SECOND YEAR (3RD SEMESTER)

2RARC301: ARCHITECTURAL DESIGN - III

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2RARC301	ARCHITECTURAL DESIGN - III	**1**	**0**	**8**	100	50	50	200	9	**8**

OBJECTIVES:

The objectives of Arch. Design in the lst semester were concerned with "space and form" and "formal transformations". The objective of Arch. Design in in the 2nd semester was to study 'space and activity'. The continuation of this leads to understanding of architecture as an outcome of 'space and structure'.

• Understanding basic structure forms in relation to space- and materials.
• Application of structure forms in design.

CONTENTS:

EVOLUTION OF STRUCTURAL SYSTEMS: -

Trabeated: Brick and stone, columns and beams slabs, one way and two way, coffers.

Arcuated: Corbelled, Radiating Arch, Vault and Dome, Squinch and Pemientives.

Vector Structures: Trusses and space frames.

Form Structures: Folded slabs, Shells. Hyperbola - paraboloid.

Tensile: Tents, Cables, and Pneumatic vis-a-vis materials and plan shape's

It should be noted that emphasis would be on the design parameters and graphical presentation of systems rather than their structural analysis.

Suggested

Exercises: Making of models of various structural forms with appropriate and innovative materials.

Making a scale model of important historical building/s incorporating one of the structural forms.

e.g. Trabeated: Parthenon, Arcuated-: Santa Sophia, Pantheon, Vector Active: Pompidou Center, Form Active: Sydney Opera House: Tensile: any of the famous bridges or stadiums.

Design programmes incorporating imaginative use of space and to forms.

Suggested studio exercises: Small space structures such as kiosks. Bus shelters. Petrol pumps, Entrance gates, Rain shelters Exhibition stalls etc.

Large space structures such as Gymnasiums, Skating Rinks, badminton Halls, Exhibition pavilion, Religious buildings etc.

APPROACH:

• Architectural models of various structural forms and important historical buildings will be preserved in the Architecture museums of the college for the use in History of Architecture classes.

• Students shall be taught Model making, pasting, Cutting, soldering also as also as a part of this class.

NOTE FOR CONDUCT OF EXAMINATIONS:

The duration of Examination for this subject is 6X2=12 hours. The examination shall be held over two days. The drawings completed on the first day shall be left in the examination hall and shall be completed and submitted on the second day.

Reference

1. Ching, Francis D. K. *"Architecture : Form, Space and Order"*, John Wiley and Sons Inc.
2. Lidwell, William, Holden, Kestina, Butler, Jill, *"Universal Principles of Design",* Rockport – Publications, Massachusetts.
3. Ahmet Hadrevic, *"Structural Systems in Architecture"*, Book Serj Publishing, South Karolina.
4. Heinoengel, *"Structure System"*
5. *Structural System for Tall Buildings*, CTBUH, McGraw-Hill,Inc.

2RARC302: BUILDING CONSTRUCTION & MATERIALS - III

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2RARC302	BUILDING CONSTRUCTION & MATERIALS - III	**1**	**0**	**6**	100	50	50	200	7	**7**

OBJECTIVES:

• To introduce and familiarize the student with constituents. manufacturing process, availability, properties/ characteristics, defects, classification and uses of traditional building materials used in construction.

• To understand the use of these traditional building materials in simple building work.

CONTENTS:

MATERIALS:

Surface Finishing: Plastering, Jointing & Pointing and Painting.

Floor Finishing: Brick flooring, Cement Concrete, Stone, Terrazzo Ceremic & Vitrified Tiles, Wooden

Glass: Translucent, Transparent and special glasses.

Glass Fibre:

CONSTRUCTION:

Brickwork Continued: Cavity Walls.

Woodwork Continued: Panelled doors. Flush doors and Windows. Mosquito proof Shutters.

Temporary Timbering: Timbering of shallow trenches Raking, Flying and Needle shoring.

APPROACH:

• The students would be familiarized with vernacular terminology prevalent in this part 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.

2RARC303: STRUCTURE - III

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2RARC303	STRUCTURE - III	**2**	**2**	**0**	50	50	-	100	4	**4**

OBJECTIVES:

• To understand the analysis of indeterminate structures and their use in field.

CONTENTS: **FIXED END BEAMS:**

Continuous Beams: Introduction, Analysis of continuous beams. Reactions at the supports. Effects of sinking of supports.

Elastic Theorems and Energy

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

Slope Deflection & Moment

Distribution Method: Introduction, Analysis of indeterminate beams and continuous beams.

APPROACH:

• The lectures by the experts in the field of design and analysis will be arranged to make students' 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.

2RARC304: ARCHITECTURAL DRAWING - III

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2RARC304	ARCHITECTURAL DRAWING - III	**1**	**3**	**0**	50	50	-	100	4	**4**

OBJECTIVES:

- To develop greater perception of complex Architectural forms and buildings.
- To develop innovative skills for presenting Architectural Drawings (like plan. elevation etc.) in different media.
- To develop the skill of making perspectives of complex buildings and Rendering them in different media.
- To develop the skills free hand sketching.

CONTENTS:

Sciography: Shades and Shadows of objects and building elements cast on irregular surfaces, rendered in suitable medium.

Shades and shadows in perspective views and for exterior and interiors

Shades and Shadows cast by point source of light in interiors.

Perspective Drawing: One point and Two-point perspective views, using measure point method, of simple & medium sized buildings- isolated or in-group, showing shades and shadow using different media like-Pencil, Pen-Ink, Water Colour, Poster, and Airbrush etc.

Other innovative methods of perspective presentation techniques should be encouraged.

One point and two point perspective drawing of interiors rendered in different media.

Introduction to short cut methods in perspective drawing. Free hand perspective.

Presentation: Introduction to different textures and finishes in plan and elevation.

Graphical representation of furniture, automobiles, human figure etc. in plans and elevation and 3-Dimension.

Preparation of presentation drawings of small buildings, through Plans. Elevation, site plan etc., using various rendering techniques and media. incorporating sciography creating three dimensioned effect.

APPROACH:

- Emphasis on experimentation with different presentation techniques and medium in two dimensioned drawing and making building perspective, interior perspective.
- The free hand drawing and perspectives need be encouraged.

References:

1. Morris, I. H. (2004). *Geometrical Drawing for Art Students*. Orient Longman, Madras.

2. Francis Ching, Architectural Graphics, Van Nostrand Rein Hold Company, New York, 1964.
3. Bhatt, N. D. *Elementary Engineering Drawing (Plane and Solid Geometry).*Charotar Publishing House, India
4. Stegman, G. K., Stegman, H. J. (1966). *Architectural Drafting.* American Technical Society, U.S.A.
5. Martin, C. L. (1964). *Architectural Graphics*. The Macmillan Company. New York.

2RARC305: ARTS & GRAPHICS – III

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2RARC305	ARTS & GRAPHICS – III	**1**	**3**	**0**	50	50	-	100	4	**3**

OBJECTIVES:

- To develop an appreciation of India Arts & Crafts among the students.
- To strengthen the skill of Architectural Rendering.
- To develop the skills to design smaller elements of buildings.

CONTENTS:

Theory: Lectures on outline of History of Indian Art from earliest times to the Renaissance of Indian Art in late l9th centaury.
Contemporary arts in India and the works of Abanindra nath Tagore,
Nand Lal Bose, Jamini Roy, Amrita Shergill, M.F. Hussain, Satish Gujral and S.H. Raza.
Exercises: Rendering in different media, Works of masters of modern Arehitecture.
Rendering of students own works (AR-30 1) interior and exterior perspectives.
Enlargement and Rendering in Ink the Indian Decorative motifs.
Preparation of collages and Murals for exterior and interior of the buildings such as waiting areas in hotels, schools and hospitals.
Design for window grills and jalis and railings in steel, balustrades in wood, pre-cast concrete.
Preparation in clay the design for concrete jalis for use in buildings.

References:

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

2RARC306: HISTORY OF ARCHITECTURE – I

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2RARC306	HISTORY OF ARCHITECTURE – I	**2**	**1**	**0**	50	50	-	100	3	**3**

OBJECTIVES:

• Understanding of the period in terms of its context of 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:

INTRODUCTION:

Primitive Beginnings: Introduction to history and architecture with special emphasis on stone age to Neolithic settlements in Europe and around with examples from Carnac and
Stonehenge.

HISTORY OF CiVILIZATIONS:

Birth of Civilization: In reference to the Asia-minor region with nascent cities like Jericho. Catalhoyuk, and Hattasus etc.

Egyptian: Particularly in reference to early tomb architecture and later temple architecture with examples like Great pyramids of Cheops. Mastabas, Funery
temples and, later temples like Khons etc.

Mesopotamian: With special attention to cities of Mesopotomian like Ninveh. Khorsahbad, Marie, Babylon. and architectural constructs like Ziggurat.

Aegean: With reference to cities in Aegean like Troy, Sparta, Mycenae. which formed the basic of Greek civilization.

INDIAN CONTEXT:

Indus Valley civilization: Particularly in reference to the town planning principles exemplified with examples from Mohenjodaro and Harappa.

The Aryan civilization: With its emphasis on the Vedic town plan. its motifs and patterns.

Buddhist Aithitecture : In specific reference to the lats, eddicts. stupas. vtharas, and chaityas. both in rock-cut or otherwise.

Hindu Architecture-Indo Aryan: With special attention to the evolution of the temple form, the shikhara in north India. Reference also to be made to the three schools of
architecture—the Gujarat the Khajuraho, and the Orrisan styles.

Hindu Architecture- Dravidian: Particularly in reference to the evolution of the vimana and the contributions of the Chalukyas, the Pallavas, the Pandyas and Cholas as well as the contributions of the Nayaks to the temple cities.

Jam Architecture: With specific reference to the temple cities of Palitana and Girnar.

APPROACH:

• Lectures could be specifically conducted with the visual aids and seminars presented by students.

• Written assignments and seminar presentations could be made by students on the architectural characteristics that identifies the building types as well as intentions of the period in response to its context and demands of the time.

• Free hand sketches and orthographic drawings could made by students in the tutorials on specific building examples to familiarize them with the architectural character that identify the works of the particular period.

• Understanding of the period in terms of its context of location, climate as well as the socio-cultural. historical, economic and political influences of the time.

• Study 01 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.

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.

1. Hirasker, G. K. (1899). The Great Ages of World Architecture. ISBN-13: 978-8189928889.

2RARCP307: OPEN ELECTIVE – I (PRACTICAL)

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2RARCP307	OPEN ELECTIVE – I (PRACTICAL)	**0**	**1**	**1**	50	-	50	100	2	**2**

FINANCIAL MANAGEMENT

Concept of Finance, scope and objectives of finance, Profit maximization vs. Wealth maximization,Functions of Finance Manager in Modern Age, Concept of Risk and Return. Capital Budgeting Decisions, Calculation of NPV and IRR,Cost of Capital,Concept of Opportunity Cost,Cost of Preference and Equity capital, Cash Flows as Profit and components of Cash Flows.

RISK MANAGEMENT

Risk management objectives and tools, risk management and value creation, the risk management process, enterprise-wide risk management, Risk management in industrial companies, RAPM - Risk Adjusted Performance Measures, value at Risk and Underwriting, Role of Actuaries- Product framing, Underwriting guidelines.

AUTOMATION AND ROBOTICS:

Definition, Classification of Robots, geometric classification and control classification. Robot Elements: Drive system, control system, sensors, end effectors, gripper actuators and gripper design. Application of robots in painting, construction, material handling, material mixing on site and transportation.

INTRODUCTION TO BIOTECHNOLOGY:

Introduction, Concept nature and scope of biotechnology. Cell Structure and Function: Eukaryotic and prokaryotic cells, cell wall, membrane organization, cell organelles, Nucleus, Mitrochondria, endoplasmic reticulum, chloroplast, viruses and toxins into cells. Brief account of structure of carbohydrates, Lipids and Proteins. Genes: Brief idea about Mendel's laws and chromosomes, nature of genetic materials, DN A and Applications of Biotechnology: Bioprocess and fermentation technology, cell culture, Enzyme technology, biological fuel generation, sewage treatment, environmental biotechnology, biotechnology in agriculture, food and beverage technology, production of biological invention. Applications in organic architecture.

2RARCP308: COMPUTER APPLICATIONS TO ARCHITECTURE – II (PRACTICAL)

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2RARCP308	COMPUTER APPLICATIONS TO ARCHITECTURE – II (PRACTICAL)	**0**	**1**	**2**	50	-	50	100	3	**3**

OBJECTIVES:

• To introduce various software to the students helping them in compilation of their text/reports etc.

• To enable the students to understand the role of various data storing devices such as scanners. Digitizers etc. and their applications.

CONTENTS:

Learning MS.OFFICE: Basic Command to operate the components of M.S. Office such as M.S. Word.

Knowledge about DTP Techniques in M.S. Word.

Use of various command to make charts, graphs. tables, to help students compile their reports in M.S. Word, exporting & importing such work done in other soft wares and using of Clip Art and making elementary shapes in M.S. Word.

Use of Mail Merge in M.S. Word.

Learning the other components of M.S. office like M.S. Excel. M.S. Power Point. Etc.

Presentation in M.S. Power point in making slides etc.

Making work sheets in M.S. Excel.

Use of Photo editing Soft wares: Using Photo editing soft wares such as Adobe Photoshop, Photo editor etc.

Introduction to use of PageMaker Familiarizing the use of scanners, printers, plotters, their hardware and other related systems

APPROACH:

• The emphasis shall be to enable the student to name M.S. Office and the other related software to help in the compilation of his reports and other text related exercises.

• To give the student a deep understanding of the software and hence helping in the formation of a strong base for the complicated and other drawing related software.

Suggested Exercises: -

• Compiling reports inclusive of Tables, Charts, and Text etc.

• Logo design using M.S. Word.

• Slide Presentations.

• Photo editing sessions.

References:

1. Ernest Norling,(1986) *Perspective drawing*, Walter Fostor 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

2ARC3010: SEAMLESS LEARNING

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2ARC3010	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.

2ARC3011: CO – CURRICULAR ACTIVITIES

	SUBJECT CODE	SUBJECT NAME	L	T	P/S	Evaluation				Contact Hours	Credits
YR		THIRD SEMESTER				In Sem.	End Sem. Theory	End Sem. Jury and/or Exam.	Total Marks		
SECOND	2ARC3011	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.