B. ARCH. SEMESTER – IX
RAR – 901, ARCHITECTURAL DESIGN - VIII

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER	
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE						
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			F.O.A.	A.K.T.U.
1	0	8	30	70	**100**	75	25	**100**	**200**	7	6+6+6 HRS.	7 HRS.

OBJECTIVES

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

Module-1	**Introduction**	Understand and learn how to solve the Built Environment needs for multi-faceted public activities especially foe large campuses. Recognizing and Integrating aspects of Sustainable design and planning.
Module-2	**Site Analysis & Case Study**	Examining existing case and literature studies of similar nature to develop design criteria. Extensive Site analysis of the proposed site for assessing on-site and off-site potentials and constraints.
Module-3	**Design Proposal**	Design of large campuses incorporating principles of efficient and sustainable site planning, space planning, circulation and services.
Module-4	**Integration of Advanced Services, Structure and Active Sustainable Strategies**	Besides design and planning of buildings within the campus the concentrations also needs to be on integration of complex building services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems. Strategies of water harvesting, waste management, utilization of solar and wind energy and reducing the overall carbon footprint of the project.

SUGGESTED STUDIO EXCERCISES

1. Major design exercise could include large institutional campuses, convention centers, large office campuses having auditoriums and other multi-utility buildings.
2. Small exercises could include design of high-rise buildings like offices, hotels, hospitals etc. incorporating development of advanced structural and service systems.

APPROACH

- Students should develop programs after prototype studies
- Effective Site planning of the campus will be emphasised upon
- Integration of complex services and structure will be deliberated upon.

REFERENCE BOOKS

1. Architecture Today.
2. Concept to the manifest.
3. Projects of various Architects of similar nature.

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Seminar / Presentation / Site Report of Module - 1	1	5	5
2	Seminar / Presentation Literature & Case Studies and Detailed Site Analysis of Module - 2	2	5	10
3	Design Exercises (Minor) of High Rise Building of Module – 3 & 4	2	10	20
3	Design Exercises (Major) of Large Sustainable Campus with Integration of Complex Services of Module - 3 & 4	1	35	35
			TOTAL	70

B. ARCH. SEMESTER – IX
RAR – 902, CONSTRUCTION & MATERIALS - VIII

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

OBJECTIVES

- The understanding for the system to be adopted for the construction of large span & multi storey structures.
- To introduce and familiarize the students with the various roofing products for construction work.
- To introduce and familiarize the students with the various construction equipments required for speedy and effective construction works.
- To familiarize the student with the advanced building construction practices on site e.g. composite construction.

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SECTION – A, BUILDING MATERIALS AND SCIENCES

Module-1	**Forms of Steel for Industrial construction & Roofing products**	Classification, Availability, Characteristics and Uses of forms of steel and first to fourth generation steel roofing products.
Module-2	**Advanced Structural Concretes**	Structural Light weight Concrete, High Strength Concrete-Classification, Availability, Characteristics and Uses.
	Materials for Pre-Stressing	Classification, Availability, Characteristics and Uses.
Module-3	**Forms & Materials for Speedy Construction**	Reinforcement types, RMC. Advanced Formwork systems - Table Form / Flying Form, Column Formwork Systems, Horizontal Panel Systems, Vertical Panel Systems, Jump Form, Slip Form & Tunnel Form. Classification, Availability, Characteristics and Uses.

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 P.V.C. factory etc. for better understanding and submit report.

WORKSHOP/CONSTRUCTION YARD PRACTICE & SITE EXPOSURE

Module-4	**Workshop/Construction Yard Practice**	Practicing in construction yard by making the examples of pre stressed components, industrial construction and speedy construction.
Module-5	**Site Exposure**	Exposure to advanced 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 Precast and Prestressed works.
2. To construct examples of precast and prestressed works in construction yard.
3. To survey construction work on site and submit report.

SECTION – B, BUILDING CONSTRUCTION TECHNOLOGY

Module-6	**Industrial Construction**	Structural Steel Works - Portal Frame Construction, North-light truss and Lattice girder roof with various roof coverings (corrugated metal sheets as roof panels - first to fourth generation sheets).
Module-7	**Pre-stressed Concrete**	Introduction, methods of pre-stressing, types of post-tensioning systems. Types of pre-stressed concrete structures - Beams (Short span, medium span, long span), Girders & Joists. Slabs (one way, two way, flat slabs, hollow core slabs, planks), Single & Double T slabs. Channel sections, Folded plate structures. Composite construction.

Module-8	**Prefabrication & Precasting**	Systems of pre fabrication – open prefab system, large panel prefab system, joints, pre-casting methods, materials, on-site and off-site prefabrication, components, etc. Precast RCC Frames - Beams and Column Frames, Wall Frames, Hollow core slabs, Planks and Tee slabs resting on Beam & Column frames and Wall frames. Connections between various components - beam to column, column to column, beam to slab, wall to slab.
Module-9	**Speedy Construction**	Methods, Types of floor construction – cast in situ, precast & composite construction. One-Way Slabs - Solid slabs, Slabs with wide beams, Ribbed slabs (One-Way Joists), One-Way joists with wide beams, Troughed slabs (ribbed slabs with integral beams and level soffits). Two-Way Slabs - Solid slabs, Waffle slabs designed as Two-Way slabs, Waffle slabs designed as Two-Way slabs with integral beams and level soffits, Flat slabs, Flat slabs with drops, Flat slabs with column heads, Waffle slabs designed as flat slabs Lift slab construction, Cast-in-situ service & stair cores, Cross wall & Box frame construction.
Module-10	**Modular Coordination**	Aims, basis, planning, dimensioning. Assembly of components, tolerances, positioning of functional elements – slabs, walls, staircases.

CONSTRUCTION PLATES

1. To understand large span structural steel works e.g. portal frames and truss-girder frames with various roof coverings products.
2. To understand the application of pre-stressed concrete in buildings – planks, hollow core slabs, single & double tee slabs, beams, columns and composite construction.
3. To understand the joint details in prefabricated buildings.
4. To understand one way and two way slab system in speedy construction.
5. To understand speedy construction techniques in buildings.
6. To understand the modular coordination in buildings' design and their components.

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. Prestressed Concrete Structures: P. Dayaratnam
11. Concrete: Microstructure, Properties and Materials P. Kumar Mehta
12. Properties of Concrete A. M. Neville
13. Concrete Admixture Handbook: Properties, Science & V. S. Ramchandran Technology
14. Modern Prestressed Concrete: J. R. Libby
15. Principle & Practices of Heavy Construction: Smith & Andres
16. Don A.Watson, Construction Materials and Processes, McGraw Hill Co.
17. Building Materials by SC Rangwala: Charotar Pub. House, Anand
18. M. Gambhir, NehaJamwal, Building Materials Products, Properties and Systems, Tata McGraw Hill Publishers, New Delhi, 2011.
19. R.K.Gupta, Civil Engineering Materials and Construction Practices, Jain brothers, New Delhi, 2009.
20. National Building Code of India (Latest Edition), Bureau of Indian Standards.
21. Engineering Materials-Deshpande.

22. Engineering Material-Roy Chowdary
23. Designing with models – Criss. B. Mills.
24. Morris, M., "Architecture and the Miniature: Models", John Wiley and Sons, 2000.
25. Mills, Criss B., "Designing with Models: A Studio Guide to Making and Using Architectural Models", Thomson and Wadsworth, 2000.
26. Raghuwanshi, B.S., "A Course in Workshop Technology - Vol. I and II", Dhanpat Rai and Co, 2001.
27. Wenninger (Magrus.J.) Spherical Models, Cambridge University Press, 1979
28. Testing of Concrete in Structures J H Bungey and S. G. Millard
29. Non-destructive testing V. M. Malhotra
30. Learning from failure – deficiencies in Design, Construction and Service R N Raikar
31. Concrete: Repair and Maintenance Illustrated, Problem Analysis, Repair strategy and Techniques Peter Emons & Gajanan Sabnis
32. Construction Failure Jacob Feld, Kennith Harper.

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	**Construction Sheets/Plates of Module 6 – 10**	**6**	**4**	**24**
2	**Tutorial/Quiz/Sketches of Module 1 – 5**	**2**	**3**	**6**
3	**Market Survey & Seminar of Module 1 – 3**	**1**	**10**	**10**
4	**Workshop/Yard of Module 4**	**1**	**4**	**4**
5	**Site Visit Reports of Module 5**	**2**	**3**	**6**
			TOTAL	**50**

B. ARCH. SEMESTER – IX
RAR – 903, PROFESSIONAL PRACTICE - I

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

OBJECTIVES

- To acquaint the students with the role of an architect in society; scale of charges; an architect's conduct in architectural Practice.
- To familiarize a student with requirements of Architectural Competitions and appointment of a contractor through tenders.
- To familiarize the students with Easement rights.
- To familiarize students with Valuation of property.

Module-1	**Organisation of Profession**	Introduction to the professional Organisations e.g. the Indian Institute of Architects, the Uttar Pradesh Architects Association. Their Objectives, working constitution, bye laws, categories of membership, election procedure etc. Detailed Study of the Architects' Act 1972, Council of Architecture and its role.
Module-2	**Professional Conduct, Conditions of Engagement**	Conditions of engagement of an architect - Duties: Responsibilities and liabilities of an architect towards the profession and society, Scale of Professional charges and mode of payment etc., Code of professional conduct and ethics, Need and types of competitions, procedure for conducting competitions.
Module-3	**Tenders and Contracts**	Concept of Contract and essential elements of contract. Tenders, their need and types. Preparation of tender documents and procedure for awarding tenders and award of projects. Type of building contracts. Preparation of contract document - General conditions of contract, defect liability period, running & final payment, retention amount and virtual completion.
Module-4	**Office Organisation and Management**	Setting up practice - Business organization, Types of offices proprietorship, partnership, Private Limited etc., Salaried appointments - public sector, private sector. Basic understanding of Income tax and GST, Basic understanding of Office accounting procedures. Office Procedure in government organization.
Module-5	**Valuation of Properties**	Fundamental concepts of Valuation, classification and types of valuation, Elements and factors affecting valuation; Valuation of immovable properties, Techniques for valuation of landed and building property.
Module-6	**Arbitration**	Concept and need of Arbitration. Law governing arbitration in India – Salient features of the Indian Arbitration Act 1940 and provisions in subsequent amendments. Role of Arbitrator. Nature of arbitration. Appointment of arbitrator/s, Umpire, Conduct, Powers, and duties of arbitrators and umpires, Procedure of arbitration and preparation of awards etc.

APPROACH:

- The course will be covered through lectures citing practical examples.
- Specialist should supplement the course through extension lectures.

REFERENCE BOOKS

1. Dr. Roshan H. Namavati, Professional practice
2. Council of Architecture, handbook of professional document.
3. The Indian Institute of architects, the handbook of Professional Practice.
4. Madhav Devshaktu, Professional Practice.

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Tutorial of Module – 1 - 6	5	3	15
2	Seminar / Presentation of Module – 1 - 6	5	4	20
			TOTAL	35

B. ARCH. SEMESTER – IX
RAR – 904, LANDSCAPE DESIGN

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

OBJECTIVES

- To make students aware of plant-scape around them
- To encourage hand drawing & drafting in landscape presentation drawings
- To familiarize students in preparation of simple landscape proposals.

Module 1	**Introduction to Landscape Architecture**	Role and scope of Landscape Architecture Factors affecting Landscape: Climatic / Natural conditions- (soil, water, landforms, vegetation, temperature, humidity, rainfall), Scale, Material, Cost, Time. Elements of Landscape Design: Natural elements (Landform, water, plantscape, microclimate) Design elements: (man-made water bodies, landscape furniture, lighting, hardscape and softscape) Principles of Landscape Design: Unity, Symmetry, Balance, Hierarchy, Repetition, Sequence with suitable examples
Module 2	**Landscape Graphics**	Techniques on making handmade landscape drawings: trees of varied textures, landforms, buildings, paving, foliage patterns, tone contrast, & balance, rock & water and other landscape features. Conventional symbols in landscape presentations.
Module 3	**Concise Theory and Evolution of Landscape Architecture**	Brief review of different garden styles.
Module 4	**Site Planning**	Detailed site analysis, identifying potentials and constraints, Site Mobilization, Sequence of site activity, Site protection measures, Site implementation, Contour Sites.
Module 5	**Landscape Engineering**	Landscape details including- Road and Parking, Paths and Plazzas. Wall, Steps, Ramps and Decks. Planters, Bed edges and Terraces. Pools and Water bodies. Terrace landscape and Vertical garden.
Module 6	**Planting Design**	Classification of Plants in accordance with composite climate: Trees, shrubs, groundcovers, flowering plants, creepers and climbers.
Module 7	**Landscape Design**	Landscape project: Inventory, Site analysis and Site planning, Conceptual design, Design development and Proposals and relevant constructional details.

APPROACH

1. Emphasis would be in drawing in studios
2. Site-visits to botanical gardens, existing parks & urban spaces
3. Suggested design exercises of traffic islands; small residences, campuses etc.

REFERENCE BOOKS

1. Geoffry& Susan Jellicoe: landscape of Man: shaping the environment from pre-history to the present day.
2. Brian Hackett: planting design

3. Nick Robinson: planting design handbook.
4. Ian Mcharg: Design with nature
5. Simonds: landscape architecture
6. Jay Applaton: Experience of Landscape
7. Paul Bannet: The language of Landscape
8. SimondSwaffield: Theory in Landscape Architecture
9. Trees of Delhi
10. Landscape Detailing (Vol. 1-4)- Michael Littlewood

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Tutorial of Module – 1	1	5	5
2	Drawings / Sheets of Module – 2, 4 & 5	10	1.5	15
3	Seminar/Presentation of Module – 3 & 6	2	2.5	5
4	Design Exercises of Module - 7	1	10	10
			TOTAL	35

B. ARCH. SEMESTER – IX
RAR – 905, ELECTIVE - II (P.G. PREPARATORY); A–BUILDING CONSTRUCTION MANAGEMENT

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

OBJECTIVES

- To provide an insight into Management of Building/Construction projects involving management of money, manpower and machinery.
- To enhance the professional ability of an Architect about the methodology of executing a Project.
- To expose the students to the currently prevalent techniques in the planning, programming and management of a project.

Module 1	**Introduction**	Aim, objectives and functions of construction management. Role of Architect & Construction/Project Manager in Construction Management. Resources of construction Industry. Various stages of construction.
Module 2	**Organization**	Organization, types of organization study of organizational structures suitable for building and construction projects, the roles of the various members of a typical construction organization, responsibility & authority, functions in the management process, qualities of an ideal construction organization and ethics in construction industry.
Module 3	**Construction Management Techniques**	Construction Planning scheduling and controlling phases. Levels of details & time scale Resource scheduling, Smoothing & levelling, Project execution, Monitoring & progress reporting. Use of Management techniques – Bar charts and limitations of bar charts. Mile Stone Chart.
Module 4	**PERT and CPM**	Use of Management techniques –PERT and CPM; event, activity, dummy, network rules, graphical guidelines for network, numbering of events. CPM network analysis & PERT time estimates, time computation & network analysis. Cost time analysis in network planning using CPM.
Module 5	**Mechanization**	Advanced and automated technology in construction Introduction to construction equipment, performance, characteristics of equipment. The role of equipment /machinery in construction industry, factors affecting selection of construction machinery, standard versus special equipment, and understanding of the various issues involved in owning, operating and maintaining of construction equipment, economic life of equipment.
Module 6	**Resource Allocation & Quality Control**	Resource usage profile - Histogram, Resource smoothing and Resource levelling. Planning of temporary services at the site, Safety precautions at construction sites, Security of materials at building site, Stages of inspection and quality control. Computer applications in construction management. Introduction to IT in construction industry-software packages.

REFERENCES:

1. Construction Planning, Equipment and Methods by RL Peurifoy
2. Project Management for Architects by S P Mukopadhyay
3. Part and CPM by L S Srinath
4. Project management through network technologies M. Thyagarajah
5. Construction Project Management Planning, Scheduling & Controlling -K. Chitkara – Tata McGrawhill

6. Dr. B.C.Punmia et al. *Project planning and control with PERT and CPM*, Laxmi Publications, New Delhi
7. Jerome D.Wiest and Ferdinand K.Levy, A Management Guide to PERT, CPM, prentice Hall of India Pub,Ltd., New Delhi, 1982
8. R.A. Burgess and G.White, *Building production and project Management*, The construction press, London,1979
9. Sharma JC, Construction Management and Accounts, Satya Prakashan, New Delhi

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Tutorial of Module 1 - 6	6	4	24
2	Seminar/Presentation of Module 1 - 6	1	11	11
			TOTAL	35

B. ARCH. SEMESTER – IX
RAR – 905, ELECTIVE - II (P.G. PREPARATORY); B–HOUSING

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

OBJECTIVES

- To create awareness about the causes and consequences of housing problems and to impart knowledge about the possible solutions.
- Understanding of the various issues involved in urban and rural housing and knowledge about the planning and design solutions for low income groups

Module 1	**Introduction & Terminology**	Housing Need and Demand in India - Present and Future. House, Housing and Settlement. Detached and Attached House Types. Net & Gross Residential Density, Perceived Density, Zoning.
Module 2	**Settlement Patterns**	Introduction to human settlement, Settlement types and patterns, Relation of housing in present day context with relation to human settlement patterns.
Module 3	**Issues Affecting Housing**	Issues Affecting Housing - Climate Change, Social factors, Affordability, Health, Safety & Security, Noise Control, Utilities and Services.
Module 4	**Objectives of Housing Agencies**	Objectives and role of government, urban local bodies and other agencies in housing development: Census, NSSO, HUDCO, State Housing Board, NBO.
Module 5	**Housing Schemes**	Understanding of various housing schemes- Rajiv Awas Yojana (RAY), Pradhan Mantri Awas Yojna (PMAY), Site & Services Scheme, Rental Housing Policy, Slum Rehabilitation Policy.
Module 6	**Housing Development & Design**	Understanding of various Housing categories through case studies e.g., Condominiums, Co-operative Housing, Affordable Housing, Rural Housing, – Their Advantages and Disadvantages. Understanding of Neighbourhood. Exercises of moderate magnitude on Neighbourhood Planning.

REFERENCE BOOKS:

1. Babur Mumtaz and Patweikly, Urban Housing Strategies, Pitman Publishing, London, 1976.
2. Geofrey K.Payne, Low Income Housing in the Development World, John Wiley and Sons, Chichester, 1984.
3. John F.C.Turner, Housing by people, Marison Boyars, London, 1976.
4. Martin Evans, Housing, Climate and Ocmfort, Architectural Press, London, 1980.
5. Forbes Davidson and Geoff Payne, Urban Projects Manual, Liverpool University Press, Liverpool, 1983. PatrikSchumacher : 2004, Digital Hadid.
6. Miglani O.P., Urban Housing in Developing Economy.
7. Jain A.K., Urban Housing and Slums.

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	**Tutorial of Module 1, 3, 4 & 5**	**4**	**5**	**20**
2	**Field Studies Reports / Presentation of Module 2 & 6**	**2**	**7.5**	**15**
			TOTAL	**35**

B. ARCH. SEMESTER – IX
RAR – 905, ELECTIVE - II (P.G. PREPARATORY); C–URBAN DESIGN

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

OBJECTIVES

- The overall goal of the course is to help students formulate an understanding of the urban forms and spaces. City history and theory will be examined.
- The contemporary needs of the society and the role of spaces will be dealt along with the need for design control.

Module-1	**Introduction**	Emergence of urban design as a discipline, definitions and its ambiguities.
Module-2	**Urban Space Study**	Historical and contemporary example of urban space. Piazza del campo, St. Peters, Campidglio, St. Marco. Yerba Buena garden, San Francisco, Pike place market, Seattle Washington. Indian cases, particularly towns on bazars & streets.
Module-3	**Urban design Parameters**	Space and place, morphology, urban form and structure, fabric, texture, grain, enclosure, human scale, complexity, etc**.**
Module-4	**Basic Principles and Theories of Urban Design**	Theories related to visual or perception aspect (Gorden Cullen) Theories related to physical aspect (Kevin lynch) Theories related to social aspect (Jane Jacob) (after understanding above aspect student will explain above theory on Indian space and context)
Module-5	**Urban Design Details**	Urban outdoor lighting, urban green infrastructure, acoustic consideration for urban fabric, air quality at street level.

REFERENCE BOOKS

1. Whyte, William H. *The Social Life of Small Urban Spaces*. Washington D.C.: Conservation Foundation, 1980.
2. Alexander, C. (1987) *A New Theory of Urban Design*
3. Jane Jacobs, *The Death and Life of Great American Cities* (New York: Random House, 1961), *55*.
4. Jacobs, A. B. (1993). *Great streets*. Cambridge, MA: MIT Press.
5. Appleyard, D. (1981). *Livable streets*. Berkeley: University of California Press.
6. Lynch K, 1960 *The Image of the City* (Cambridge, Mass: MIT Press)
7. Lynch k, Good city form(Cambridge, Mass:MIT Press)
8. Goden Cullen, *the concise townscape.*
9. Rob krier, *urban space*
10. Bernard tshumi, *Manhattan transcript*
11. Deeependra Prasad, *New architecture and urbanism,*
12. John Lang, Architecture and Independence
13. Bill Hiller, *Social logic of space*
14. Paul D. Speriregon Architecture of town and cities, The MIT press
15. jan gehl , Life between buildings: using public space
16. ian geh,l Cities for people
17. Christopher Alexander, Public spaces public lifePattern language
18. *The City of Tomorrow and its Planning* by F. Etchells, London, Architectural Press, 1929,
19. Lewis mumford – city in history
20. Rapoport, amos history and precedent in environmental design
21. Rapoport, amos the meaning of built environment.
22. Watson D. et al (ed), Time saver standards of urban design, McGraw Hill,2003

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Tutorial of Module 1 - 5	5	5	25
2	Seminar/Presentation of Module 1 - 5	1	10	10
			TOTAL	35

B. ARCH. SEMESTER – IX
RAR – 905, ELECTIVE - II (P.G. PREPARATORY); D–SUSTAINABLE ARCHITECTURE

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

OBJECTIVES

- Sustainable architecture aims to create environment – friendly and energy efficient building by actively harnessing renewable nature sources of energy (solar energy etc.) and utilizing materials that least pollute the environment
- The objectives include creating awareness of designing energy efficient building envelopes that respond to the climate of a place bldg. lighting of resource – efficient practices in India, advocating of the application of renewable energy system and the promotion of efficient lighting & HVAC system to reduce energy demand.
- Propose and evaluate strategies for improving the energy performance of buildings.

Module-1	**Introduction to Sustainability**	Sustainable development: Social, economic, environmental factors, ecological footprint, local and worldwide sustainable benchmarks. Energy consumption of buildings in the India; Need of energy efficient building in India.
Module-2	**Sustainable design Principals**	Principles and strategies - site design, energy management, renewable energy, Sustainable material selection, water management, indoor air quality, alternative Energy.
Module-3	**Solar Energy and Buildings**	Solar geometry and built form – Various techniques of shading to reduce heat gain in tropical climate. Various methods of Maximising exposure to solar radiation in cold & temperate climate. Heating & cooling loads – Energy conservation methods – Efficient daylighting.
Module-4	**Energy Codes and Rating System**	ECBC Code, LEED, IGBC, GRIHA, NBC, Internal load, ASHRAE 90.1 – compliance Paths.
Module-5	**Building Envelope**	Building envelope components- WALL, ROOF, FLOOR, DOOR, and WINDOW & SKYLIGHT. Role of envelope in building design for Energy efficiency.
Module-6	**Energy Simulation – eQuest- Energy Programming and Modelling**	Interface, basics of Schematic Design Wizard – building footprint, zoning, envelope construction, exterior doors and windows, Internal loads, Schedules, performing simulations - Design Development Wizard. Defining multiple shells. Importing/using CAD floor plans. Detailed edit mode.

REFERENCE BOOKS:

1. Climatically Responsive Energy Efficient Architecture, PLEA/SPA, New Delhi - 1995.
2. Ms.Sudha, N.K.Bansal and M.A.S.Malik - Solar Passive Building - Pergamon Press.
3. Brown, G Z, Sun, Wind and Light: Architectural design strategies, John Wiley, 1985.
4. Energy Simulation in Building Design, by J. Clarke Computerized Building Energy Simulation Handbook, by Waltz and Waltz
5. Green Building Guidelines: Meeting the Demand for Low-Energy, Resource Efficient

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Tutorial of Module 1 - 3	3	5	15
2	Seminar/Presentation & Report of Module 4	1	10	10
3	Simulation Design Development Report of Module 5 & 6	1	10	10
			TOTAL	35

B. ARCH. SEMESTER – IX
RAR – 905, ELECTIVE - II (P.G. PREPARATORY); E–CONSERVATION

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

OBJECTIVE:

- To understand what is heritage and its importance in terms of Architecture, structure, materiality and its significance in the evolution of the mankind in understanding nature and adapt and make its dwelling units respecting the nature and local climatic conditions.
- The overall goal is to conserve our rich heritage specially built heritage to showcase the richness of our Architecture, culture & society during various period of time and regime and promote conservation of our heritage for our future generations to see and learn evolution in building architecture and technologies during various time periods.
- Our main objective will be to document the heritage of our city and make guidelines, policies, conservation plans for built heritage structures, Heritage precincts and region with respect to its economic viability and spread awareness in the locals and institutions through workshops which will help in sustainable development of the societies.

Module-1	**Introduction to Architectural Conservation**	Definition of heritage, what is an historic building? Introduction to architectural conservation of buildings of importance – definition, nature, purpose and scope. Values in conservation; Ethics of conservation building conservation legislation etc.
Module-2	**Defects in Heritage**	Causes of defects and decay of a heritage structure. Natural agents of deterioration and loss.
Module-3	**Preparatory Procedures for Conservation.**	Preparatory procedures for conservation. Initial inspection, Continuing Documentation, Analysis of the documentation. Role or need of documentation for the conservation & restoration of the any Heritage built form, Heritage precincts or any sort of tangible and Intangible heritage. - Listing of the Region or Precincts for generating a data base of the heritage properties. - Development of regional level maps for various types of heritages. (Heritage site maps, Heritage land-use maps). - Buildings and Precincts typology study according to is usage, Architectural style, religion (study of demography and its comparison past and present) study. - Building material, Construction techniques of Heritage structures in various typologies of buildings with respect to time.
Module-4	**Introduction to International Charters**	Introduction to various charters their significance and their role in guiding our conservation policies and guidelines or regional level and structural level (special reference to Barra and Venice charter).
Module-5	**Literature Study and Site Visit**	Literature case study of Red Fort (available on ASI web site) and site visit of ASI protected heritage buildings (in local city/town) and along with condition assessment techniques and methods.

REFERENCE BOOKS:

1. An introduction to conservation by Feildon B. M.
2. Conservation of Building by I. H. Harvey.
3. A critical bibliography of Building Conservation by Smith I. H.

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Tutorial of Module 1 - 5	5	5	25
2	Seminar/Presentation of Module 1 - 5	1	10	10
			TOTAL	35

B. ARCH. SEMESTER – IX
RAR – 905, ELECTIVE - II (P.G. PREPARATORY); F-PRODUCT DESIGN

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

OBJECTIVES

- To give students basic understanding about Product and Industrial design process.
- The emphasis of the course is on group product design projects.

Module-1	**Introduction**	Definition of product design, design by evolution & design by innovation, essential factors, morphology of design, primary design phases and flow charting
Module-2	**Product Strategies & Analysis**	Standardization, industrial design organisation, role of aesthetics in product design, functional design practice, strength, stiffeners and rigidity considerations in product design
Module-3	**Review Of Production Processes**	Primary, machining & non-traditional machining processes, manufacturing requirements in design of machine components, design for forging, pressed components, casting & machining, designing with plastics, rubber, ceramics & wood
Module-4	**Economic Factor and Anthropometrics Effecting Design**	Product value, design for safety, reliability and environmental considerations, economic analysis, human considerations in product design, anthropometry.
Module-5	**Product Development**	Product development from concept to product designing for function, production, handling, use and maintenance

APPROACH

- Basic knowledge has to be given by the teacher through presentation or any other technique supplemented by student seminars to make it interactive.
- Product development: Selection of the projects is based on the possibility of user interaction leading to innovation. Projects end with a comprehensive presentation through working/mock up models, design drawing and a report.

REFERENCE BOOKS

1. Chitale & Gupta, Product Design & Manufacturing, PHI, 3rd edition, ISBN-10: 8120326369, 2005.
2. Ulrich & Epinger, Product Design And Development; T M H, ISBN-10: 007229647X, 2005.
3. N. F. M. Roozenburg, J. Eekels, Product Design, Fundamentals and Methods, Willey Publications, 2008.
4. M. Baxter, Product Design - Practical Methods for the Systematic Development of New Products, Chapman & Hall, 1995.
5. P. H. Hill, The Science of Engineering Design, Holt, Rinehart and Winston, N.Y, 1970

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	**Tutorial of Module 1 - 4**	**2**	**5**	**10**
2	**Seminar/Presentation & Report of Module 2 - 4**	**1**	**10**	**10**
3	**Product Design & Development of Module 5**	**1**	**15**	**15**
			TOTAL	**35**

B. ARCH. SEMESTER – IX
RAR – 906, ADVANCED SERVICES

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

OBJECTIVES

- To develop an understanding of the advanced building services and their application in the design proposals of buildings of slight complex nature such as multistoried.
- The thrust shall be on understanding the use and application of the services and not the calculation or numerical part.

CONTENTS

Module 1	**Gas Installation**	L.P.G / Bio-gas installations, their location and layouts in residential and non-residential buildings
Module 2	**Automated Parking System**	Introduction, Types, Working and Advantages of automated parking system.
Module 3	**Mechanical Ventilation**	Standard requirements of ventilation for different conditions of living and works. Conditions for comfort. Control of quality, quantity, temperature and humidity of air.
Module 4	**Control Room**	Code of Safety prescribed in NBC.
Module 5	**Waste Treatment & Management**	Introduction, Reduce–Reuse–Recycle, Waste collection, Treatment & disposal. Thermal treatment Dumps and Landfills. Biological waste treatment. Waste water treatment
Module 6	**Integrated Building Management System**	The objectives of the Integrated Building Management System (IBMS), the list of utility, safety and security systems that are generally monitored and controlled through IBMS, the various components of IBMS, types of integration with the utility, safety and security systems and the basic knowledge on how they are designed and installed.

SUGGESTED EXCERCISES

- Site visits of buildings where different types of advanced services equipments have been installed, their working and the merits and demerits of the system.
- In an already designed project of a large covered area & multi-stroried building installation of these systems and the location of their parts and how they will be connected.

APPROACH

- Specialized lectures from technical people in the field.
- Practical and site based exercises to make the data more comprehensive.

REFERENCES

1. Understanding Building Automation Systems (Direct Digital Control, Energy Management, Life Safety, Security, Access Control, Lighting, Building Management Programs) by Reinhold A. Carlson, Robert A. Di Giandomenico
2. Building Automation: Control Devices and Applications by In Partnership with NJATC (2008)
3. Building Control Systems, Applications Guide (CIBSE Guide) by The CIBSE (2000)
4. Building Automation Online by McGowan; McGowan, John J.

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Tutorial of Module 1 - 6	6	3	18
2	Seminar/Presentation of Module 1 - 6	1	10	10
3	Site Visit Reports of Module 2 & 5	2	3.5	7
			TOTAL	35

B. ARCH. SEMESTER – IX
RAR – 907, ADVANCED SURVEYING & GEOMETIC TECHNIQUES

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER	
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE						
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			F.O.A.	A.K.T.U.
1	0	2	30	70	**100**	0	0	**0**	**100**	1	X	X

OBJECTIVES

- To develop knowledge and skills related to advanced surveying, photogrammetry, remote sensing and Geographic Information Systems (GIS) principles and practice.
- To impart knowledge about the basic principles of geomatics engineering techniques for data collection and mapping for planning infrastructural facilities, including various architectural applications.
- To provide basic knowledge of GIS, Remote Sensing, GPS theory and their applications using the existing state-of-the-art GIS software.

Module-1	**Total Station Survey**	Introduction, Working principle of total station and its use. Use of software for different applications.
Module-2	**Photogrammatery**	Definition, Principles and application of photogrammatery and stereoscopy in surveying.
Module-3	**GIS (Geographic Information System)**	Introduction to geographical concepts and terminology, Difference between Image Processing system and GIS, Utility of GIS. Raster and Vector Data - Introduction, Descriptions about Raster and Vector data, Raster Versus Vector, Raster to Vector conversion, Remote Sensing Data in GIS, Topology and Spatial Relationships, Data storage verification and editing. Data preprocessing, Geo-referencing, Interpolation of data, Database Construction, Data Output, GIS analysis functions, Generation of thematic maps, Digital Elevation Model (DEM), Introduction to software..
Module-4	**Remote Sensing**	Basics concepts of remote sensing, Electromagnetic spectrum, Platforms and sensors, Remote sensing data products, Introduction to visual and digital image interpretation techniques and image processing software, Field verification..
Module-5	**GPS (Global Positioning System)**	Introduction to GPS surveys, GPS data collection for mapping.
Module-6	**Application**	Application of geomatic engineering techniques to architecture and planning, Utility of high resolution remote sensing data for infrastructural planning, 3D visualization.

LIST OF ASSIGNMENTS (Practicals, Field Exercises & Drawings)

1. Preparing topographical map of given area using total station.
2. Study various aerial images.
3. Demo on various GIS software and their salient features. Practice on GIS for layers creation.
4. Customized application in GIS.
5. 3D GIS.
6. Use of remote sensing images for Landuse and landcover classification.
7. Use of GPS for taking field measurements.
8. Practice on Image Processing System to use remote sensing images.

REFERENCE BOOKS

1. Surveying Volume I & II by Dr. B.C. Punmia
2. Surveying and Leveling (Part – 1) by Kanetkar TP and Kulkarni SV
3. Surveying Volume -1 by Dr. K.R.Arora.
4. Burrough, P.A. and McDonnel, R.A., “Principles of Geographic Information System”, Oxford University Press.
5. Chrisman, Nicholas R., “Exploring Geographic Information Systems”, John Wiley.

6. Longley, Paul A, Goodchild, Michael F., Maguire, David J. and Rhind, David W., "Geographic Information Systems and Science", Wiley.
7. Lo, C.P. and Young, A.K.W., "Concepts and Techniques of Geographical Information System", Prentice Hall India.
8. Lillesand, T.L., and Kieffer, R. W., "Remote Sensing Image Interpretation", John Wiley and Sons.
9. Gopi, S., "Global Positioning System: Principles and Applications", Tata McGraw Hill.

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	**Report on Working and Application of Module 1 & 2**	**2**	**5**	**10**
2	**Exercises of Module 3 & 4**	**4**	**7.5**	**30**
3	**Exercises of Module 5 & 6**	**2**	**15**	**30**
			TOTAL	**70**

B. ARCH. SEMESTER – IX
RAR – 908, ARCHITECTURAL THESIS - I

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER	
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE						
			CT	TA	TOTAL	THEORY	VIVA	TOTAL			F.O.A.	A.K.T.U.
1	0	3	0	100	**100**	0	50	**50**	**150**	4	X	X

OBJECTIVES

- To prepare a student to conduct in-depth study of one focus area of thrust emerging from architectural domains like structure, climate responsiveness, vernacular, architecture theory / philosophy, low cost construction techniques, parametric design and simulation, universal design, disaster management, green and intelligent buildings, advanced construction, services and materials etc. and form it as the basis of designing his/her thesis project proposal.
- To educate the student to independently handle and present all aspects of an architectural design, from its evolution to final solution in totality.
- To understand the importance of the evolutionary stages of a design process and various techniques required for a successful presentation of an architectural design.
- To develop in students the ability to handle specific aspects / thrust area of design relevant to the topic.

INTRODUCTION

- The multiple challenges of 'built environment' offer unlimited scope for the choice of an architectural design thesis. The selection of the thesis subject may result either from issue/s involved, or from the challenges of design, or the inherent and acquired aptitude of a student, which he/she wishes to perfect and present. The variety of the intentions give students the choice to select the topic of the thesis from a purely hypothetical to a 'live' programme, as long as the topic can result in tangible 'built environment' solution. Consequently, the size of the project has no relevance in the selection of the topic; the riding clause being the topic's relevance to serve the laid down specific objectives inherent in the philosophy of the institution.
- For reasons of maintenance of uniformity in results and standards, the thesis presentation shall be in two distinct compartments: a report comprising of all the preliminary studies required for the thesis topic, and the final design solution.
- Thesis I in 9th semester shall comprise of the research part of thesis in form of report part while the 10th semester shall carry forward the design stages in form of drawings.
- The Thesis report shall also consist of thrust area studies/ research and all relevant contextual studies: of user, place and time to enable the formulation of design criteria and should be spiral bound for the thesis I submission.

Module-1	**Stage I**	**Selection and research of thrust area**
	Marks = 50	Identification & brief Description of Literature/ library/ case studies to form background study. Thesis Plan: Identifying aims and objectives (for implementing thrust area in subsequent design proposals), methodology, scope and limitations.
Module-2	**Stage II**	Detailed Literature Review of selected Thrust Area/ Issue forming the Design Criteria for Thesis Project.
	Marks = 50	All Literature and Library studies including prescribed standards for selected Thesis Project. Selection of Site(s) for implementation of Thesis Project. Selection of case Studies, along with criteria.

The Students will be expected to complete all Background Study for the Selected/ Proposed Thesis Project before leaving for winter break when he/she will conduct extensive site studies and visit case / prototype studies for submission of Stage I in next semester.

COMPOSITION OF JURY PANEL FOR INTERNAL EVALUATION OF THESIS AT EVERY STAGE

- There shall be one or more jury panels. Each panel shall consist of the following -
- Senior faculty member, an architect, (Professor/Asso. Professor) of the Department of the parent institution / university.
- Junior faculty member, an architect, (Asst. Professor) of the Department of the parent institution / university.
- Thesis Guide(s).

There shall be **two** juries/presentations for each student in order to assess Stage I and Stage II.
Further the Thesis Coordinator (s) will act as facilitator.

COMPOSITION OF JURY PANEL FOR FINAL (EXTERNAL) EVALUATION / EXAMINATION OF THESIS.

- There shall be one or more jury panels. Each panel shall consist of the following -
- An Architect Director / Principal / Head of the Department / Professor of the parent institution / university.
- An Architect Director / Principal / Head of the Department / Professor of other than the parent institution / university.
- An eminent architect from the profession with at least 15 years of field experience.
- Thesis Guide(s) as member, but not part of evaluation.

Further the Thesis Coordinator (s) will act as facilitator.

B. ARCH. SEMESTER – X
RAR – 1001, ARCHITECTURAL THESIS - II

PERIODS			EVALUATION SCHEME						SUBJECT TOTAL	CREDITS	DURATION OF THEORY PAPER	
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT			ESE					F.O.A.	A.K.T.U.
			CT	TA	TOTAL	THEORY	VIVA	TOTAL				
1	0	26	0	450	**450**	0	350	**350**	**800**	20	X	X

OBJECTIVES

- To prepare a student to independently handle and present all aspects of an architectural design, from its evolution to final solution in totality.
- To understand the importance of the evolutionary stages of a design process and various techniques required for a successful presentation of an architectural design.
- To develop in students the ability to handle specific aspects / thrust area of design relevant to the topic.

INTRODUCTION

- The multiple challenges of 'built environment' offer unlimited scope for the choice of an architectural design thesis. The selection of the thesis subject may result either from issue/s involved, or from the challenges of design, or the inherent and acquired aptitude of a student, which he/she wishes to perfect and present. The variety of the intentions give students the choice to select the topic of the thesis from a purely hypothetical to a 'live' programme, as long as the topic can result in tangible 'built environment' solution. Consequently, the size of the project has no relevance in the selection of the topic; the riding clause being the topic's relevance to serve the laid down specific objectives inherent in the philosophy of the institution.
- For reasons of maintenance of uniformity in results and standards, the thesis presentation shall be in two distinct compartments: a report comprising of all the preliminary studies required for the thesis topic, and the final design solution.
- The Thesis report shall consist of all relevant contextual studies: of user, place and time to enable the formulation of design criteria.
- The design solution shall be in the form of drawings and models of the concept and design and shall further include the presentation of at least one specific aspect relevant to the selected topic in complete detail.
- The report, in duplicate, shall be submitted in bound form together with prints/photographs of all the drawings and model/s.
- All relevant/ pertinent drawings, sketches, models from previous stages to be put up for the jury to show evolution of design.

Module-1	**Stage III** **Marks = 100**	Summary of previous stages, Revised Design Criteria. Detailed Case Studies identified for Thesis Project. Detailed Site Studies and Analysis for implementation of Thesis Project. Concept and Sketch Design through drawings and models.
Module 2	**Stage IV** **Marks = 100**	Finalised Sketch Design through well drafted double line plans, sections, elevations and models.
Module-3	**Stage V** **Marks = 100**	Design development in form of Site Plan(s), floor Plan(s), Sections and Elevations, Views and Working Models fully explaining the design, Structural Systems, Services Compliance. Selection of Elective; Criteria, Objectives, Methods, Scope and Limitations.
Module-4	**Stage VI** **Marks = 75**	Developed working Drawings incorporating all structural systems, services and electives.
Module-5	**Final (Internal)** **Marks = 75**	Finalized Detailed Drawings complete with electives, 3Ds views, walk throughs and models with Final Thesis report

COMPOSITION OF JURY PANEL FOR INTERNAL EVALUATION OF THESIS AT EVERY STAGE

- There shall be one or more jury panels. Each panel shall consist of the following -
- Senior faculty member, an architect, (Professor/Asso. Professor) of the Department of the parent institution / university.
- Junior faculty member, an architect, (Asst. Professor) of the Department of the parent institution / university.
- Thesis Guide(s).

There shall be **five** juries/presentations for each student in order to assess Stage I to Stage V.
Further the Thesis Coordinator (s) will act as facilitator.

COMPOSITION OF JURY PANEL FOR FINAL (EXTERNAL) EVALUATION / EXAMINATION OF THESIS.

- There shall be one or more jury panels. Each panel shall consist of the following -
- An Architect Director / Principal / Head of the Department / Professor of the parent institution / university.
- An Architect Director / Principal / Head of the Department / Professor of other than the parent institution / university.
- An eminent architect from the profession with at least 15 years of field experience.
- Thesis Guide(s) as member, but not part of evaluation.

Further the Thesis Coordinator (s) will act as facilitator.

B. ARCH. SEMESTER – X
RAR – 1002, PROFESSIONAL PRACTICE – II

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

OBJECTIVES

- To familiarize the students with elementary knowledge of various instruments of legislation to safeguard the professional interest of architects as also societal interest.

Module-1	**Law related to Land**	Introduction to the Land Acquisition Act - 1894 and its subsequent amendments through Act of 2013 and 2015, a study of the LAND ACQUISITION AMENDMENT BILL 2018. Notification to acquire land under various sections, concept of public purpose, and compensation apportionment etc. The Uttar Pradesh Urban Buildings (Regulation of Letting, Rent and Eviction) Act, 1972- Its important provisions and effect on the urban development.
Module-2	**Urban Development Law**	Introduction to the UP Urban Planning and Development Act-1973- Concept of Urban Development Authority its power authority and Role in regulating the urban development, Salient features of the provisions of the act. The Uttar Pradesh Slum Areas (Improvement and Clearance) (Amendment) Act- 1981 and its important provisions for achieving.
Module-3	**Law of Easement**	Concept of Easement and essential elements of valid easement, creation of easement – types of Easement, Easement by prescription, Easement by necessity and quasi easement. Termination, suspension and revival of easement and other related concepts.
Module-4	**Mercantile Law**	The Contract Act - 1872 and subsequent amendments – Concept of Agreement, Essential elements of Contract, Flaws in contract etc. Indian Partnership Act - 1932 and subsequent amendments, Relationship of Partners, sharing of profits, Exit of a partner, liabilities of and rights of other partners.
Module-5	**The Law of Environment**	A general understanding of purpose, provisions, and the impact of various components of the environmental law e.g. The National Green Tribunal Act-2010; The Air (Prevention and Control of Pollution) Act- 1981; The Water (Prevention and Control of Pollution) Act- 1974; The Environment Protection Act, 1986; The Hazardous Waste Management Regulations, etc.
Module-6	**Real Estate (Regulation and Development) Act, 2016 (RERA)**	Concept of real estate, Need of the RERA and its impact on real estate, RERA authority, registration under the Act, Role and responsibilities and liabilities of architects under the provisions of the RERA.

APPROACH

- The spectrum of lectures will be covered through lectures citing practical examples. Specialist should supplement the courses through extension lectures**.**

REFERENCE BOOKS

1. Dr. Roshan H. Namavati, Professional practice
2. Council of Architecture, handbook of professional document.
3. The Indian Institute of architects, The handbook of Professional Practice.
4. Madhav Devshaktu, Professional Practice
5. Governance of Societies under Multistoried buildings/housing

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Tutorial/Quiz of Module 1–5	5	5	25
2	Seminar / Presentation of Module – 6	1	10	10
			TOTAL	35

B. ARCH. SEMESTER –X
RAR – 1003, ELECTIVE – III (MISCELLANEOUS); A–ARCHITECTURAL PEDAGOGY

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

OBJECTIVES

- Seeking Responsive Forms of Pedagogy in Architectural Education.
- To develop students' critical thinking abilities about the role of community involvement in different phases of the design process.
- To enhance students' understanding of the core concepts, methods, and techniques that pertain to community design as they relate to different phases of the design process (programming, design, post occupancy evaluation), and as they relate to different types of environments.
- To understand the techniques of teaching a specialized course like architecture.
- The course would attempt encouraging students to evolve individual, creative yet pragmatic thought process.

Module-1	**Introduction To Architectural Pedagogy**	Understanding Pedagogy, Importance of Pedagogy, Role of Pedagogy in Architecture. Nature of Interaction between teacher and students, Level of participation / involvement of both Educators and Students in various subjects / experiences. The routines of students and educators. The rules that govern the relationship between students and teachers.
Module-2	**Instructional Methods and Techniques**	Instructional Methods - Lecture method, Demonstration method, Case Study method, Project method, Programmed Instruction/ Learning, Studio method. Instructional Media - Meaning, Need and importance, Projected media, Non-projected media, Computer Based multimedia.
Module-3	**Field Studies in Architecture**	Learning of various aspects of architecture through site visits. Understanding the methods of learning, observing and experiencing these aspects. Preparation of report of the particular case study.
Module-4	**Hands – on - Studios as a Tool for Learning**	Development of exercises for various subjects in Architectural Studios. Learning about programme making for the various studios and workshops.

REFERENCE BOOKS

1. Transformative Pedagogy in Architecture and Urbanism by Ashraf M. Salama.
2. Art, Architecture, Pedagogy Experiments in Learning by Ken Ehrlich.

REFERENCE WEBSITES

1. http://aap.cornell.edu/news-events/how-we-teach-architecture-pedagogy-featured-puerto-rico-symposium.
2. www.architectural-review.com/...pedagogies...architectural...
3. http://www.edtechpost.ca/readings/davidorr-architecture-as-pedagogy.pdf
4. www.field-journal.org/uploads/file/.../Field%205(1)%20Salama.pdf

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	**Tutorial of Module 1 - 2**	**2**	**5**	**10**
2	**Seminar/Presentation of Module 1 - 2**	**2**	**5**	**10**
3	**Field Studies Reports of Module 3**	**1**	**5**	**5**
4	**Hands – on - Studios of Module 4**	**1**	**10**	**10**
			TOTAL	**35**

B. ARCH. SEMESTER –X
NAR – 1003, ELECTIVE – III (MISCELLANEOUS); B–MANAGEMENT & MARKETING SKILLS

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

OBJECTIVES:

- To impart the students latest and relevant knowledge from the field of management theory and practice.
- To provide opportunities to the students for developing necessary managerial skills.

Module-1	**Basic Concepts of Management**	Definition, Need and Scope, Introduction to Management Science, Theory & Practice, Environment of Management, Managers & Entrepreneurs, Managerial Roles & Skills, Manager's Social & Ethical Responsibilities.
Module-2	**Functions of Management**	Planning – Concept, Nature, Importance, Steps, Limitations, Management by objectives Organizing - Concept, Nature, Importance, Principles, Centralization, Decentralization, Organization Structures, Line and Staff Authority, Functional, Leadership & Management, Product, Matrix, Geographical, Customer, New Forms of Organization – Virtual, Organizations as Networks - Types of Network. Organizations/Clusters – Self Organizing Systems. Organizational Designs Staffing - Concept, Nature, Importance, Steps. Concept of knowledge worker. Directing – Concept, Nature, Importance. Controlling - Concept, Nature, Importance, Process of controlling, Control Techniques.
Module-3	**Financial Management**	Cost of project, Means of finance, Estimates of sales and production, Cost of production, Working capital requirement and its funding, Profitability projections, Break Even Point(BEP), Projected cash flow statement, Projected balance sheet, Project profitability at market prices, Techniques of financial appraisal, Financial risk and over-all financial viability of the project through Internal Rate of Return (IRR)
Module-4	**Marketing Management and Skills**	Introduction to Marketing concept - Evolution of marketing & customer orientation, Marketing Environment and Evaluation of Market opportunities, Market research & Marketing Information Systems, Demand forecasting, Market potential analysis, Product Life cycle, New Product development process.
Module-5	**Marketing Environment and Planning**	Promotion decisions, Integrated Marketing communications concept, Communication tools, Contents of Marketing Plan, Developing Marketing Plan for variety of goods and services, Promotion decisions, Integrated Marketing communications concept, Communication tools, Personal selling & Sales management

REFERENCE BOOKS

1. Essentials of Management – Koontz – TMGH
2. Essentials of Management- Thomson Southwestern, Andrew J. Dubrin
3. Principles & Practices of Management - Saxena
4. Modern management: concepts and skills- Samuel C. Certo and Tervis Certo,
5. Principles and Practices of Management - Shejwalkar and Ghanekar
6. Management Concepts & Practices – Hannagan
7. Managerial Economics – D. Salvatore, McGraw Hill, New Delhi.
8. Managerial Economics – Pearson and Lewis, Prentice Hall, New Delhi
9. Principles of Marketing - Philip Kotler and Gary Armstrong
10. Fundamentals of Marketing - Stanton
11. Marketing Management – Rajan Saxena

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	Tutorial of Module 1 - 5	5	4	20
2	Seminar/Presentation of Module 1 - 5	5	3	15
			TOTAL	35

B. ARCH. SEMESTER –X
RAR – 1003, ELECTIVE – III (MISCELLANEOUS); C-FUTURISTIC ARCHITECTURE

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

OBJECTIVES:

- To have an overview of the innovative concepts for future in terms of design, infrastructure and latest technology.
- To understand the limitations in terms of energy and area to build and sustain.

Module-1	**Theoretical and Imaginative Ideas**	Overview of the theoretical texts and drawings of the ideas by architects over the ages, who have imagined beyond today. E.g. Scholari, Archigram (Peter Cook), Raimund Abraham, Boullee, Ledoux etc.
Module-2	**Alternate Sustainable Ideas through Design and Technology**	Enumerating the varied innovative energy alternatives and their harnessing through design ideas, materials, techniques and functions. Prefabrication as a basic module for building.
Module-3	**Social and Practical implications of a new world**	Comprehending the new social order, modes of transport, physical dimensions of an alternate world.
Module-4	**Futuristic Geometry**	Understanding a higher geometry (minimal surfaces) and its eventual spatial order. Fractals, Fuzzy Logic in architecture.

APPROACH:

- Presentations would be made by the teacher. The students are expected to do library studies and seminars on varied topics to supplement the information base and make it more interactive.

REFERENCE BOOKS:

1. Fantasy Architecture: 1500-2036 [Neil Bingham, Clare Carolin, Rob Wilson, Peter Cook]
2. Visions of the Future: Architecture for the 21st Century, Loft Publications.
3. Futuristic : Visions of Future Living, Caroline Klien (Editor), Stefanie Lieb (Text by)
4. Future Architectue by Eduard Broto

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	**Tutorial of Module 1 - 4**	**4**	**5**	**20**
2	**Seminar/Presentation of Module 1 - 4**	**1**	**15**	**15**
			TOTAL	**35**

B. ARCH. SEMESTER –X
RAR – 1003, ELECTIVE – III (MISCELLANEOUS); D–ARCHITECTURAL JOURNALISM

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

OBJECTIVES

- To make students aware about Architectural Journalism
- To encourage them for Architectural writing, Documentation and Page Composition
- To familiarize students in preparation of Book Reviews and Articles.

Module-1	**Introduction To Architectural Journalism**	What is Journalism and why it is important? Relation between Architecture and Journalism. Looking at the ways design and the built environment are covered in the media today Reading a broad range of contemporary and historical writings by journalists and critics and discuss how these stories reveal different approaches, attitudes, and biases in covering design.
Module-2	**Introduction To Architectural Writing**	Writing on different kinds of articles - from news stories to critical essays on particular buildings and social issues. Sometimes students will report on buildings under construction and other times they will reflect on and criticize projects that are completed. Learning how to gather information and do research for stories and then write various kinds of articles about built environment in Architecture, which will help them to understand the built environment and express their ideas on it.
Module-3	**The state of Architectural Criticism**	Introduction to Criticism and Importance of Criticism. Relationship between Architecture and Criticism. Reading the various articles from the magazines, newspapers and websites about the built environment to understand the criticism and social commentary. Failures of Architectural Criticism. Analysis of various critical themes, and their comparison and learn how to criticize a built environment in various aspects and writing about criticism.
Module-4	**Structure of Architectural Journals & Photo Journalism**	Learning of documenting the collected information. Formatting, page composition, editing write-ups, content writing. Learning the techniques of clicking photographs through specific angles of built environment and their editing and modification. Learning the technique of how the photographs are supporting the write-ups about built environment, to help them understand the expression of pictorial, verbal and visual relationship of architecture journalism.
Module-5	**The Built Environment & How We Live Today?**	Looking at and explaining a building in today's scenario. What's happening now and what should be the future. Read article and write an essay on recent projects. Writing about the new technologies in today's architecture and new construction techniques.

APPROACH

- Each week, students will have a reading and a writing assignment. Usually, readings will come from a newspaper, magazine, or website and students will have to respond with their own piece of writing. In class, everyone will discuss the readings and present their ideas about the topic in question.
- Students will be assessed by the quality of their writing, the level of understanding they bring to the readings and topics, and the quality of their in-class presentations and participation.
- Writing is a critical skill for all architects, one that they can use to communicate with clients, the public, and other Architects.

REFERENCE BOOKS

1. Dave Sounders, *Professional Advertising Photography*, Merchurst, London 1988
2. Roger Hicks, *Practical photography*, Cassell, London 1996
3. Julian Calder and john Garrett, *The 35mm Photographer's* Handbook, Pan Books, London 1999
4. Julie Adair King, *Digital Photography for Dummies*, COMDEX, New Delhi 1998
5. Architecture and the Journalism of Ideas by Bender, Thomas
6. Architectural Criticism and Journalism by Mohammad al-Asad w/ Majd Musa
7. Nieman Reports: *Architectural Criticism: Dead or Alive* by Blair Kamin.
8. *The Failures of Architecture Criticism,* by Lance Hosey in theHuffington Post.
9. *Writing Architecture: A Practical Guide to Clear Communication about the Built Environment,* by Carter Wiseman

REFERENCE WEBSITES

1. http://niemanreports.org/articles/ar chitecture-criticism-dead-or-alive/
2. http://www.huffingtonpost.com/lanc e-hosey /the-failures-of architect_ b_6445858.html
3. Architectural website, such as **archrecord.com**; **archpaper.com**; **archdaily.com**; and **dezeen.com**
4. Grace Farms designed by SANAA, article in Architectural Record by
5. Naomi R. Pollock. http://archrecord.construction.com/ projects/portfolio/2015/1511- Grace-Farms Kazuyo-Sejima- Ryue-Nishizawa-SANAA.asp
6. http://archrecord.construction.com/ tech/techFeatures/2015/1509- Mass-Timber-Construction.asp

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	**Tutorial of Module 1 - 5**	5	4	20
2	**Seminar/Presentation of Module 1 - 5**	1	15	15
			TOTAL	35

B. ARCH. SEMESTER –X
RAR – 1003, ELECTIVE – III (MISCELLANEOUS); E–ART APPRECIATION

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

OBJECTIVES

- The knowledge and understanding of the universal and timeless qualities that identify all great art.
- To introduce the students to the importance of art in today's world and the purposes art has served from pre - historic through modern times in a variety of cultures both western and oriental.
- To understand artistic intent and expression through basic element of art and architecture and to increase appreciation of art in today's society.

Module-1	**Introduction & Terminology**	Grammar of the language of art - Natural, Realistic, Symbolic, Abstract, Modern and Contemporary.
Module-2	**Ideologies of Aesthetics in Art**	Complete understanding of Ideologies of aesthetics in art while discussing the art of Western and Oriental. Plato, Aristotle, Baumgartan, I.A. Richards, Leo Tolstoy, Sigmund Freud. Shadanga: Six limbs of Indian painting. Rasa theory of 'Bharat Muni'. Iconography.
Module-3	**Development of Art**	Development of art over the period of time. Tracking the progress in art in aspects of the Functional diversity of styles, Art as form of social consciousness, Impact of Cultural and Religion on art, Understanding the role of art in contemporary society.

APPROACH

- Presentation would be made by the teacher. The students are expected to do library studies and seminars (Reports, Tutorials and PPT's) on varied topics to supplement the information base and make more interactive.

REFERENCE BOOKS

1. What Is Art For? (June 1, 1990) by Ellen Dissanayake.
2. Learning to Look: A Handbook for the Visual Arts (Phoenix Books) 2nd Revised ed. Editionby Joshua C. Taylor.
3. More Than Meets The Eye: Seeing Art With All Five Senses (Bob Raczka's Art Adventures) Paperback – October 1, 2003by Bob Raczka.
4. How to Read a Painting: Lessons from the Old Masters Paperback – December 7, 2004 by Patrick De Rynck.
5. Learning to Look at Modern Art by Mary Acton.
6. Teaching with Khan Academy: Art for Beginners: A Curriculum Guide to Teaching Beginning Art History and Appreciation with Khan Academy Paperback – Large Print, November 8, 2012by Beverly Fields.
7. Art: Over 2,500 Works from Cave to Contemporary Hardcover – October 20, 2008 by Iain Zaczekand Mary Acton.
8. Aesthetics - YURI BOREV.
9. Approaches to Art in Education - LAURA H. CHAPMAN.
10. Panorama of the Arts- RUDEL.

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	**Tutorial of Module 1 - 3**	**3**	**5**	**15**
2	**Seminar/Presentation of Module 1 - 3**	**1**	**10**	**10**
3	**Hands – on – Studios of Module 3**	**1**	**10**	**10**
			TOTAL	**35**

B. ARCH. SEMESTER –X
RAR – 1003, ELECTIVE – III (MISCELLANEOUS); F–HUMAN SETTLEMENTS

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

OBJECTIVES

- To study the Evolution and Growth of Human Settlements
- To expose students to the development of Human Settlements in the Indian Context
- To Critically analyse learnings from development of informal and formal Human Settlements
- To discuss new and emerging concepts, methods and tools to face new challenges in built environment in Developing countries.

Module-1	**Evolution and Development of Human Settlements**	Origin and Growth of Human Settlements, River Banks as carriers to growth of Human Settlements; River valley Settlements: Greek, Roman, Medieval, Renaissance and Modern.
Module-2	**Human Settlements in India**	Human Settlements in India since the ancient to Medieval and Modern periods. Factor affecting their development and extinction: Scio-Cultural, Disasters and Environmental Aspects.
Module-3	**Study and Analysis of Informal and Formal Settlements**	Detailed Analysis of selected informal and formal human settlements in the world and India for deriving learnings for contemporary usage especially in the context of Efficient management of Resources, Solid Waste Management, Sustainability, Preservation of Cultural Practices.
Module-4	**Establish criteria for contemporary Sustainable human settlements**	A critical evaluation and discussion of new emerging concepts methods and tools, and cases like Masdar City, Auroville for upcoming challenges in human settlements for developing countries.

APPROACH

- Focus shall be on learning from growth and development of traditional human settlements.
- Aspects affecting their evolution and socio-cultural and other related aspects.
- Learning through case studies and literature studies along with relevant site visits shall be preferable.

REFERENCE BOOKS

1. Water Conservation Techniques in Traditional Human Settlements by Pietro Laureano.
2. Human Settlements: The Environmental Challenge. A compendium of United Nations papers prepared for the Stockholm conference on Human Environment 1972.
3. The Evolution of Human Settlements from Pleistocene Origins to Anthropocene Prospects by Bowen, William M., **Gleeson**, Robert E.
4. History of human settlements and urban design from the early ages to the end of the 19th century (Council of Planning Librarians. Exchange bibliography) Unknown Binding – 1969 by Gideon Golany
5. Evolution of human settlements in India by S.P. Chatterjee
6. Human Settlements and Planning for Ecological Sustainability: The Case of Mexico City by Keith Pezzoli John Friedmann.

CRITERIA FOR ASSESSMENT OF SESSIONALS

S.NO.	PARTICULARS	NO. OF ASSIGNMENTS	MARKS PER ASSIGNMENT	TOTAL
1	**Tutorial of Module 1 - 2**	**2**	**5**	**10**
2	**Case / Site Study of Module 3**	**3**	**5**	**15**
3	**Seminar/Presentation of Module - 4**	**2**	**5**	**10**
			TOTAL	**35**

B. ARCH. SEMESTER – IX
NAR – 903, ELECTIVE - II (F – ENERGY SIMULATION)

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

OBJECTIVES

Students should able to –

5. Apply energy and mass conservation principles in the analysis of energy performance of buildings;
- Conduct design day and annual analysis of energy use in residential and commercial buildings;
- Develop detailed building energy simulations using state-of-theart building energy simulation software packages;
- Propose and evaluate strategies for improving the energy performance of buildings. architects whose works have been influenced by the vernacular architecture of the region.

Module-1	**Introduction**	Overview: Energy consumption of buildings in the India; Need of energy efficient building in India
Module-2	**Energy Simulation softwares**	Software programs for energy simulation modeling (Ecotect, Energy Plus, Open Studio & Sketch Up, eQuest, Trnsys, IES/VE, DOE, TRACE).
Module-3	**Energy Codes and Standards**	ECBC Code, LEED, IGBC, GRIHA, BEE. ASHRAE 90.1 – compliance paths
Module-4	**Internal loads in buildings**	Plug loads, lighting, people, equipment. Schedules. Data resources for building sector energy use. Energy Use Intensity (EUI)
Module-5	**eQuest- Energy programming and modelling**	eQuest's interface, basics of Schematic Design Wizard – building footprint, shape, zoning, envelope construction, exterior doors and windows, performing simulations, and basic output. Design Development Wizard. Defining multiple shells. Importing/using CAD floor plans. Detailed edit mode.

REFERENCE BOOKS

- Energy Simulation in Building Design, by J. Clarke Computerized Building Energy Simulation Handbook, by Waltz and Waltz
- Green Building Guidelines: Meeting the Demand for Low-Energy, Resource Efficient
- Contrasting capabilities of building energy performance simulation programs. Research Paper by Drury B. Crawley