2012: No Experience required – Eric Wing
6. Mastering Autodesk Revit Architecture 2012 – James Vandezande, Phil Read, Edd

B. ARCH. SEMESTER – IV
NAR – 405, ARTS AND GRAPHICS - IV

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	0	2	15	35	**50**	50	0	**50**	**100**	3	3 HRS.

OBJECTIVES

- To develop an appreciation and understanding of Indian contemporary art and trends.
- To develop skills of making mural, sculpture,furniture, pottery and fountains from fiber glass,mild steel, cast iron, stainless steel, wood, plaster of paris, terracotta, cement concrete and ceramics etc.
- To develop skills of graphic printing techniques.

SECTION – A, ARTS AND GRAPHICS

Module-1 History of Art — Renaissance in Indian art i.e. 19th century, Post-independence art of India.

Module-2 Contemporary arts and artist in India — Contemporary arts and artist in India, Works of AbanindraNath Tagore, NandLal Bose, Jamini Roy, Amrita Sher Gill, M.F. Hussain, Satish Gujral and S.H.Raza.

SECTION – B, WORK SHOP

Module-3 Work shop — Designing of murals, sculptures, furniture, pottery and fountains for outdoors in suitable materials.

DRAWING PLATES

1. Making graphic prints by using different technique of print making i.e. wood cut print, linocut prints, and serigraphy.
2. Drawing and Rendering of Designs up to material finish.
3. Drawing and designing of decorative elements for Interior display (drawing room, living room etc.).
4. Drawing and rendering of designs like murals, sculptures, furniture, pottery and fountains for outdoor.

LIST OF ASSIGNMENTS (Field Exercises & Workshop Activities)

1. To understand the various techniques of making of murals, sculptures, furniture, pottery and fountains etc. for outdoor of in suitable materials.

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

B. ARCH. SEMESTER – IV
NAR – 406, ARCHITECTURAL SERVICES – III

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	1	0	15	35	**50**	50	0	**50**	**100**	2	3 HRS.

OBJECTIVES

- To understand the basic principles of physics of sound.
- 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 -
Terminology and unit.
Characteristics of audible sound – Propagation, Velocity, Frequency, Pitch, Quality/timbre, Loudness andIntensity.
Behavior of audible sound in enclosures – Reflection,Absorption, Diffraction andTransmission of sound.
Common acoustical defectsand 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.
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.
Acoustical design principles and factors–
Acoustical design principles for Auditoriums, Cinema halls, Conference rooms etc. and factorsviz. Site selection & planning, Dimensions, Shape, Seats & seating arrangements, Treatment of interior surfaces, Reverberation & sound absorption.

SECTION – B, APPLICATION

Module-2 Acoustical Design

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

Module-3 Field / Market Surveys

Familiarization and understanding of sound system equipment available in marketmanufactured 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.

B. ARCH. SEMESTER – IV
NAR – 407, HISTORY OF ARCHITECTURE – III

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	1	0	15	35	**50**	50	0	**50**	**100**	3	3 HRS.

OBJECTIVES

- To inform about the development of Western architecture from 1st century onward and its contextual and ecclesiastical aspects.
- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion, climate and technology.
- To gain knowledge of the development of architectural form with reference to technology, style and character in western architecture.
- To comprehend and analyze spatial character, scale, and structure through historical and traditional built form.
- To comprehend and relate to the theoretical and philosophical basis of western architecture.

Module-1	**Early Christian Architecture**	Development of early church from Roman basilica. The concept of center and path of Christianity manifested through centralized and longitudinal church. Interiority of churches and the articulation of interiors to create spiritualized space. Study of different basilica churches in Italy.
Module-2	**Byzantine Architecture**	Centralization in Byzantine churches. Centrality and interiority of both cross-domed 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 Constantinople
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.Integration of centralized and longitudinal plans. Articulation of external wall like arcaded interiors resulting in dematerialization of exterior. Study of important cathedrals and churches from Italy and France.
Module-4	**Gothic Architecture**	Continued integration of centralized and longitudinal plans. Spatial and formal integration of Romanesque churches. Integration of wall and vault. Ribbed vault and the dissolution external wall to allow light. Sensitivity to light and use of stained glass for mysterious interiors. Need and development of different external buttressing. Study of important cathedrals and churches in France.
Module-5	**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.
Module-6	**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-7	**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.Samdstrp, 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.

B. ARCH. SEMESTER – IV
NAR – 408, RESEARCH - III

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	1	0	15	35	**50**	0	0	**0**	**50**	2	-

OBJECTIVES

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

Module-1	**Introduction**	Styles of Referencing
Module-2	**Technical Writing**	Referencing Techniques, Bibliography.
Module-3	**Book Reviews**	Review of book and its presentation

LIST OF ASSIGNMENTS

1. Review of an architectural book/books prescribed by the assigned teacher.
2. Referencing assignments based on the book / topic assigned by the faculty member student is assigned with.

REFERENCE BOOKS

1. Raman Meenakshi and Sharma Sangeeta, "Technical Communications – Principles and Practices", Oxford UniversityPress, 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.

B. ARCH. SEMESTER – IV
NAR – 409, BUILDING ECONOMICS

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
1	1	0	10	15	**25**	25	0	**25**	**50**	2	3 HRS.

OBJECTIVES

- To develop an understanding among the students regarding management of physical and human resources including evaluation techniques pertaining to a business organization in general and specific to construction industry.

Module-1	**Elementary concepts of economics**	Introduction to economics- Definitions, Needs& Wants, Nature & Scope of Economics. Division of economics – MicroEconomics-Scarcity, Utility - Marginal, Total& Average.Laws of Demand and Supply. Macro Economics-Economic system in India.
Module-2	**Economics in relation to architecture, engineering and other sciences**	Meaning and scope of building economics, Issues and challenges associated with building projects. Building Efficiency, BuildingLife-cycle. Costs and Benefits of Building - Monetaryand Non Monetary.
Module-3	**Project Financing**	Equity, Financing Institutions in Financing Process, Interim Finance and Permanent Financing, BankLoan - Simple Interest and Compound Interest. Types of Mortgage, Lease Arrangements.
Module-4	**Economic performance of building**	Decision Making using techniques of economic performance to measure tangible and non-tangible issues - Cost-Benefit Analysis, Incremental Analysis and Multi-criteria Analysis.

REFERENCE BOOKS

1. Modern Economic theory - K.K. Dewett.
2. Economic for Engineers – M.L. Gupta.
3. Micro – economic theory – Samuelson.
4. Building Economics for Architects – T. Mann.

B. ARCH. SEMESTER – IV
AUC-002**-** *Cyber Security/*
AUC-001- *Human Value & Professional Ethics*

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			
2	0	0	15	10	**25**	50	**-**	**75**	**75**	**-**	**-**

*Human values & Professional Ethics /Cyber Security will be offered as a compulsory audit course for which passing marks are 30% in End Semester Examination and 40% in aggregate.