

THIRD YEAR (5TH SEMESTER)

3RARC501: ARCHITECTURAL DESIGN - V

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
THIRD	3RARC501	ARCHITECTURAL DESIGN- V	1	0	8	100	50	50	200	9	8

OBJECTIVES:

- Understanding design as a function of specific agenda such as site conditions, orientation, climate, circulation and essential services with design limited to design of low- rise buildings.

CONTENTS:

Designing with climate: Design exercises related to multi-functional buildings with specific agenda of peculiar climate: hot and dry, hot and humid, and cold to very cold, conditions.

Site constraints and Architecture: Design exercises on sloping terrain with specific orientation and views on peculiar sites. Suggested studio exercises: low-rise guest houses. tourist resorts, holiday inns, artist's house. shopping malls etc. or more advanced such as auditoriums, library, offices, commercial complexes etc.

APPROACH:

- Prototype studies may be done in-groups o 3-5 students.
- Slide lectures on similar projects.
- Design time problems between major studio programs to prepare students for examinations.

References:

1. Ching, Francis D. K. (2007). *Architecture: Form, Space and Order*, John Wiley and Sons Inc., 3rd Edition, New Jersey, Canada, ISBN 978-0-471-75216-5
2. Lidwell, William, Holden, Kestina, Butler, Jill, "Universal Principles of Design", Rockport – Publications, Massachussets.
3. Evans, Martin. (1980). *Housing, Climate and Comfort*. Architectural Press, London.
4. Koeningsberger, et al. (1975). *Manual of Tropical Housing and Building (Part-II)*. Climate Design, Orient Longman Ltd. Hyderabad.
5. Mani, A. (1980). *Handbook of Solar Radiation Data for India*. Allied Publishers, New Delhi.
6. Olgyay, A. and Olgyay, V. (1957). *Solar Control and Shading Devices*. Princeton University Press. New Jersey.

7. Robbins, C. L. (1986). *Day lighting: Design and Analysis*. Van Nostrand Reinhold Co.
8. Kukreja, C. P. (1978). *Tropical Architecture*. McGraw-Hill. ISBN.
9. Krishan, Arvind, et al, (2013). *Climate Responsive Architecture*. Mc Graw Hill Ltd.
10. Tzonis Alexander. (2001). *Tropical Architecture*. Wiley & Sons.
11. Casserly, R. James. (1979). *Earth Sheltered Housing Design*. Van Nostrand Reinhold Co.

3RAR502: BUILDING CONSTRUCTION & MATERIALS - V

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
THIRD	3RAR502	BUILDING CONSTRUCTION & MATERIALS – V	1	0	6	100	50	50	200	7	7

OBJECTIVES:

- To introduce and familiarize the students with constituents. manufacturing process/ availability, properties / characteristics, defects, classifications, treatments, preservation and uses of traditional building materials used in construction.
- To understand the use of these traditional building materials in simple building works.

CONTENTS: MATERIALS:

MATERIALS

Gypsum Products: Introduction - Gypsum Board. Suspended Ceiling (Board & Tiles). Gypsum Plaster, Components and Accessories, Jointing and finishing.

Metals: Ferrous - Iron (Pig, Cast & Wrought), Steel. Structural. Sheet and Alloys.

Non Ferrous: Aluminum.

Materials with special reference to interiors: Floor Coverings, Wall Finishes, Ceiling Finishes, Window Dressings, Fabrics / Upholstery, Hardware.

CONSTRUCTION:

Structural Steel Works: Typical metal joinery (mechanical (riveted & bolted), soldering and brazing and welding). Detailing of structural steel work - beam to column joint beam, to beam joint. Column Splice, Column Base, Roof Truss to column joints.

Doors, Windows & Partitions (Metals): L and Z section mild steel, Pressed steel section, Aluminum section

Partitions & False Ceilings (Gypsum Board): Construction details of Metal Stud Partition (single layer). Suspended Ceilings

APPROACH:

- The students would be familiarized with vernacular terminology prevalent in this pelt of the country.
- The emphasis will be on construction details as applicable to Indian conditions.
- Site visits and market surveys will be integral part of sessional work.

References:

1. McKay, W. B. (1955). *Building Construction*. Volume I, II, III and IV. Longmans. Harlow.

2. Ching, F. D. K., Adams & Cassandra (2000). *Building Construction Illustrated*. Wiley and Sons.
3. Barry R. (2007). *The Construction of Buildings – Barry Volume I, II, III and IV*. Blackwell Science Ltd.
4. Chudley, Roy (2005). *Construction Technology*. Longmans.
5. Mitchell & Charles F. (1934). *Building Construction (Elementary and Advanced)*. B. T. Batsford.
6. Rangwala, S. C. (2007). *Building Construction*. Charotar Publishing House.
7. Punmia B. C., Jain A. J., and Jain A.J. (2005). *Building Construction*. Laxmi Publications.
8. Rangwala S.C. (2014). *Building Materials*. Charotar Publishing House.
9. Gambhir M., Jamwal Neha. (2011). *Building Materials Products, Properties and Systems*. Tata McGraw Hill Publishers, New Delhi.
10. Gupta R. K. (2009). *Civil Engineering Materials and Construction Practices*. Jain brothers, New Delhi.
11. National Building Code of India, 2005, Bureau of Indian Standards.
12. Morris, M., (2000). *Architecture and the Miniature: Models*. John Wiley and Sons.
13. Raghuwanshi, B.S. (2001). *A Course in Workshop Technology - Vol. I and II*. Dhanpat Rai and Co.

3RARC503: STRUCTURES - V

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
THIRD	3RARC503	STRUCTURES – V	2	2	0	50	50	-	100	4	4

OBJECTIVE:

- To understand the analysis of intermediate structures and their use in field in greater depth.

CONTENTS:

- Limit state method, Limit state method vs. working stress method, Building code.
- Introduction, Limit state, characteristics strength and characteristics load, Design values, Partial safety factors, Factored Loads, stress strain relationship for concrete & steel, yield stress.
- Theory & design of simply reinforced. Doubly-reinforced L & T beams (Limit state method).
- One way. Two-way & flat slabs (Limit state method).
- RCC column for Pure-axial load, Lateral ties, Direct and bending stresses combined and RCC footing.
- Element of pro stressed concrete, Principles and systems, loss of pro stress, analysis of pro stresses and design of beam.

APPROACH:

- The lectures by the experts in the field of design and analysis will be arranged to make student's exposure to practical aspect of design.

References:

1. Nautiyal B. D. (2011) *“Introduction to Structural Analysis”*. B.H.U.
2. Punmia P. C. (2012) *“Strength of Materials & Mechanics of Structures”*. L.P.
3. Khurmi R. S., (2009) *“Strength of Materials”*. S. Chand.
4. Ramamrutham S.(2004) *“Strength of Materials”*. Dhanpat Rai Pub.

3RARC504: HISTORY OF ARCHITECTURE - III

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
THIRD	3RARC504	HISTORY OF ARCHITECTURE - III	2	1	0	50	50	-	100	3	3

OBJECTIVES:

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

CONTENTS:

Greek Architecture: Classical orders as constituent element of Architecture. Column Orders and the articulation of temples, Classification of temples, Geometry and symmetry of individual buildings and their relationship with others based on different organising principles and conditions of site. Study of important acropolis. agora, temples, theatres, tombs and house forms.

Roman Architecture: Multiple building types to correspond the complex social functions and structure. Complex axial organisations of Forums. Concrete and construction of walls, vaults and domes Use of Classical Orders in surface articulation. Study of important forums, temples, basilicas, thermaes, theatres. amphitheatres, circuses, tombs, triumphal arches, palaces, houses and villas.

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.

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.

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.

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.

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.

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.

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.

APPROACH:

- Lectures to be specifically conducted with the visual aids and seminars presented by students.
- Students will make written assignments and seminar presentations on architectural characteristics that identify the building types and the intentions of the period in response to context and time.
- Students will make free-hand sketches and orthographic Drawings in the tutorials of specific building examples to familiarize them with the architectural character that identifies the work of a particular period.

References:

1. Fletcher, S. F. B. (1996). *A History of Architecture*, The Antholone Press. University of London.
2. Kostof, S. (1958). *A History of Architecture*. Oxford University Press. London.
3. Roth, L. M. (1994). *Understanding Architecture: Its elements, history and meaning*. ISBN-13:978-0813349039.
4. Huxtable, A. L. (1972). *Pier Luigi Nervi;History of World Architecture*. George Braziller. German.
5. Guidoni, E., Murray, P., Norberg-Schulz, C. & Muller, H. W. (1978). *History of World Architecture Series, 10 Volumes: Byzantine, Oriental, Modern, Gothic, Islamic, Ancient, Pre-columbian, Baroque, Renaissance, Primitive (History of World Architecture)*. Harry N. Abrams.
6. Scully, V. (1991). *Architecture the Natural and the Man Made*: Harper Collins Pub.
3. Hirasker, G. K. (1899). *The Great Ages of World Architecture*. ISBN-13: 978-8189928889.

3RARC505: INTERIOR DESIGN

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
THIRD	3RARC505	INTERIOR DESIGN	1	3	0	50	50	-	100	4	3

OBJECTIVES:

To initiate students into theory and practice of Interior Design.

CONTENTS:

THEORY:

Principles of Interior Design and their application.
 Elements of Interior Design — Space, Light and Illumination, Color, Texture, Furniture (movables & built-in), Fittings and Fixtures.
 Understanding the furniture works of Great Masters.
 Modern trends and contemporary attitudes to Interior Design e.g. Modular Furniture.
 Modern materials.

STUDIO

Furniture design exercises.
 Design of a small interior space e.g. Entrance Hall. Conference Room.
 Executive's Office. Study Room. Kitchen, Toilet etc.
 Making estimates for the designed projects.

APPROACH:

- Course would be covered through lectures and seminars by the students.
- Regular studio work for total grasp.

References:

1. Ching, Francis D.K. (1987). *Interior Design Illustrated*, V.N.R. Pub. NY
2. Pandya, Yatin. *Elements of spacemaking*.
3. Massey, Anne.(1900). *Interior Design Since*
4. Litchfield, Fredrick. *Illustrated History of Furniture from the earliest to the present time*.
5. Fiell, Charlotte and Peter. *1000 chairs*

3RARC506: BUILDING SERVICES – II (ELECTRICAL)

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
THIRD	3RARC506	BUILDING SERVICES - II (ELECTRICAL)	1	1	0	50	50	-	100	2	3

OBJECTIVE:

- The course intends to integrate the knowledge of electrical services in buildings and to enable a student to take the appropriate decisions at the planning stage from electrical services point of view.
- To make the student familiar with the design principles and applications of light for indoor and outdoor requirements.

CONTENTS:

Section -A

ILLUMINATION:

Terminology in illumination, definitions and units: Light and its characteristics — propagation, reflection, radiation, transmission, absorption: light and vision, colors.

Types of illumination schemes: Direct semi direct, semi indirect, indirect and diffused lighting.

Design Considerations of lighting schemes: Methods of lighting calculations — Light flux method and Point to Point method.

Sources of light, types and characteristics: Incandescent, gas filled and gaseous discharge lamps.

Luminaries: Types and characteristics.

Interior and Exterior Lighting: Residential, Commercial, Industry lighting, Flood lighting and Street lighting.

Section B

Electrical Installation: Basic principles of electrical circuitry, definitions and units, NBC.

Wiring Systems: System of supply & distribution; Methods of wiring -joint box and **Loop-in;** Systems of wiring - Batten. Capping and Casing, conduits open and concealed. Circuits - Series and parallel. Simple circuits. Load calculation and wiring diagrams.

Wiring Material and Lighting Accessories: Wires and cables - materials, types, sizes, specifications, Main switch. M.C.B, Distribution Board, Meter, Lighting accessories-switches, Ceiling rose, socket outlets, plugs, lamp holders.

Design Considerations of electrical Installations: Protection against overload, short-circuit, earth fault, lightning protection, Earthing, methods of earthing; Fuse and types of fuses, Guidelines for installation of lightings.

APPROACH:

Site visits to existing facilities showing indoor and outdoor lighting and electrical services so as to give them exposure to practical aspects. Exercises representing services in drawing should be given.

Section B

ELECTRICAL INSTALLATION:

- Basic principles of electrical circuitry definitions and units . N.B.C.
- Introduction of domestic fittings and appliances.

Wiring Systems: System of supply & distribution. Methods of wiring -joint box and loop —in systems of wiring — batten capping and casing, conducts open and cancelled. Circuits - series and parallel, simple circuits, load calculation and wiring diagrams

Wiring Material and Lighting Accessories: Wires and cables - materials types. sizes, specifications, Main switch , M.C.B, Distribution Board. Meter, Lighting accessories- switches, ceiling rose, socket outlets ,plugs, lamp holders.

Protection against overload, short-circuit, earth fault, lighting protection, Earthing, methods of earthing, fuse and types.

Design Considerations of electrical installations: General requirements of electrical Guidelines for installation of lightings.

Estimating and costing of electrical installations residential and Commercial buildings.

APPROACH:

- Site visits to existing facilities showing indoor and outdoor lighting and electrical services so as to give them exposure to practical aspects.
- Exercises representing services in drawing should be given.

References:

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

3RARC507: BUILDING ECONOMICS & SOCIOLOGY

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
THIRD	3RARC507	BUILDING ECONOMICS & SOCIOLOGY	2	1	0	50	50	-	100	3	3

OBJECTIVE:

- To develop a sociological base for Architecture.

CONTENTS:

Introduction – man his social and physical environment, social group and social structure, utility and relation with architecture

Indian communities – rural and urban communities, their social structures and problems, cultural heritage, rituals and community gathering etc.

Urbanization – trend and characteristics, dynamics of urban growth and social change, urban attitude, value and behavior, review of planning commission reports.

Social aspect of physical environment, its implications and limitations in buildings, neighborhood planning, slum improvements and city fabric, significance of public opinion and participation.

Man, environment and society.

Rural society, traditional patterns and trends of change. The concept of social stratification, urbanization and modernization. Concept of social structure, cultural and social institutions,

Relation between **social structure and special structure**, Social aspects of housing and problems of slums.

Social theories of Gandhi and Nehru and Contemporary India.

Community development and Panchayati Raj.

Broad features of Indian Economy, Economic significance of building, features of development plans, Money and banking functions, factors of production, macro economic theory, demand and supply, Indifference curve analysis, Equilibrium of firm, laws of returns, macro economic concepts and system theory of growth and models

Land economics: Land as limited resource, demand for land acquisition, Economics of regional development, economic development in relation to regional planning, regional economic theories, problems and prospects of balanced regional development

Building economics: building efficiency and cost reduction through planning, design of building components, use of new materials and innovative construction techniques etc., rent and other building acts, economics of high rise buildings etc.

Case Study: sociological study of communities with their habitat and built environment.

References:

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

**3RARCP508: COMPUTER APPLICATIONS TO ARCHITECTURE – IV
(PRACTICAL)**

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
THIRD	3RARCP508	COMPUTER APPLICATIONS TO ARCHITECTURE – IV (PRACTICAL)	0	1	3	50	-	50	100	4	3

OBJECTIVES:

- To develop an understanding of software assisting in 3-Dimensional design.
- Introduction to the use and application of internet.

CONTENTS:

Understanding AUTOCAD: 3-Dimensional drawings, learning to place elements in 3-D view of a predesigned space.

- a) Creation of 2D, 3D surface and solids.
- b) Introduction to UCS, view ports, 3-D views and 3-D orbit.
- c) Internet Compatibility.

Using 3-D MAX: 3-D Max and other related software for developing exterior and interior surfaces and spaces and creating walkthroughs using camera, light and assigning materials.

- a) Introduction to animation.
- b) Animation of still life.
- c) Introduction to modeling
- d) Introduction to materials and mapping.
 - i.) Assigning materials
 - ii) Creating Transparencies.
 - iii) Mapping and mapping co-ordinates.
- e) Introduction of lighting
 - i.) Lighting effects.
 - ii) Shadow maps.
- f) Rendering using active shades and depth of field.

Setting up an INTERNET Connection:

- a) Introduction to Internet Explorer and web Browsers like Netscape.
 - b) Finding Information on the Web
 - c) Browsing and Working Offline.
 - d) Security Aspects of Internet.
- Printing and Saving Information

References:

1. Ernest Norling,(1986) *Perspective drawing*, Walter Foster Art Books, California,.
2. Bernard Alkins 147 (1986), *Architectural Rendering*, Walter Foster Art Books,.

3. Rober W.Gill,(1974.) *Advanced Perspective*, Thames and Hudson, London,
4. *Autodesk Revit Architecture 2012: No Experience required* – Eric Wing
5. *Mastering Autodesk Revit Architecture 2012* – James Vandezande, Phil Read, Edd
6. Kelly L. Murdock (2015) *Autodesk 3ds Max 2015 Complete Reference Guide*

3ARC5010: SEAMLESS LEARNING

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
THIRD	3ARC5010	SEAMLESS LEARNING	0	0	2	100	-	-	100	2	1

Course objectives:

- To sensitize among the students importance of values in a social system.
- To develop a sense of social responsibility among the students and encourage them to take up the initiative to serve for the noble cause.

METHODOLOGY

1. The course shall be inclusive of the various activities which shall be performed under the expert guidance of the course instructor.

3ARC5011: CO- CURRICULAR ACTIVITIES

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		FIFTH SEMESTER			In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks			
THIRD	3ARC5011	CO- CURRICULAR ACTIVITIES	0	0	2	100	-	-	100	2	1

Course objectives:

- To sensitize among the students importance of co-curricular activities in a social system.
- To give an opportunity of brushing up the skills to a limit of perfection and facilitating for the overall development of the students.
- To encourage the students for taking up the challenge of competing with the students of the other schools to ensure the enhancement of their interaction and coherent development.

METHODOLOGY

1. The students shall be informed about the various competitions/ conferences, being organized in and around at National and International level, by the respective club and/ or course co-ordinators.
2. The students shall be given effective guidance related to the respective clubs and other activities.
3. The students shall be enrolled in at least one club as a mandate.