SCHOOL OF PLANNING AND ARCHITECTURE

UNIVERSITY OF MYSORE,
Manasagangotri, Mysuru.

BACHELOR OF ARCHITECTURE - Five Year Degree Programme

Detailed Syllabus of I & X Semesters

(Admission Year 2016-17)

PROGRAM OUTCOME:

B. Arch program enables the students with enhanced knowledge related to the practice of Architecture profession all over the country and knowledge component for the same. The education in the School of Planning and Architecture (SPA), University of Mysore is grounded with effective and interactive instruction provided by dedicated and qualified faculty members. It qualifies the graduates to pursue a career in architecture along with other areas of the design and construction. Towards the end, the students who complete this program will possess the ability to:

- Implement the critical thinking method to build abstract relationship and understand the impacts of designing ideas based on study and analysis.
- Developing architectural practices, technical skills + knowledge, visual and verbal communication skills at various stages of design and delivery process.
- Students will be able to demonstrate their ability in synthesizing a wide range of integrated design solutions for varied scale design problems.
- Understanding the design philosophies and fundamental principles of multi-dimensional aspects and multi-faceted nature of architecture.
- Developing the overall personality and professional confidence in dealing with all scales of projects in the architectural and construction industry.
- Work in collaborative manner that is consistent with the accepted professional standards, ethical responsibilities and as an integral member of multi-disciplinary/inter disciplinary design and execution team in the industry.

B.ARCH. DEGREE PROGRAMME (5 YEAR)
I TO X SEMESTERS CURRICULUM (CBCS)-2016-17

SEMESTER-I

Sl. No.	Course Code	Course Title	L	T	S	C	Marks			Mode of Exam
							I	E	Total	
1	ARS101	Basic Design	0	0	9	9	60	40	100	Jury
2	ART102	Building Materials & Construction-I	2	0	4	6	60	40	100	3hrs
3	ART103	Architectural Graphics-I	1	0	3	4	60	40	100	3hrs
4	ART104	History of Architecture-I	3	0	0	3	60	40	100	2hrs
5	ART105	Mechanics of Structures	3	0	0	3	60	40	100	2hrs
6	ART106	Theory of Architecture-I	3	0	0	3	60	40	100	2hrs
7	ARS107	Workshop – I (Visual Arts)	0	0	4	2	100	-	100	Prog. Marking
TOTAL NO. OF CREDITS						**30**				

SEMESTER-II

SL. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARS201	Architectural Design -I	0	0	9	9	60	40	100	Jury
2	ART202	Building Materials & Construction -II	2	0	4	6	60	40	100	3hrs
3	ART203	Architectural Graphics-II	1	0	3	4	60	40	100	3hrs
4	ART204	History of Architecture-II	3	0	0	3	60	40	100	2hrs
5	ART205	Strength of Materials	3	0	0	3	60	40	100	2hrs
6	ART206	Theory of Architecture-II	3	0	0	3	60	40	100	2hrs
7	ARS207	Workshop - II (Model Making)	0	0	4	2	100	-	100	Prog. Marking
TOTAL NO. OF CREDITS						**30**				

SEMESTER-III

Sl. No.	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARS301	Architectural Design -II	0	0	10	10	60	40	100	Jury
2	ART302	Building Materials & Construction -III	2	0	4	6	60	40	100	3hrs
3	ART303	History of Architecture-III	3	0	0	3	60	40	100	2hrs
4	ART304	Structural Analysis	3	0	0	3	60	40	100	2hrs
5	ART305	Building Services –I (Water supply, Plumbing & Sanitation)	3	0	0	3	60	40	100	2hrs
6	ART306	Surveying, Levelling & Site Planning	3	0	0	3	60	40	100	2hrs
7	ART307	Climatology	3	0	0	3	60	40	100	2hrs
8	ARS308	Computer Applications -I	0	0	3	2	100	-	100	Prog. Marking
TOTAL NO. OF CREDITS						**33**				

SEMESTER –IV

SL. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARS401	Architectural Design -III	0	0	10	10	60	40	100	Jury
2	ART402	Building Materials & Construction -IV	2	0	4	6	60	40	100	3hrs
3	ART403	History of Architecture-IV	3	0	0	3	60	40	100	2hrs
4	ART404	Design of R.C.C. Structures -I	3	0	0	3	60	40	100	3hrs
5	ART405	Environmental Science	2	0	0	2	60	40	100	2hrs
6	ART406	Building Services –II (Electrical & Acoustics)	3	0	0	3	60	40	100	2hrs
7	ARS407	Computer Applications -II	0	0	3	3	100	-	100	Prog. Marking
8	ARE408	**Elective-I**				2				
TOTAL NO. OF CREDITS						**32**				

Courses which can be chosen during semester-IV in Elective-I

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARE408-1	Vernacular Architecture	2	0	0	2	60	40	100	2hrs
2	ARE408-2	Barrier Free Built Environment	2	0	0	2	60	40	100	2hrs
3	ARE408-3	Stage and Set Design	2	0	0	2	60	40	100	2hrs
4	ARE408-4	Introduction to Art & Architecture	2	0	0	2	60	40	100	2hrs

SEMESTER-V

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARS501	Architectural Design-IV	0	0	12	12	60	40	100	Jury
2	ART502	Building Materials & Construction - V	2	0	4	6	60	40	100	3hrs
3	ART503	Contemporary Architecture	3	0	0	3	60	40	100	2hrs
2	ART504	Building Services-III (HVAC, Lift & Fire Fighting)	3	0	0	3	60	40	100	2hrs
5	ART505	Design of R.C.C. Structures - II	3	0	0	3	60	40	100	3hrs
6	ART506	Energy Efficient Architecture	3	0	0	3	60	40	100	2hrs
7	ARE507	**Elective-II**				2				
TOTAL NO. OF CREDITS						**32**				

Courses which can be chosen during semester-V in Elective-II

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARE507 -1	Waste Management and Recycling	2	0	0	2	60	40	100	2hrs
2	ARE507 -2	Furniture & Product Design	2	0	0	2	60	40	100	2hrs
3	ARE507 -3	Architecture Journalism & Photography	2	0	0	2	60	40	100	2hrs
4	ARE507 -4	Cost Effective Technology	2	0	0	2	60	40	100	2hrs

SEMESTER – VI

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARS601	Architectural Design-V	0	0	12	12	60	40	100	Jury
2	ART602	Working Drawing & Detailing	0	0	3	6	100		100	Prog. marking
3	ART603	Ecology and Landscape	2	0	0	3	60	40	100	2hrs
4	ART604	Design of steel structures	3	0	0	3	60	40	100	2hrs
5	ART605	Estimation, Costing & Valuation	3	0	0	3	60	40	100	2hrs
6	ART606	**Elective-III**				2				
TOTAL NO. OF CREDITS						**29**				

Courses which can be chosen during semester-VI in Elective-III

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARE607-1	Sustainable Architecture	2	0	0	2	60	40	100	2hrs
2	ARE607-2	Constitution of India	2	0	0	2	60	40	100	2hrs
3	ARE607-3	Theory of Design	2	0	0	2	60	40	100	2hrs
4	ARE607-4	Structure and Architecture	2	0	0	2	60	40	100	2hrs

SEMESTER –VII

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARS701	Professional Training	16 weeks			**10**	60	40	100	JURY (Viva Voice)

SEMESTER – VIII

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARS801	Architectural Design-VI	0	0	16	16	60	40	100	Jury
2	ART802	Professional Practice and Ethics	3	0	0	3	60	40	100	2hrs
3	ART803	Urban Planning	3	0	0	3	60	40	100	2hrs
4	ART804	Interior Design & Detailing	1	0	3	4	100	-	100	Prog. Marking
5	ARE805	**Elective-IV**				2				
6	ARE806	**Elective -V**				2				
TOTAL NO. OF CREDITS						**30**				

Courses which can be chosen during semester-VIII in Elective-IV and Elective-V

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
Elective – IV										
1	ARE805-1	Architectural Conservation	2	0	0	2	60	40	100	2hrs
2	ARE805-2	Research Methodology	2	0	0	2	60	40	100	2hrs
3	ARE805-3	Building Automation & Management System	2	0	0	2	60	40	100	2hrs
Elective – V										
1	ARE806-1	Earthquake Resistant Structures	2	0	0	2	60	40	100	2hrs
2	ARE806-2	Modular Co-ordination	2	0	0	2	60	40	100	2hrs
3	ARE806-3	Urban Economics & Sociology	2	0	0	2	60	40	100	2hrs

SEMESTER-IX

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARS901	Architectural Design - VII	0	0	16	16	60	40	100	Jury
2	ART902	Urban Design & Renewal	3	0	0	3	60	40	100	2hrs
4	ART903	Disaster Mitigation & Management	3	0	0	3	60	40	100	2hrs
5	ART904	Pre-Thesis	0	0	4	4	100	-	100	Prog. Marking
6	ARE905	**Elective - VI**				2				
7	ARE906	**Elective - VII**				2				
TOTAL NO. OF CREDITS						**30**				

Courses which can be chosen during semester-IX in Elective-VI and Elective-VII

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
		Elective - IV								
1	ARE905-1	Housing	2	0	0	2	60	40	100	2hrs
2	ARE905-2	Construction Technology & Management	2	0	0	2	60	40	100	2hrs
3	ARE905-3	Vastuvidya	2	0	0	2	60	40	100	2hrs
		Elective - V								
1	ARE906-1	Green Building & Technology	2	0	0	2	60	40	100	2hrs
2	ARE906-2	Industrial Architecture	2	0	0	2	60	40	100	2hrs
3	ARE906-3	High Rise Structures	2	0	0	2	60	40	100	2hrs

SEMESTER –X

Sl. No	Course Code	Course Title	L	T	P	C	Marks			Mode of Exam
							I	E	Total	
1	ARS1001	Architectural Design Thesis			18	18	60	40	100	Jury

DETAILED SYLLABUS

YEAR-1 SEMESTER-I

Subject: Basic Design		
Code: ARS101	**Credits: 9**	**Hours / Week: 9 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: JURY**

AIM

The course intends to introduce a creative stimulus and provide a starting point towards visual design. It provides the meaning of "design" and relates it to "architecture" through an understanding of basic elements and principles of design along with their applications.

OBJECTIVES

- To tackle students from varied backgrounds to a highly focused training in analytical abilities, visualization.
- To theoretically understand first the various elements of basic design relationship, and principles and demonstrate the same through drawing exercises.
- To understand the elements and principles of Basic Design as the building blocks of creative design through exercises that will develop the originality, expression, skill and creative thinking.
- To involve students in a number of exercises to understand the grammar of design and visual composition.
- To enable the understanding of 3D Composition by involving students in a number of exercises which will help generation of a form from a two dimensional / abstract idea.
- To enable the understanding of the relationship between the grammar of design and architecture by involving the students in seminars, workshops and simple exercises which will look at building form analytically.

COURSE CONTENT:

UNIT- I Introduction to Architectural Design through Basic Design – Elements of Design

The design exercises are aimed at understanding the role of Basic elements of design – Point, Line, Plane, Volume, Pattern, Shapes, Forms, Spaces, Color, Texture, Light, and Fenestrations, Application of Modules.

UNIT II Principles of Visual Compositions

Understanding and using principles like Movement, Direction, Gradation, Contrast, Repetition, Rhythm, Radiation, Symmetry, Asymmetry, Monotony, Harmony, Balance, Scale and Proportion, Form generation through addition & subtraction, Positive & Negative spaces, Solid and Voids.

Unit III Figure & Ground relationships
Architectural elements and their part played in modulating space- Horizontal and Vertical space-defining elements (linear or planar) and openings in them.

UNIT III 2D Compositions
Application of the principles of composition in two dimensional compositions through shapes, patterns, use of grids in creating repetitive patterns.

UNIT IV 3D Compositions
Introduction to geometry; Concepts of geometry –different three-dimensional forms, primitive forms and understanding the behavior when combined- Transformations to three dimensional forms; Explorative exercises in three dimensional compositions**;** Study of ornamentation on buildings and its types.

UNIT V
Colors - Study of classification of colors with different hues, values, and shades; color wheel and color composition, properties of color; Color and Light, Textures - Study of texture and schemes of texture both applied and stimulated and their application.
Anthropometry - Introduction to Anthropometry, Basic anthropometrics, human functions and their implications for space requirements; Minimum and optimum areas for mono functions, user's data. Movement and circulation diagrams, spatial interpretations – various activities and their relationship with spaces. Anthropometry as related to physically handicapped and elderly persons are required to be studied. Functional furniture layout, circulation, lighting and ventilation for spaces.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Define and apply basic design in Architectural design through interpretation of lines, plane, solids, voids, texture, color and proportions.
- Demonstrate 2D compositions through explorations of different patterns and 3D compositions through understanding positive and negative spaces through forms.
- Acquaint them to different model making materials to explore linear and planar forms.
- Understand human anthropometry through study of spaces
- Synthesis and manifest ideas into visual forms through presentations, sketches and drawings.

TEXT BOOKS

1. **Shibikawa, Ikuyoshi and Takahashi, Yumi.** Designers Guide to Colour.
2. **Smithies, K.W.** Principles of Design in Architecture. Chapman and Hall, 1983.
3. **Ching, Francis D.K.** Architecture: Form, Space, and Order, 2nd ed. Van Nostrand Reinhold, New York, 1996.

REFERENCES

1. **Hanks, A. David**. Decorative Designs of Frank Lloyd Wright, Dover Publications, Inc. New York, 1999.
2. **Hepler, E. Donald, Wallach, I. Paul.** Architecture Drafting and Design, 3rd ed. McGraw-Hill Book Company, New York, 1977.
3. **Itten, Johannes**. Design and Form: The basic course at the Bauhaus, Thames and Hudson Ltd., London 1997.
4. **Pipes, Alan.** Drawing for 3-Dimensional Design. Thames and Hudson Ltd., London 1990.
5. **Shibikawa, Ikuyoshi and Takahashi, Yumi.** Designers Guide to Colour.
6. **Maier Manfired** Basic Principles of Design, Vol.1, 2, 3 & 4, Van Nostrand Reinhold, NY. (1977).
7. **Lawrence Bunchy C.Acrylic** for Sculpture and Design, 450, West 33rd Street, New York, N.Y.10001, 1972.
8. **Exner V., Pressel D.,** "Basics Spatial Design", Birkhanser, 2009.

Subject: Building Materials & Construction –I		
Code: ART102	**Credits: 6**	**Hours / Week: 6 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 3 hrs.**

AIM

The course intends to study various construction details in co-ordination with the Building Materials and science and their applications on the field.

OBJECTIVES

- To introduce and understand the basic elements and elementary methods of building construction and materials.
- To familiarize conventional tools for drawings and introduction to construction drawings and their applications.
- To develop and understand the construction details of different types of foundation, brick walls and materials.
- To understand the functions and construction detailing of different masonry.

COURSE CONTENT:

Introduction:
Introduction to Basic components of a "building", Role of Construction in Architecture, General idea about basic building materials such as soil, stone, wood, concrete, steel etc.

Unit –I lay: Tiles, Terra-cotta-its varieties, Stoneware, earthen ware, Porcelain, ordinary, glazed, porous, polished and fine; sun dried brick
Brick: Composition of earths, standard, market and ISI. Size properties, as per ISI brick manufacturing processes.
Components of a good brick, Types and their applications, shape of bricks, properties and uses of bricks, Special types of bricks, uses and properties Different uses of brick in construction, process of manufacture, Fire clay bricks - varieties; sand lime bricks; paving bricks; Building Tiles**:** Roof, floor and wall tiles.
Brickwork masonry: Various types of bonds-English, Flemish, Rat trap, Single, one, half thick walls for corners and T junctions, Garden wall bonding- Honey comb, Raked, Herring bone, Ornamental. Brick jallis, Ornamental brick panels, brick pavements, stopped ends, junctions, piers, jambs, footings, foundations, corbelling, damp proof course, window sills, thresholds, copings, mortar joints and pointing, stopped ends, junctions, piers, jambs, footings, corbelling, damp proof course, thresholds, copings, mortar joints and pointing.

Unit –II Stones Geological Classification of stones, stone units - khandki, rubble, black stones, stone metal, flag stones. method of quarrying of building stones, types of stone dressings defects in stone, stones for finishes- cutting and polishing, distribution and description with respect to uses in construction, aggregates, tools used, test for stones,

Uses of stones, Preservation of stone available for construction in India: granite, laterite, quartzite, marble and slates -properties and uses; deterioration of stones
Stone masonry **-** Types of stones, stone bonds, wall in stone masonry, window sills, plinth, and cornices, surface finishes- Random, rubble, SR, Ashlar, Masonry joints, Supervision and Precaution.

Unit – III Composite masonry
Brick backed ashlar, rubble backed ashlar, concrete backed masonry, ashlar faced concrete walls, marble faced masonry; tile faced concrete, hollow block masonry.
Cladding**:** Cladding of various materials-marble, granite, slate, tiles, metal etc.

Unit – IV Foundations
Definition, Functions of foundation, Empirical rules and thumbs rule to arrive at the depth and width of foundation, Types of foundation, Simple stone and Brick foundation, load bearing foundation

Unit – V Lintels
Lintels - Various alternatives to span an opening, Idea of a lintel, Lintels of wood, stone, brick and concrete, methods of construction.

Unit – VI Innovative rural techniques in construction and materials
Rural building materials, their properties and uses, soil stabilization, need for soil stabilization, stabilised soil blocks, bamboo, casuarina, coconut, palm, hay, coir, mud, timber, thatch, CEB (Compressed earth block) frames, Fire retardant treatment and Insect proofing.
Lime: Basic definitions, Types of binding sources of lime, various classification of lime, its properties and uses

Sessional Work:
1. The students are subjected to submit all the plates before the next exercise begins
2. Construction techniques will be supported by site visits off the studio hours
3. The students will be making miniature models after a construction technique is learnt
4. The class work and home assignments should include appropriate site visits by the students.
5. Student will maintain field observations / record books for relative consideration of construction detailing with materials and its learning through market survey

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Analyze the practical applications through survey, sample collections, model making and presentations.
- Synthesis and apply the fundamental of drawings through measuring the existing building components.

- Acquaint them to hands on, site visits, construction yards to gain practical knowledge.

TEXT BOOKS

1. **WB McKay** , Building construction-Metric volume(in 4 vols), 5th edition 2013
2. **Barry** - The Construction of Buildings, volume 1, New Delhi, 1999.
3. **Roy Chudley** , Building construction technology, (vol.1 to 4)
4. **Ching Francis D.K.,** Building Construction illustrated, 4th edition 2008, Indian reprint 2012.
5. Building construction, S.C.Rangwala, revised by K.S.Rangwala & P.S.Rangwala, 32nd edition, 2014.
6. Building material Sushil Kumar, 20th edition, reprint 2015
7. Building Materials S.K.Duggal
8. Bureau of Indian Standards, National Building Code of India, 2005.

REFERENCES

1. Varghese P.C., "Building Materials", Prentice Hall of India put Ltd, New Delhi 110001, 2005.
2. Spencke R.J. and Cook S.J., "Building materials in developing countries", John Wiley and sons 1983.
3. Dunkelberg (K), "Bambus – Bamboo, Bamboo as a Building Material", Karl Kramer Verlag Stuttgart, 2000.
4. Gernot Minke and Friedemann Mahlke "Building with straw: Design and Technology of a Sustainable Architecture", Birkhauser, Publisher for Architecture Berlin, Bostan, 2005.

Subject: Architectural Graphics-I		
Code: ART103	**Credits: 4**	**Hours / Week: 4 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 3 hrs.**

AIM

The course introduces the fundamental techniques of architectural drawing and develops the appropriate skills for visualization and representation.

OBJECTIVES

- To introduce and familiarize with drafting tools and accessories.
- To Comprehend and Visualize the Geometric Forms.
- To introduce architectural drawing techniques and to facilitate effective visual communication.

COURSE CONTENT:

Unit I Fundamentals of Architectural Graphics
Fundamentals of drawing and its practice, introduction to drawing equipment, familiarization, use and handling. Drawing sheet sizes, title panels, legends, layouts and composition, construction of lines, line value, line types, free hand lettering.

Scale Drawing - Study of scales, their use in practice and construction of Plain and Diagonal scale. Introduction to Graphical scale. Scaled drawings of simple objects, furniture, rooms, building elements in plan, elevation and section. Application of scale to enlarge or to reduce the objects in drawing.

Unit II Geometrical Drawing: Plane and Solid Geometry
Study of points, lines, and planes leading to simple and complex solid geometrical forms. Construction and development of planar surfaces like triangles, square, rectangle, polygon and ellipse, Construction of curves like parabola, hyperbola and involutes.

Unit III Geometrical Drawing: Orthographic Projections
Orthographic Projections- Definition, Principles and Methods of projection, Planes of projection, First angle & Third angle projection, Projection of points, lines & planes, Representation of solids in Plan and Elevations, Sections of solids, true shape of solids.

UNIT IV Geometrical Drawing: Axonometric Projection
Isometric, plan oblique and elevation oblique projection of planes, solids and combination of solids etc.

UNIT V Measured Drawing
Introduction to fundamentals of measured drawing, representation format for presentation methods and technique of measuring buildings and their details. Measured

drawing of simple objects like furniture, detailing in terms of construction, ornamentation, measured drawing of building components like column, door, window, cornice, etc.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Demonstrate the construction and development of planar surfaces and simple and complex solid geometrical forms through simple exercises.
- Develop and understand orthographic projections with planes and solids.
- Analyse fundamentals of measure drawing through measuring simple building elements.

TEXT BOOKS

1. **Bhatt N.D. & Panchal V.M**., Engineering Drawing; Charotar Publishing House, Anand, 2004.
2. **Parkinson A.C**., A First year Engg. Drawing; Sir Issac Pitman and sons, London, 1958.
3. **Shah, P.J**, Engineering Graphics; S.Chand & Company, New Delhi, revised edition, 2014.
4. **Morris IH**., "Geometrical Drawing for Art Students", Orient Longman, Madras, 2004.
5. **Shah, M.G., Kale, C.M. and Patki**, S.Y. Building Drawing: with an integrated approach to built environment, 7th ed. Tata McGraw Hill Pub., Delhi, 2000.

REFERENCES

1. **Black, Earl, D**." Engg.and Technical Drawing";Van Nostrand Reinhold Company,1972.
2. **Francis D. K. Ching**, "Architectural Graphics", John Wiley and Sons, 2009.
3. **Fraser Reekie, Reekie's**, "Architectural Drawing", Edward Arnold, 1995
4. **Leslie Martin C**., "Architectural Graphics", The Macmillan Company, New York, 1978.
5. **Cooper Flouglas,** "Drawing & Perceiving", Van Nostrand Rein hold, New York 1995.
6. **Hale Robert Beverly Watson**," Drawing lessons from the Great Masters",Guptill publication New York 1964.
7. **Edward J Muller, James G Fausett, Philip A Grau**, Architectural Drawing & Light Construction – Preutice-Hall Inc.,-1993.

Subject: **HISTORY OF ARCHITECURE-I**		
Code: ART104	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM

The course intends to study the outcomes of Physical factors like geography, climatology, location, Building Materials and available Technology and also the influence of Art, Culture and Society as reflected in the major historical periods beginning from early civilizations.

OBJECTIVES

- To provide an introduction to the culture and architecture of early civilizations
- To explain the students the evolution of architecture in relation to time with special emphasis to historical, social, religious, political and environmental factors.
- To make the students understand the developments in the construction technology in different periods.
- To gain knowledge of the development of architectural form with reference to technology, style, and character in the prehistoric work, ancient Egypt, west Asia, Greek and Rome.

COURSE CONTENT:

Unit I – Pre-Historic Architecture
Introduction to Ancient World. Primitive man, Paleolithic and Neolithic Culture – art forms and evolution of shelter and settlements. Megaliths. Study of buildings/settlements, structural development, materials of different ages used in Europe and Central Asia.

Unit II - Ancient River Valley Civilizations: Egypt
Landscape and culture of Ancient Egypt –Factors influencing the development of Egyptian civilization- (Geographical, Geological, Climatic, historical, religious, Social, Political.) Characteristic Features, - Tomb & temple Architecture. Tomb – Evolution of Pyramids, (Mastabas, stepped Pyramids, pyramids - Great Pyramid of Cheops, Gizeh.)
Temples – Mortuary and cult temple- Temple of Khons, Karnak, Great temple of Ammon, Karnak. Temple of Abu Simbel. Other architectural elements like columns, relief carving, obelisks, pylons, sphinxes.

Unit III - Ancient River Valley Civilizations: Mesopotamia
Empires of Western Asia – Urbanization in the Fertile Crescent Mesopotamian, Sumerian, Assyrian, Babylonian and Persian culture - Factors influencing architecture - Outline of architectural character – Ziggurat of Ur, Urnammu, Palace of Sargon, palace of Khorsabad - Palace at Persepolis.

Unit IV – Greek Architecture

Introduction to Greek Architecture, Factors influencing architectural character, Evolution of city states. Important construction techniques– Minoan and Mycenaean cultures – Hellenic and Hellenistic cultures – Greek character– Greek city planning – architecture in the archaic and classic periods – Domestic architecture; Public Buildings: Agora, stoas, theaters, bouletrion and stadias – Greek temple: evolution and classification. Building Examples – The Acropolis, Athens; The Parthenon, Athens; The Erectheion, Athens; The Tower of Winds, Athens; The theatre at Epidaurous, sanctuaries, Agoras & monuments. Orders in architecture: Doric, lonic, Corinthian – optical illusions and corrections in architecture.Appreciation of perfection.

Unit V – Roman Architecture

Roman Architecture: A brief account of materials, structural systems adopted and construction techniques - The Roman orders – Tuscan & Composite orders, urban planning, a short description of Roman urban spaces, temples, thermae, basilicas, theatres, pantheon amphitheatres, circuses and houses. Building Examples - The Colloseum; TheThermae of Caracalla; ThePantheon, Rome, The Circus Maximus, Aqueducts.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Demonstrate the spatial and stylistic qualities associated with the early civilizations.
- Understand the outcome of various social, political and economic upheavals, and as a response to the cultural and climate conditions.
- Analyze the importance of history in fostering appreciation for how surrounding structures affect our lives in a border cultural context.

TEXT BOOKS

1. **Sir Banister Fletcher**, "A History of Architecture", CBS Publications (Indian Edition),1999.
2. **Spiro Kostof,** "A History of Architecture:Setting and Rituals, Oxford University Press, London, 1985
3. **Francis D K Ching** "Global History of Architecture"
4. **Leland M Roth**; "Understanding Architecture: Its Elements, History and Meaning"; Craftsman House; 1994.
5. **Emily Cole** "Grammar of Architecture".

REFERENCES

1. **Pier Luigi Nervi**, General Editor, "History of World Architecture – Series", Harry N. Abrams, Inc.Pub., New York, 1972.
2. **Lloyd S. and Muller H.W**., "History of World Architecture – Series", Faber and Faber Ltd.,London, 1986.
3. **Gosta, E. Samdstrp**, "Man the Builder", Mc.Graw Hill Book Company, New York,1970.
4. **Webb and Schaeffer**; "Western Civilisation", Volume I; VNR: NY: 1962.
5. **Vincent Scully**, "Architecture – The Natural and the Manmade", Harper Collins Pub:1991.

Subject: Mechanics of Structures		
Code: ART105	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM

Provides an in-depth understanding of the concept associated with different element of structures.

OBJECTIVES

- To enable a student to learn fundamentals of structural systems, functions of structural components and types of loads on the structure.
- To make students to understand the effect of action of forces on a body and the concept of equilibrium of the body through exercises.
- To study the different forms of structures, types of supports, boundary conditions, degree of freedom and exercises on determinate bodies.
- To calculate the sectional properties (centroid, moment of inertia, section modulus and radius of gyration) for various sections by working out problems.

COURSE CONTENT:

Unit 1 Introduction
Introduction to fundamentals of structural system, technical names of structures, components from foundation to roof and their functions, loads-dead, live, wind, impact and dynamic loads.

Unit 2 Basic Idealization
Basic idealization – types of forces (gravity, lateral) and its distribution on surfaces, classification of force systems, principle of physical independence, superposition, transmissibility of forces, introduction to SI units.

Unit 3 Composition of forces
Composition of forces – definition of resultant composition of coplanar-concurrent force system parallelogram law of forces, principle of resolved parts, numerical on composition of coplanar concurrent force systems. Equilibrium of forces – definition of equilibrium condition of static equilibrium for different force system, lami's theorem, numerical on equilibrium of coplanar-concurrent and non-concurrent force system.

Unit 4 Forms of structures
Forms of structures, types of supports, boundary conditions, degree of freedom and support. Concept of statically determinate and statically indeterminate structures, numerical problems on support reaction for statically determinate beams with point load and uniformly distributed load.

Unit 5 Centroid and Moment of Inertia

Centroids – introduction to the concept, centroid of line and area, centroid of basic geometrical figures, computing centroids for – T, L, I, Z and full/quadrant circular section and their built-up section. Numerical problems

Moment of inertia – introduction to the concept, radius of gyration, parallel axis theorem, perpendicular axis theorem, moment of inertia of basic planar fig. computing moment of inertia for – T, L, I, Z and full/quadrant circular section and their built up section. Numerical problems

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COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
- Calculate support reaction for any type of determinate beams.
- Apply the concepts of centroid and moment of inertia of regular cross sections in structural design.

TEXT BOOKS

1. **Ramamrutham S. Engineering Mechanics**, 7th ed. Dhanpat Rai Pub. Co. Ltd., New Delhi, 2004.
2. Elements of Civil Engineering and Engineering Mechanics by **M.N. Shesha Prakash and Ganesh. B. Mogaveer**, PHI Learning, 3rd Revised edition (2014).
3. Elements of Civil Engineering IV Edition by **S.S. Bhavikatti**, New Age International Publisher, New Delhi, 3rd edition 2009.
4. Engineering mechanics by **R K Bansal**, Lakshmi publication, New Delhi 2005.
5. **Kurmi R S** Engineering Mechanics, S Chand and Co. Ltd., New Delhi, 1999.

REFERENCES

1. Engineering Mechanics by **S.Timoshenko, D.H.Young, and J.V.Rao**, TATA McGraw-Hill Book Company, New Delhi
2. **Beer FP** and **Johnson ER**, "Mechanics for Engineers- Dynamics and Statics" - 3rd SI Metric edition, Tata McGraw Hill. - 2008
3. **Shames IH**, "Engineering Mechanics – Statics & Dynamics" - PHI – 2009.
4. **Dongre AP** "Structural Engineering for Architects", third edition, Scitech Publications, India Pvt. Ltd.

Subject: Theory of Architecture-I		
Code: ART106	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM

The course intends to understand the influence of form and space in architectural design, understanding the terms and techniques involved in creative thinking of architectural design.

OBJECTIVES

- To establish a strong knowledge on how architecture is a social art backed by needs how to develop a vocabulary for design process.
- To introduce the formal vocabulary of architecture as one of the ways to experience the built environment and to appreciate design and design elements.
- To understand the architectural forms and space in terms of elements and principles of designs.
- To understand the concept of Space, relation between the Form and Space.

COURSE CONTENT:

Unit -I Introduction to Architecture
Definitions of Architecture – Origin of Architecture – architecture as a discipline – context for architecture as satisfying human needs: functional, aesthetic and psychological-outline of components and aspects of architectural form-site, structure, skin, materials, services, use, circulation, expression, character, experience – Introduction to the formal vocabulary of architecture and ideas of visual perception.

Unit-II Fundamental Elements of Architecture
Understanding the fundamental elements such as point, line and linear elements, plane and planar elements, volume, shape, pattern, Color, Material, Texture, solids and voids with reference to the evolution of architectural form and space.

Unit-III Forms and Spaces of Architecture
Understanding the role of shape in defining forms – Regular and Irregular Forms. Understanding perceptual effects of specific geometric forms such as sphere, cube, pyramid, cylinder and cone and their derivations – observations- application in architectural forms. Transformation of forms – Dimensional transformation, subtractive and additive forms, concept of articulation of form in architecture.

Definition of Architectural Space, Role of Mass in the formation of form, Relation between form and space, Organization of Spaces, Exploring the relationship of spaces, Scale of Spaces, Typology and Character of Spaces, Orientation of Spaces.

Unit –IV Scale and Proportion
Proportion, its application and advantages in architecture. Application of order, Golden section, modular section with examples. Scale, its application in architecture and advantages. Application of human scale and generic scale in architecture with examples in Architecture.

Unit- V Ordering Principles
Understanding design principles like Unity, Axis, Symmetry/ Asymmetry, Rhythm, Harmony, Focus, Hierarchy, Datum, Balance, Contrast, Dominance, Climax, Emphasis – their role and application in the architectural form evolution. The use of colors in Architecture, principles of colors and their application and advantages in buildings.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Develop an understanding on the vocabulary and elements of architectural form and space.
- An exposure to the principles of architecture and application of the same in building.

TEXT BOOKS

1. **Smithies, K.W**. Principles of Design in Architecture. Chapman and Hall, 1983.
2. **Francis D.K. Ching**, "Architecture-Form, Space and Order", Van Nostrand Reinhold Company, New York, 2007.
3. **James F. Eckler**, "Language of Space and Form", Wiley, 2012.

REFERENCES

1. **Sireesh Deshpande**, "Design Dialog", COA Publication, 2013.
2. **Yatin Pandya**,"Elements of Space making", Mapin 2007.
3. **Simon Unwin**, "Analysing Architecture", Rouledge, London, 2003.
4. **Pramar V.S**., "Design Fundamentals in Architecture", Somaiya Publications Private Ltd., New Delhi, 1973.
5. **Krier, Rob**. Architectural Composition, Academy Editions, London, 1988.
6. **Leland M.Roth,** "Understanding Architecture: Its Experience History and Meaning", Craftsman house, 1994.
7. **Peter von Meiss**, "Elements of architecture – from form to place", Spon Press 1977.
8. **Rudolf Arnheim**, "The dynamics of architectural form", University of California Press, 1977.
9. **Neils Prak**, "The language of Architecture", Mounton & Co., 1968.
10. **Paul Alan Johnson**, "The Theory of Architecture – Concepts and themes", Van Nostrand Reinhold Co., New York, 1994.
11. **Helen Marie Evans and Carla David Dunneshil**, "An invitation to design", Macmillan Publishing Co. Inc., New York, 1982.

Subject: **Workshop – I (Visual Arts)**		
Code: ARS107	**Credits: 2**	**Hours / Week: 4 hrs.**
Progressive Marks: 100		

AIM

The course intends to emphasize on developing visual communication skills necessary and related to architectural presentation including drawing, imaginative thinking and creativity though a hand on working various medium and materials.

OBJECTIVES

- To familiarize the student with the various mediums and techniques of art though which artistic expression can be achieved.
- To understand free hand drawing as a means to communicate and to train the students to sketch and render natural forms, built forms and presentation drawings manually in various media.
- To involve students in a series of exercises this will look at graphic an abstract representation of art.
- Involving them in a series of exercises which will help them experiment with forms and Hands on training

COURSE CONTENT:

Materials: Pencil, Pen, Ink, Colour, Brush, charcoal and Suitable Paper.

UNIT I Drawing
Introduction to drawing skills–Scribbling, Doddles, simple hand movements, drawing form nature – Types of drawing – Visual effects of drawing —Approach to sketching.

Drawing form observations-Exercise involving Indoor and outdoor sketching – Spot sketching –Line and Shape, Tone and Texture, Form and Structure, Space and Depth, detailed study of natural and manmade elements.

Drawing from imagination – visualization- Organic and Geometric shapes - Compositions - Scale and proportion in drawing,

Unit –II Perspective
Simple Perspective Drawing for outdoor and indoor, Illustration techniques for architectural presentation, Practicing in detail Line, Dot, Tone, Texture with utilizing play of Light and Shade.

UNIT II Painting
Introduction of painting – Colour – Properties of colour – Colour schemes – Types of colours -

Application and visual effects of colour. Exercise involving Study of colour – Properties of paper, brush and other tools – Basic washes – 3D effects from still-life, nature and built environment using mono chromatic and multi-colour.

Unit –III Anatomy Sketching
Introduction of human anatomy, sketching human forms [Knowledge of anatomy] – Free hand Drawing, gesture Drawing, Rendering with Various Methods and Mediums.

Unit- IV Introduction to Model Making
Introduction to basic model making techniques using various materials such as Paper, (Paper Craft), Clay, Plaster of Paris, Thermocol, sawdust, wire, mill board and sun board, etc.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Understand the basics of 2D and 3D sketching using various media.
- Imbibe skills of free hand sketching techniques using different media.
- Use of appropriate coloring techniques for architectural drawings and enhance the building details with appropriate presentation techniques.

TEXT BOOKS

1. **Craven, C. Roy**. Indian Art a Concise History.
2. **Krier, Rob**. Element of Architecture. Academy Editions, London, 1992.
3. **Francis D.K. Ching** with **Steven P.Juroszel**, Design Drawing. USA, 1997.

REFERENCES

1. **Lang, Jon**. A Concise History of Modern Architecture in India. Permanent Black, Delhi, 2002.
2. **Magnet, Jacque**. The Asesthetic Experiences: An anthropologist looks at the Visual Art.
3. **Preble, Duame**. Art Forms.
4. **Snyder, C. James and Catanese, J. Anthony**. Introduction to Architecture.
5. **Tapert, Annette. Swid Powell**: Objects by Architects. Rizzoli, New York, 1990.
6. **Thyagarajan**. Basic practical photography.

YEAR-1 SEMESTER-II

Subject: Architectural Design –I		
Code: ARS201	**Credits: 9**	**Hours / Week: 9 hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: Jury**

AIM

The course intends to introduce the student to the conception of design, Fundamentals in Architectural design and design process as a synthesis of variety of factors analyzed and studied.

OBJECTIVES

- To develop the ability to translate **abstract principles of design into architectural solutions** through simple design exercises.
- To make the students learn **the theoretical aspects of design** and understand how it could be **manifested in architectural design**
- To develop a **perception of space and a sense of visualization** with the help of tools like **sketches, drawings, models**, etc.
- To enable the presentation of **concepts through** various modes and techniques that will move constantly between **2D representation and 3D modeling**
- To involve students in a design project(s) that will involve simple space planning and the understanding of the functional aspects of design.
- To involve students in building **case study** by choosing appropriate examples to enable them to formulate their concepts and architectural program.

COURSE CONTENT:

Basic anthropometrics, human functions and their implications for space requirements.
Aesthetic and psychological experience of form and space in terms of scale, colour, light, texture, etc.
Minimum and optimum areas for mono functions, User's data, Movement and circulation diagrams, spatial interpretations – various activities and their relationship with spaces.
Anthropometry as related to physically handicapped and elderly persons are required to be studied. Functional furniture layout, circulation, lighting and ventilation for spaces.

Typology/ project

Design of simple building elements such as gate. Welcome arch, Memorial, bus shelter layout of parks, Entrance portal, Garden pavilion, Memorial, edifice, Bus shelter, snack kiosk and layout of parks.
Functional furniture layout, circulation, basic lighting and ventilation for spaces such as living, dining, bedrooms, bathroom, kitchen, shop, and exhibition pavilion, children's environment,

Any One Room enclosure could be taken to explore the implication of light, movement, transformation, scale, structure and skin.

Snack bar/cafe, petrol bunk, fire station, Residence, police station, cottage for an elderly couple, Architect's office, Doctor's clinic, Toilet for a physically handicapped person, Hostel room, Workshop etc.
Projects involving small span, single space, single use spaces with simple movement, predominantly horizontal, as well as simple function public buildings of small scale to understand integration of form and function.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Assimilate basic functional aspect of designing simple building type and its relevant spatial organization.
- Reciprocate the design or concept of the environment to reality.
- Analyze ideation of a functional space crafted by robust elements in an aesthetic manner and exploiting 3D drawings as a medium of near realistic representation of architectural intent.

TEXTBOOKS

1. **John Hanock** ,"Timesaver Standards For Architectural Design Data"
2. **Ramsey et al**, "Architectural Graphic Standards", Wiley 2000
3. **Farrely, Lorraine,Basics** Architecture 01: Representational Techniques
4. **Julius Panero, Martin Zelnik**, "Human Dimension and Interior Space", Whitney Library of Design,1975
5. **Ernst Neuferts,** "Architects Data", Blackwell 2002
6. **Joseph De Chiara, Michael J Crosbie,** "Time Saver Standards for Building Types", McGraw Hill Professional 2001.
7. **Hideaki Hareguchi**, "A Comparative analysis of 20th century houses", Academy Editions, 1988
8. **Robert Powell**, "Tropical Asian House", Select Books, 1996
9. **Terence Conran,** "The Essential House Book", Conran Octopus, 1994
10. **Sam F. Miller,** "Design Process: A Primer for Architectural and Interior Design", Van Nostrand Reinhold, 1995.

REFERENCES

1. **Juhani Pallasmaa** , The Thinking Hand (Architectural Design Primer)
2. **Gaston Bachelard,** The Poetics of Space Paperback
3. **Matthew Frederick,** 101 Things I Learned in Architecture School (MIT Press)
4. **Steen Eiler Rasmussen**, Experiencing Architecture 2nd Edition
5. **Guerras Perez,** Conceptual Architecture
6. **Conceptual and Activity Diagram** ,Pyo Miyoung
7. **Simon Unwin (Routledge, 2014).**Analysing Architecture (Fourth Edition)

REFERENCE WEBSITES

1. www.design basics.com/-(on house type – Americans)
2. http://www.geosystems.gatech.edu/ - (on detail design method)
3. http://www.c.s.berkely.edu/ - (on bubble diagram builder with interaction)
4. http://www.plannet.com/resources.htme - (on resource info)

Subject: **Building Materials & Construction -II)**		
Code: ART202	**Credits: 6**	**Hours / Week: 6 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: 3 hrs**

AIM

The course intends to acquaint the students with various methods and techniques of construction of doors and windows, stairs and partitions of a building using timber in detail.

OBJECTIVES

- To understand the elementary and simple construction methods like joinery details in wood, fixing of hardware.
- To understand timber as a material for construction with its different details and their applications.
- To familiarize the industrial and commercial modes of timber with their characteristics and uses.

COURSE CONTENT:

Unit – I
Commercial and Industrial modes of Timber: Resin bonded ply wood, types of laminates, laminated wood, insulating boards and other miscellaneous boards, veneers from different varieties of timber, their characteristics and uses MDF& HDF Boards. Types of wood, Identification of basic woods, uses in construction, Growth of Trees, Felling, Varieties, Defects and decay, Seasoning and Prevention, Fire proofing, Treatment of wood, Strength and uses of wood products, Thermal insulation.

Unit –II
Introduction to joints in carpentry: Terms defined; mitring, ploughing, grooving, rebating, veneering. Various forms of joints in wood work, such as lengthening joints, bearing joints, halving, dovetailing, housing, notching, tusk and tenon etc.

Unit- III
Doors: Definition of terms, types of doors: wooden, ledged, ledged and braced, paneled, flush door. Hinged, single and double shutters, sliding, folding, revolving, pivoted and heir construction techniques Decorative panel doors, glazed doors, Flush doors, Wire mesh door, Panelled doors, Doors with fan light.

Unit- IV
Windows: details of timber frames, shutters, fixed shutters, Windows (panneled, louvered, glazed and sliding windows) Casement, top and bottom hung, pivoted and sliding sash. Hardware: fixtures, locks, hinges, fastenings for doors and windows.

Unit- V

Wooden Roofs: Simple pitched roof, lean to, close collar; couple closes roofs with Mangalore tile, Queen post, King post.

Unit- VI

Stair cases: Introduction of stair cases, Types of staircases- Straight flight staircase, Dog legged staircase, Open well staircase, Geometrical staircase, Circular staircase, spiral, bifurcated, wooden, stone, metal staircase and elementary knowledge of RCC staircase. Timber staircase in detail.

Sessional Work:

1. The students are subjected to submit all the plates before the next exercise begins
2. Construction techniques will be supported by site visits off the studio hours
3. The students will be making miniature models after learning construction technique.
4. The class work and home assignments should include appropriate site visits by the students.
5. Student will maintain field observations / record books for relative consideration of construction detailing with materials and its learning through market survey

NOTE

Visits to study various timber and allied products available in the market under different trade names for their properties, constituents, using manufacturer's details, specifications, laying process etc.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Assimilate basic functional aspect of designing simple building type and its relevant spatial organization.
- Reciprocate the design or concept of the environment to reality.
- Analyze ideation of a functional space crafted by robust elements in an aesthetic manner and exploiting 3D drawings as a medium of near realistic representation of architectural intent.
- Analyze various techniques of timber joineries, treatment and construction detailing with their applications, uses and calculation of wood works.
- Acquaint themselves with the construction details of building elements such as doors and windows.
- Comprehend and integrate the use of different building materials and techniques in the construction of wooden roofs.

TEXT BOOKS

1. **WB McKay** , Building construction-Metric volume(in 4 vols), 5th edition 2013
2. **Barry** - The Construction of Buildings, volume 1, New Delhi, 1999.
3. **Roy Chudley** , Building construction technology, (vol.1 to 4)
4. **Ching Francis D.K.,** Building Construction illustrated, 4th edition 2008, Indian reprint 2012.
5. Building construction, S.C.Rangwala, revised by K.S.Rangwala & P.S.Rangwala, 32nd edition, 2014.
6. Building material Sushil Kumar, 20th edition, reprint 2015
7. Building Materials S.K.Duggal

REFERENCES

1. Don A. Watson, "Construction Materials and Processes", McGraw Hill, 1972.
2. W.B. McKay, "Building Construction", Vol, 1 and 2, Longmans, UK, 1981.
3. S.C Rangwala "Building Construction", Charotar Publishing House, India, 2000
4. S.K.Sharma, "A Text book of Building Construction", S.Chand & Co Ltd., New Delhi, 1998.
5. American Institute of Timber Construction (AITC), " Timber Construction Manual", Wiley Publishers, 2004.

Subject: Architectural Graphics-II		
Code: ART203	**Credits: 4**	**Hours / Week: 4 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: 3 hrs**

AIM

The course intends to develop the skill of representation in advanced drawing techniques and building documentation.

OBJECTIVES

- To involve students in a number of exercises that will help them develop the skill of representation in advance drawing techniques involving perspective and sciography.
- To involve students in a number of exercises that will help to understand the measured drawing method to document buildings of architectural interest using simple and advanced techniques of representation.

COURSE CONTENT:

Unit I: Perspective: Scientific Method
Concepts and methods of perspective drawing One point and two-point perspective of simple geometrical shapes like cube, prism, combination of shapes, simple one, two and three-point perspective of building interiors and exteriors. Adding of figures, trees furniture etc., shade and shadows and applying rendering techniques.

Unit II: Perspective: Short Out Method
Introduction to short cut perspective method; Adding of figures, trees furniture etc., shade and shadows and applying rendering techniques.

Unit 3: Sciography
Principles of shade and shadow – construction of shadow of simple geometrical shapes construction of sciography on building, shadows of architectural elements.

Unit 4: Plans & Sections of Buildings
Introduction to the basic principles of drawing – scale conversion etc. Graphical representation of plans and sections of buildings. Floor plans, elements above and below plan cut, reflected ceiling plan, site plan with contours, site sections, building elevations, section of buildings.

Unit 5: Measured Drawing
Detailed measured drawing and documentation of historic building – preparation of plans, elevations, sections, details views etc.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Acquaint themselves with the knowledge of sciography and its application.
- Construct the perspective drawings of the buildings and 3d views as well as the documentation of buildings through drawings.
- Interpret basic principles of drawings through case studies and graphically represent it in the form of plans, sections and elevations.

TEXT BOOKS

1. **John M.Holmes**, Applied Perspective, Sir Isaac, Piotman and Sons Ltd., London 1954.
2. **Robert W.Gill**, Basic Perspective, Thames and Hudson, London, 1974.
3. **C.Leslie Martin**, Architectural Graphics, the Macmillan Company, New York, 1964.
4. **Francis D K Ching,** Architectural Graphics, Van Nostrand and Reinhold Company, NY 1975.

REFERENCE BOOKS

1. **Thoms, E. French**. Graphic Science and Design, New York: MC Graw Hill.
2. **Nichols, T.B. and Keep, Norman. Geometry of Construction**, 3rd ed. Cleaver – Hume Press Ltd., London, 1959.
3. **Bhatt, N.D. and Panchal V.M. Engineering Drawing**: Plane and Solid Geometry, 42nd ed. Charotar Pub., Anand, 2000.
4. **Gill, P.S. T.B**. of Geometrical Drawing, 3rd ed. Dewan Suhil Kumar Kataria, Ludhiana, 1986
5. **Shah, M.G., Kale, C.M. and Patki,** S.Y. Building Drawing: with an integrated approach to built environment, 7th ed. Tata McGraw Hill Pub., Delhi, 2000. Claude Batley –Design Development of Indian Architecture Ernest Burden –Architectural Dilineation, Miniature, scale models.

Subject: History of Architecture-II		
Code: ART204	Credits: 3	Hours / Week: 3 hrs.
Progressive Marks: 60	Examination Marks: 40	Mode of Exam: 3 hrs

AIM

The course intends to enlighten and generate an understanding about the development of civilization and its architectural implications about development of architecture in India from river valley civilization to Indo-Aryan period.

OBJECTIVES

- To make the students understand the contributions to architecture by the river valley, Aryan and Mauryan civilizations and the kinds of building materials and techniques adopted by them.
- To enable the students to understand the influence of Buddhism and Jainism in India and architecture of buildings caves by studying specific examples.
- To study the evolution of Hindu temple during different periods with selected examples in India.
- To explain the students the evolution of architecture in relation to time with special emphasis to geographical, geological, social, religious, political, aesthetical and environmental factors.
- To make the students understand the developments in the construction technology in different periods.

COURSE CONTENT:

UNIT 1 - Ancient India

Indus Valley Civilization: culture and pattern of settlement. Origin of Early Hinduism, Impact of Aryan culture - Vedic village, culture and the rudimentary forms of bamboo and wood. Wooden construction under the Mauryan rule.

Unit 2 - Buddhist Architecture

Evolution of Buddhism - Hinayana and Mahayana Buddhism. Evolution of building typologies – The stupas, viharas and the chaitya hall. Salient features of a Chaitya hall and Vihara, Rock cut architecture in the Western and Eastern ghats - Karli, Viharas.Ideas in Northern India - Architectural Production during Ashoka's rule - Ashokan Pillar, Sarnath, Rock cut caves at Barabar, Sanchi Stupa.

UNIT 3 - Jainism

Evolution of Jainism and building typologies. Characteristic features, Examples.

UNIT 4 - Evolution of Hindu Temple Architecture

Hindu forms of worship – evolution of temple form - meaning, symbolism, ritual and social importance of temple - categories of temple - elements of temple architecture - early shrines of the Gupta and Chalukyan periods
Styles of Hindu temple Architecture

- North Indian or Indo-Aryan
- Central or Vesara
- South Indian or Dravidian

Unit 5 - Dravidian Architecture
Construction Techniques, Planning and Ornamentation of religious buildings and civic buildings of Early Chalukyan, Chola, Pandya, Later Dravidian period - Vijayanagar and Madura dynasties and later Chalukyan.

Early Chalukyans
Characteristic features, Factors responsible for development of Chalukyan Architecture, Different Materials used, Construction techniques and detailing.
Structural Temples and Rock Cut Caves
Location – Aihole, Badami and Pattadakal.
Egs:-Ladkhan Temple, Durga Temple-Study of temple Plan, Section, Elevation, View, Study of the towers/shikaras on the roof top of these structures.
Rockcut Caves at Badami, Study of Five Caves in detail. Pattadakal group of temples.

Pallavan Architecture
Structural Temples and Rock Cut temples at Mahaballipuram
Structural temple: - Shore temple, Mahaballipuram
Rock Cut temple: - Five Rathas, Mahaballipuram
Location, Detail study of Shore temple, Materials used for construction, Planning aspects, Plan, view and details.

Cholan Architecture
Characteristic features, Factors responsible for development of Cholan Architecture, Different Materials used, Construction techniques and detailing.
Eg:-Brihadeshwara temple, Tanjore, Gangaikonda Cholapuram and Darasuram temples.

Hoysalan Architecture
Characteristic features, Factors responsible for development of Hoysalan Architecture. Different Materials used, Construction techniques and detailing. Eg: Temples from Belur, Halebeed and Somanathpur. Vijayanagar style - Study of Hampi temple in detail. Madurai style - Temple towns: Madurai and Kanchipuram. Study of Meenakshi temple, Madhurai.

UNIT - 6 Indo Aryan Style
Temple architecture of Gujarat, Orissa, Madhya Pradesh and Rajasthan - their salient features Lingaraja Temple, Bhuvaneswar - Sun temple, Konarak. - Somnatha temple, Gujarat, Surya kund, Modhera Khajuraho, Madhya Pradesh - Dilwara temple, Mt. Abu.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Demonstrate the spatial and stylistic qualities associated with the different civilizations.
- Perceive the importance of history in fostering appreciation for how surrounding structures affect our lives in a broader cultural context.
- Analyze the factors that influence the evolution of early forms of temples, architectural characteristics and features of each type.
- Evaluate the socio – cultural and religious characteristics of civilization to appreciate their architectural development across timeline.

TEXT BOOKS

1. Brown, Percy. Indian Architecture: Buddhist and Hindu Periods. D.B. Taraporevala Sons and Co., Mumbai, 2003.
2. Grover, Satish. (2003). Buddhist and Hindu Architecture in India, 2nd edition. CBS publishers and distributors, New Delhi
3. Rowl, Benjamin. Art and Architecture of India.
4. Tadgell, Christopher. The History of Architecture in India: from the Dawn of
5. Civilization to the End of the Raj. Om Book Service, New Delhi, 1990. Vistara. The Architecture of India.
6. Deva, Krishna. (1995). Temples of India, vol. I and II. Aryan books international, Delhi.
7. Fergusson, James. (1997). History of Indian and Eastern Architecture, revised and edited with additions, Indian architecture by James Burgess and Eastern architecture by R. Phene Spiers, reprint, vol. I and vol. II. Low Price Publications, Delhi.
8. Fisher, Robert E. (1993). Buddhist Art and Architecture. Thames and Hudson Ltd, London.
9. George Michell, “The Hindu Temple”, BI Pub., Bombay, 1977.
10. Marian Moffett, Lawrence Wodehouse and Michael Fazio. (2004). A World History of Architecture. McGraw-Hill Professional, ISBN-10: 0071417516
11. Parameswaranpillai V.R., “Temple culture of south India”, Inter India Publications,
12. Stella Kramrisch, “The Hindu Temple”, Motilal BanARPidass, 1976.
13. Tadgell, Christopher. The History of Architecture in India: from the Dawn of Civilization to the End of the Raj. Om Book Service, New Delhi, 1990.

REFERENCES

1. A.Volwahsen, Living Architecture - India (Buddhist and Hindu), Oxford and IBM, London, 1969.
2. George Michell Ed, “Temple Towns of Tamil Nadu”, Marg Pubs, 1995.
3. George Michell, “The Hindu Temple”, BI Pub., Bombay, 1977.
4. Stella Kramrisch, “The Hindu Temple”, Motilal BanARPidass, 1976.
5. Roth, Leland. (2006). Understanding Architecture: Its Elements, History and Meaning. Westview Press, ISBN-10: 0813390451.

Subject: **Strength of Materials**		
Code: ART205	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Mark: 40**	**Mode of Exam: 3 hrs**

AIM

The course intends to give an in-depth understanding of the concept associated with different element of structures.

OBJECTIVES

- To study the stress – strain behaviors of steel and concrete due to axial loads and to determine the stresses and strains developed in solids due to external action.
- To determine the stresses in beams and strength of section by working out problems.
- To enable a student to understand the basic concept of shear force and bending moment acting on beams subjected to various loading conditions through exercises.
- To determine the internal forces induced in truss members due to external loads by working out problems.
- To study the theory of columns by working out problems.
- To enable the understanding of the different types of joints and study the efficiency and strength of joints.

COURSE CONTENT:

UNIT 1 Stress and Strain
Simple stress and strain – introduction, properties of materials, stress, strains, hook's law, poisson's ratio, stress -strain diagram for structural steel and concrete. Analysis of stress and strain in bars of varying cross-sections. Numerical problems.

UNIT 2 Bending moment and shear force
Bending moment and shear force in beams – introduction, types of beams loading and supports, shear force in beams, bending moment in beam, sign conventions, shear force and bending moment equations, shear force diagram and bending moment diagram for fixed end, simply supported and over hanging beams considering point loads, uniformly distributed loads.

UNIT 3 Short and long columns
Short and long columns – concept of elastic stability – Euler's theory – assumption and load carrying capacity of columns with different end condition – concept of effective length – slenderness ratio – limitations of Euler's theory – Rankine's formula.

UNIT 4 Trusses
Analysis of truss, loads on trusses, 2D truss analysis using method of joint.

UNIT 5 Introduction to joints

Types of joints, lap joint and butt joint, failure of riveted joint, strength of the joint, efficiency of joint, unwins formula, chain riveting and diamond riveting.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Determine the stress and strain in steel cross sections.
- Apply the concepts of determining the techniques of finding the stresses.
- Analyzing the different types of columns and determinate trusses.
- Design the steel joints for maximum efficiency and strength.

TEXT BOOKS

1. Ramamrutham S, "Strength of Materials" Dhanpatrai and Sons, New Delhi, 1990.
2. R K Bansal, "Strength of Materials" Lakshmi publication, New Delhi 2006.
3. B C Punmia, "Strength of Materials" Lakshmi publication, New Delhi 1994.
4. Rajputh R K. "Strength of Materials" 6th Ed. S Chand.
5. Basavarajaiah. "Strength of Materials" 3rd Ed.

REFERENCES

1. Nash W A, "Strength of Materials" – Schaums Series, Mc Graw Hill book company, 1989.
2. Rajput R K, "Strength of Materials", S Chand and Company Ltd, New Delhi, 1996.

Subject: Theory of Architecture-II		
Code: ART206	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: 3 hrs**

AIM

The course intends to study spatial aspects, compositions and their analysis in buildings, along with the understanding of the terms and techniques involved in creative thinking of architectural design.

OBJECTIVES

- To introduce factors that lends meaning to architecture, expression, communication.
- To introduce the concept on case studies as a tool for understanding, represent, analyze and interpret the architectural experience holistically through studying existing live built environment.
- To understand the spatial character of built forms with examples.
- To understand the generation of individual meaning in architecture through study of philosophies /theories and exemplary works of architects.

COURSE CONTENT:

Unit – I Elements of Design in Nature
Points, lines and shapes found in nature. Role of elements to emphasize the location, as landmark, for direction and dominance, etc. Patterns in nature and building design. Chaos and Order. Study: examples of nature inspired man-made design

Unit –II Circulation
Circulation - Movement with reference to the architectural form and Circulation – Types of circulation – Building Approach and entrance, Path configuration – form of circulation spaces.

Unit – III Case Study Methodology
To understand the definition of case study and its role in architectural design, case study and its importance, detailed process of case study – Selection of case study, identification and observation, understanding how case studies have used representational, analytical and interpretation tools. Understanding architecture in totality in terms of various studied in this course firsthand experience, analysis and interpretation of building.

Unit –IV Works of Architects
Identify and Explore the theoretical concepts learn on form and space in various architects works – role of architects in the generation of architectural form, exemplary works, architectural inspirations, philosophies, ideologies and theories of architects. Understanding of formative ideas, organization concepts, and spatial characteristics, -

Massing and circulation in design analysis of the following buildings: Falling water house, & Guggenheim museum by F. L. Wright –Villa, Savoye & Chapel of Notredame DuHaut by Le Corbusier, British Council, New Delhi by Charles Correa, Indian National Science Academy and Parliament Library by Raj Rewal, National Science Centre Museum by Achyut Kanvinde. (Reduce the description)

Unit-V Perception in Architecture

Experience of architecture in basic psychological and physiological terms. Way in which human minds and bodies respond to space, light, texture, color, and other architectural elements.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Articulate the concepts of Form and Space in the design process.
- Incorporate and analyse the circulation pattern of simple buildings like residence, restaurants, office, etc.
- Analyze and experience architecture through case studies of various architect's works.

TEXT BOOKS

1. Transfers and Transformation by **Charles Correa**
2. **Ching, Francis D.K**. Architecture: Form, Space, and Order, 2nd ed. Van Nostrand Reinhold, New York, 1996.
3. **Ching, Francis D.K, Francis** D. K. Ching, James F. Eckler, Introduction to Architecture, New York, 2012 Edition.
4. **SimonUnwin**, "Analyzing Architecture", Routledge 2003.
5. **Yatin Pandya**, "Elements of Space making", Mapin 2007.
6. **Pramar V.S**., "Design Fundamentals in Architecture", Somaiya Publications Private Ltd., New Delhi, 1973.

REFERENCES

1. **James C. Snyder**, Introduction to Architecture, New York: Mc Graw Hill.
2. **Christopher Alexander, Pattern Language**, New York: Oxford University Press
3. **Thomas Mitchell, Redefining Designing**: From to Experience, James snyder and Anthony Y catanse, Introduction to Architecture, Mc Graw-Hill Book company, New York, 1979.
4. **Anthony Antoniades**, "Poetics of architecture: Theory of design, Wiley 2008
5. **Steen Eiler Rasmussen**, "Experiencing Architecture", MIT Press 1964
6. **Peter von Meiss,** "Elements of Architecture - From Form to Place", Span Press, 1992
7. **Bryan Lawson**, "How Designers Think", Architectural Press Ltd" London, 1980.
8. **Hanno Rauterberg**, "Talking Architecture, Interview with Architects", Prestel 12008 The A-Z of Modern Architecture-Taschen 2007.
9. **Geoffrey Broadbent** - Design in Architecture - Architecture and the human sciences - John Wiley & Sons, New York, 1981
10. **Paul Alan Johnson** – The Theory of Architecture – Concepts and themes, Van Nostrand Reinhold Co., New York, 1994.
11. V.S.**Pramar,** Design Fundamentals in Architecture, Somaiya Publications Private Ltd., New Delhi, 1973.

Subject: **Workshop - II (Model Making)**		
Code: ARS207	**Credits: 2**	**Hours / Week: 4 hrs.**
Progressive Marks: 100		

AIM

The course intends to build confidence and inculcate various soft skills and to help Students to identify and achieve their personal potential and provides the foundation and capability to represent the concepts three dimensionally.

OBJECTIVES

- To help the students achieve effectiveness in their professional activities, harness skills and develop qualities suited for the profession.
- To elaborate upon the importance of model making.
- To acquire the skills in constructing three dimensional forms using different model making materials and equipment, using different scale.
- To introduce various fabrication skills and techniques necessary to produce scale models and to encourage preparation of models as an essential phase in design development and evaluation.

COURSE CONTENT:

Unit I- Communication Skills
Verbal communication, Body language, Vocabulary building, Public speaking and extempore speech skills, Presentation skills, Panel discussions. Written communication-Letters, reports etc. Conflict Management, Assertiveness, Time management.

Unit – II Introduction to Model Making
Introduction to model-making: Need; role of scale-models in design; general practices; Essentials of model-making: understanding of various tools and machines employed, best practices involved in operating the tools and the techniques**.**

Unit-III Materials for Model Making
Various materials available for model making such as mill board foam board, wood, plastics, Plaster of Paris, acrylic, Styrofoam, FRP, cane, bamboo, using materials like mount boards, snow whiteboards, paper pulp, fiber glass, sand, saw dust, stone chips etc. Making details models which include the representation of various building elements like walls, column, steps, window/glazing, sun shadow, handrails, etc...

Unit- IV
Carpentry: Introduction to the use of different types of tools and different types of joints used in carpentry. Joinery details which are commonly used in timber construction. Joints: Different types of joints, joinery details (which are commonly used in timber construction.

Unit- V
Clay-I: - Generation of basic forms – cube, cone, dome and arch
Clay-II: - Walls, corbel/free forms and surface finishes
Bricks I: - Types of Joints, tools used & model generation - walls (types – linear, curved, zig-zag etc) corbel
Bricks II: - Form Generation-dome, arches, free forms.

Unit- VI
Photography in built models, using lighting and natural background.

COURSE OUTCOME:

On successful completion of this course, the student should be able to**:**

- Prepare Scale model for architectural built forms and elements.
- Use various tools and machines employed and best practices involved in operating the tools and the techniques for model making
- Represent various surface finishes like Brick, Stone, Stucco finish etc
- Various site elements contours representation, Roads/Pavements, Trees/Shrubs, Lawn, Water bodies, Street furniture, Fencing etc.

REFERENCES

1. Developing Communication Skills, Krishna Mohan & Meera Banerji Macmillan India
2. Principles of Public Relations, C S Rayudu, Himalaya Publishing House.
3. Ching Francis, Drawing a creative process, Van Nostrand Reinhold , New York,1992.
4. Alan Swann, Graphic Design School, Harper Collins,1991
5. Molva Hunty, The Artist drawing book, David & Charles, U.K., 1994.
6. John Harmilton, The complete Book of Sketching, Chancellor Press, 2003.
7. Jannsen, Constructional Drawings & Architectural models, Kari Kramer Verlag Stuttgart, 1973.
8. Harry W.Smith, The art of making furniture in miniature, E.P.Duttor Inc., New York, 1982.
9. Thames and Hudson Manual of Rendering with Pen and Ink-Robert W Gill.
10. Model building for Architects & Engineers by John Taylor.
11. Architectural Models by Rolf Janke.
12. Architectural Graphics by Ching Frank.
13. Geometrical & Building Drawing by Kelsey W.E.
14. Architectural Graphics by Martin C. Leslie.
15. Rendering with pen and ink by Gill Robert.

YEAR-II SEMESTER-III

Subject: ARCHITECTURAL DESIGN II		
Code: ARS 301	**Credits: 10**	**Hours / Week: 10 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: Jury**

AIM:

This course is intended to provide skills for designing a single use, small span and single-storey buildings.

OBJECTIVE:

- To develop design abilities in the context of user requirements.
- To train the student to gather knowledge on the given design project based on books / literature and websites.
- To understand the salient features of functions such as movement, climate, acoustics, structure and services into the building.
- To evolve a design with their aesthetic appeal.

COURSE CONTENT:

The study of design shall continue with further progress and complexity in aesthetic qualities but with more emphasis on architectural and functional aspects like:

a) Complexity in circulation- and pattern of horizontals as well as vertical movement.
b) Integration in terms of facilitation, platform, volume, concept and space organization.
c) Application of basic building materials to evolve a design with their aesthetic appeal, functional quality and elementary structural concepts to evolve specific form.
d) Climatic consideration for the design, orientation of building on site, simple concepts of sun shading devices, their application in elevations as functional / aesthetic solutions.
e) Landscape Detail like Importance, exploring & understanding the essence; Detailing process; User analysis; Elements; Functionality & aesthetics; Materials.

TYPOLOGY:

Art Gallery, Library, Motel, Cultural Centre, Nursery, Kindergarten, Recreational Club, Guest House, Balwadi, Kindergarten School, Primary Health Centre, Doctor's Clinic, small Cafeteria, Highway Restaurant, Village Post Office, Bank extension counter, Police Station, Architect's Office, Departmental Store, School Gymkhana and Youth Club etc. Site Extent - sloping site upto 8000 m^2; Topography - average slope ranging from 1:5 to1:8.

NOTE:
At least two major exercises and one minor design/time problem should be given.
The final submission shall necessarily include a model for at least one of the two main problems. In end exam which is a viva-voce the students have to present the entire semester work for assessment

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Develop understanding of the standards, handling of spaces.
- Exhibit the architectural expression, its relation between form and structure through relevant case studies.
- Exploring & understanding the essence of basic building materials and climatic responsive design.
- Understanding and application of circulation pattern in building design

REFERENCES:

1. Chiara Joseph de and others. Time Savers Standards of Building Types. McGraw – Hill, 1980.
2. Kirk, Paul Hayden and Sternberg, D. Eugene. Doctors Offices and Clinics, 2nd ed. Reinhold Pub., USA, 1960.
3. Neufert, Ernst. Ernst Neufert Architects Data, Granada Pub. Ltd., London, 1970.
4. Pevsner, Nikolaus. A History of Building Types. Thames and Hudson, London, 1976.
5. Shah, S. Charanjit. Architects Hand Book Ready Reckoner. Galogotia Pub. Co., New Delhi, 1996.

Subject: BUILDING MATERIALS AND CONSTRUCTION - III		
Code: ART302	**Credits: 6**	**Hours / Week: 6 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 3 hrs.**

AIM:

The course intends to introduce the methods and techniques of construction of doors, windows, stairs and foundation of a building using different materials

OBJECTIVES:

- To understand in detail the methods and techniques of construction of doors and windows using steel and aluminum.
- To introduce construction of building components in Reinforced Cement Concrete and practices pertaining to foundations and staircases.
- To develop an understanding of construction details of staircases with the application of different materials.
- To highlight the current trends and innovations in the usage of glass as a building material.

COURSE CONTENT:

UNIT-I: GLASS AND METALS

Glass various types of glass (plate glass, tinted, decorative, reinforced, laminated glass block, glass murals, partially colored glass etc.). The properties of glass, fabrication techniques, etching, its applications for exteriors & interiors. Fiber reinforced composite materials and products.

Metals

i **Ferrous metals** – Characteristics and uses of Wrought Iron, Cast Iron, pig iron, mild steel, stainless steel and casting. Steel-treatment, steel tempering, annealing, normalizing, and case hardening, their objectives and effect on alloy steels. Galvanizing, oxidation and casting of metallic products, corrosion of iron and their prevention. Metallic protective coatings.

ii **Non-ferrous metals** – Basic idea of important ores, properties and uses of Aluminum, Zinc, Copper, Tin and Lead.

UNIT-II: DOORS AND WINDOWS

Mild steel -doors and windows, Rolling shutters, collapsible doors, revolving doors
Aluminum- doors and windows, sliding door, folding door, sliding and folding door, sliding window, double glazing. PVC & FRP- doors and windows

UNIT-III: RCC CONSTRUCTION

Concrete -Types of Concrete and its ingredients, grades of concrete, additives and admixtures, sampling and testing, Grading: importance, fineness modulus, combined aggregate, water cement ratio. Mixing and Curing
Understanding the properties and characteristics of RCC. Its advantages and disadvantages. Cast-in-situ and pre-cast constructional methods in RCC. Understanding the structural components of a typical RCC frame structure with reference to their location, junctions, load transfer and design
Substructure: Detailing of RCC foundations and footings in simple framed buildings – Isolated and combined footing, Raft, pile, matt and grillage foundations.

UNIT-IV: STAIRCASES
RCC staircases, Metal staircases and Composite staircases.

UNIT-V: ARCHES, VAULTS AND DOMES
Construction of arches in brick, stone and concrete. Brief study on domes and vaults

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Enable knowledge to understand the different construction practices adopted for the various components with respect to material properties.
- Provide base knowledge on market surveys, sample collections, model making and presentations.
- Familiarise the fundamentals of drawing through measuring the existing building components.

TEXT BOOKS:

1. Chudley R. (1998). Construction technology. ELBS England.
2. McKay, G.B. (1972). Building Construction (Metric). Longman, London.
3. Barry, R. The Construction of Buildings Vol.2, 5th ed. East-West Press. New Delhi, 1999.
4. Francis D.K Ching "Building Construction" illustrated, John Willey & Sons, 2008.
5. Alan Blanc, "Stairs, Steps and Ramps", Butterworth, Heinemann Ltd., 1999.

REFERENCES:

1. Bindra, S P. and Arora, S P. Building Construction: Planning Techniques and Methods of Construction, 19th ed. Dhanpat Rai Pub. New Delhi, 2000.
2. Moxley, R. Mitchell's Elementary Building Construction, Technical Press Ltd.
3. Rangwala, S.C. Building Construction, 22nd ed. Charotar Pub. House, Anand, 2004.
4. Sushil Kumar. T.B. of Building Construction, 19th ed. Standard Pub, Delhi, 2003.
5. Gurucharan Singh. (1981). Building Construction Engineering. Standard Book House, New Delhi.
6. Foster, Stroud. (1963). Mitchell's Advanced Building Construction. Allied Publishers Private Limited, Bombay.
7. Dr.T.S.Balagopal Prabhu. (1987). Building Drawing and Detailing. Spades Publishers Pvt. Ltd., Calicut

Subject: HISTORY OF ARCHITECURE – III		
Code: ART303	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

The course intends to provide an understanding of the evolution of Early Christian, Byzantine, Romanesque, Gothic and Renaissance Architecture in their various stylistic modes characterized by technology, ornamentation and planning practices.

OBJECTIVES:

- To enlighten the students the evolution of architecture in relation to time with special emphasis to historical, social, religious, political and environmental factors.
- To create an awareness about the planning, construction, function and aesthetics of historical buildings and an appreciation of architectural style as a product of the time, place and culture in the western world.
- To study the building typologies and make the students understand the developments in the construction technology in different periods.
- To gain knowledge of the development of architectural form with reference to technology, style, and character in the Early Christian, Byzantine, Romanesque, Gothic and Renaissance Architecture.

COURSE CONTENT:

UNIT-I: EARLY CHRISTIAN ARCHITECTURE
Introduction to Early Christian Architecture, Factors influencing the development of Early Christian Architecture - Geographical, Geological, Climatic, historical, religious, social, political. Characteristic Features, Example: Basilican Churches - St. Clemente, Rome. France and England - Examples: Pisa group, Italy; Abbaye aux Hommes, Caen; Tower of London.

UNIT-II: BYZANTINE ARCHITECTURE
Introduction to Early Byzantine Architecture, Factors influencing the development of Byzantine Architecture - Geographical, Geological, Climatic, historical, religious, social, political. Characteristic Features, Examples: St.Sophia, Constantinople.

UNIT-III: ROMANESQUE ARCHITECTURE
Introduction to Romanesque Architecture, Factors influencing the development of Romanesque architecture - Geographical, Geological, Climatic, historical, religious, social. Characteristic Features, Examples - Pisa Cathedral, Italy, The Abbey Church, Cluny.

UNIT-IV: GOTHIC ARCHITECTURE
Formation and Development of Gothic Architecture, Characteristic Features, Examples - Cathedrals and churches.

French gothic - Religious and social influences - Evolution of vaulting and development of structural systems, Examples: Notre Dame, Paris.
English gothic - Examples: Westminister Abbey, Hampton Court Palace, London; Doges Palace, Venice; Milan Cathedral.

UNIT-V: RENAISSANCE ARCHITECTURE
Formation and Development of Renaissance Architecture, Characteristic Features
Italian Renaissance - The idea of rebirth and revival of art - Outline of the Architecture during the early Renaissance, High Renaissance and Baroque Periods - Features of a typical Renaissance palace, Example:- Palazzo Ricardi, Study of the contribution of the following architects: Brunelleschi, Michaelangelo, Andrea Palladio, Example - St. Peter Rome, Villa capra in Vicenza. French and English Renaissance - architectural character in the classical & Rococo period - Example – Chateau de Chambord, Louvre, Paris – Domestic British architecture- Study of the works Sir Christopher Wren & Inigo Jones, Example - St. Paul's Cathedral, London. Banqueting House, Whitehall.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Understand the architecture as an outcome of various social, political and economic upheavals.
- Understand various architectural styles and movements through historical analysis.
- Gain knowledge of the development of architectural form with reference to technology, style, and character in the western world.

TEXT BOOKS:

1. Sir Banister Fletcher, "A History of Architecture", CBS Publications (Indian Edition) 1999.
2. David Watkin "A History of Western Architecture".
3. G.K.Hiraskar, "Great Ages of World Architecture", Dhanpat Rai & Sons, Delhi.
4. Spiro Kostof, "A History of Architecture: Setting and Rituals, Oxford University Press, London, 1985
5. Francis D K Ching "Global History of Architecture"
6. Leland M Roth; "Understanding Architecture: Its Elements, History and Meaning"; Craftsman House; 1994.
7. Emily Cole "Grammar of Architecture".

REFERENCES:

1. Yarwood, Doreen. A Chronology of Western Architecture. B.T. Batsford Ltd., London, 1987.
2. Schulz, Christian Norberg. Meaning in Western Architecture, 2nd ed. Rizzoli Intl. Pub., New York, 1981.

3. Copplistone, Trewin and Others. World Architecture: An Illustrated History, 11th ed. Hamlyn, London, 1979.
4. Bindoo. D.D, History of Architecture, Milind P Lakshana, Hyderabad – 2006.
5. Wittkaner R Architectural Principles in the Age of Humanism, Chichester :Academy Editions 1998
6. Pier Liugi Nervi, General Editor – History of World Architecture – Series, HARRY N.Abrams, Inc. Pub,New York, 1972.
7. S.Lloyd and H.W.Muller, History of World Architecture Series, Faber and Faber Ltd., London, 1986.
8. Spiro Kostof – History of Architecture – Setting and Rituals, Oxford University Press, London, 1985.
9. Gosta, E.Sandsform, Man the Builder, McGraw Hill Book Company, New York, 1980.

Subject: STRUCTURAL ANALYSIS		
Code: ART304	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

The course intends to impart sound knowledge of strength, behavior of various materials and techniques in the analysis of structures.

OBJECTIVE:

- To determine the stresses in beams and strength of sections by working out problems.
- To understand slopes and deflection in beams.
- To understand the concept of indeterminate structure and its analysis.
- To analyze the different types of Arches.
- To introduce to the different types of concrete and their properties.

COURSE CONTENT:

UNIT-I: BENDING STRESSES IN BEAMS.
Theory of simple bending, neutral axis, moment of resistance, Section modules. Shear stresses in beams in cross sections.

UNIT-II: DEFLECTION OF BEAMS.
Introduction of slope and deflection. Slope and deflection for simply supported and cantilever beam with point load and UDL using double integration method and moment area method.

UNIT-III: ANALYSIS OF INDETERMINATE STRUCTURES.
Analysis of fixed beams and portal frames with different loading conditions by moment distribution and kani's method.

UNIT-IV: ANALYSIS OF ARCHES.
Determination of horizontal thrust, bending moment and radial shear for three hinged parabolic and segmental arches with supports at same level and different levels.

UNIT-V: CONCRETE TECHNOLOGY.
Different types of cements and concrete, Properties of concrete ingredients, Properties of hardened concrete – Durability of Concrete - High Strength Concrete, High Performance Concrete, Self Compacting Concrete, Fiber Reinforced, Polymer Concrete, Admixtures. Concrete mix design using IS 10262: 2009.

COURSE OUTCOME:

On successful completion of this course, the student will be able:

- To apply the concepts of determining the techniques of finding the bending stresses.
- To analyze the different types of indeterminate beams and arches
- To identify the different types of concrete and their properties.

TEXT BOOKS:

1. A.K.Jain and B C Punmia. Strength of Materials
2. Ramamrutham, S. Theory of Structures, 17th ed. Danpat Rai Pub. Co. Ltd., New Delhi, 2005.
3. Reddy, C.S. Basic Structural Analysis, 18th ed. Tata McGraw Hill Pub.Co.Ltd., New Delhi, 1991.
4. R.K. Bansal, "A Text Book on Strength of Materials", Laxmi Publications, New Delhi, 2006.

REFERENCES:

1. M.M. Ratwani & V.N. Vazirani, "Analysis of Structures", Vol. 1, Khanna Publishers, Delhi, 2012.
2. Timoshenko, S.P. and D.H. Young, "Elements of Strength of Materials", Fifth edition, East West Press, 1993.
3. A.R. Jain and B.K.Jain, "Theory and analysis of structures", Vol. 1, Nemchand and Bros, Roorkee, 1987.
4. R.K. Rajput. "Strength of Materials", S.Chand, 2006.

Subject: BUILDING SERVICES – I (Water Supply, Plumbing & Sanitation)		
Code: ART305	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

Understanding the significance, design and functioning of water and sewerage systems as essential components in building design and site planning.

OBJECTIVE:

- Introduce and gain practical knowledge on the various ways of providing information on water supply and sanitation system principles.
- To gain knowledge on disposal system and need for recycling
- Defining on domestic services, utilsation and its approach.

COURSE CONTENT:

UNIT-I: SOURCES AND TREATMENT OF WATER
Types of sources, surface sources, underground sources, types of well construction, yield of a well, spacing of wells, sanitary protection of wells. Principles involved in water treatment.

UNIT-II: DISTRIBUTION SYSTEM OF WATER
Methods of distribution, service reservoirs, systems of supply of water, methods of layout of distribution pipes, Pipe appurtenances, air valves, reflux valves, relief valves, relief valves, scour valves, sluice valves, slop cocks, use of pumps in water supply systems.

UNIT-III: DOMESTIC UTILISATION
Principles of house drainage, traps, sanitary fittings, system of plumbing, drainage plans, testing of drains and pipes, maintenance of house drainage system. Domestic Water demand, Over Head and underground (sump) Water tanks. Cold and hot water distribution within the buildings. House/service connection. Layout of water supply lines in a domestic house. Types of fittings like taps, bathtubs, showers, jets, cocks, valves, electrical fixtures, etc. Faucets for kitchens, bathrooms and toilets. Check valves, foot valves, sump pump check valves, and pressure test gauges. Rain Water Harvesting

UNIT-IV: SANITATION
Basic principles of sanitation and disposal of waste matter from building. Brief description of various systems of sewage disposal and their principles. Conventional water treatment – sedimentation, coagulation, filtration and disinfection. Distribution system, sanitary, storm and combined sewerage system. Design of sewerage systems, Location of sewage systems, conventional wastewater treatment, activated sludge, trickling filters etc.

UNIT-V: DISPOSAL SYSTEMS

Waste-water disposal systems, septic tank and its design, soil absorption system, alternatives, solid wastes collection and removal from buildings. On-site processing and disposal methods. Aerobic and Anaerobic decomposition, purifying capacity of water bodies. Biochemical Oxygen Demand.

UNIT-VI: ROADS AND PAVEMENTS

Different types, water bound macadam, tar bitumen, asphalt and Cement concrete roads, soil stabilization, types of paving-murram, brick, and stone paving. Drainage of roads, sub-drains, culverts, ditches and gutters.

Design considerations on drainage scheme:

Types of fixtures and materials- wash basins, water closets, urinals, bidets, sinks etc. Conditions of flow in building drainage pipes, traps, vents and their material specifications. Over-head and under-ground reservoirs. Details study of Independent House and Apartment

Design of drainage and vent pipes, system for low-rise and high-rise buildings,building drains, sewers, gullies, inspection chambers, manholes, connection topublic sewer, cross connections, ferrule, water meters, stopcocks, bib cocks etc. Modern techniques in Re-Use of the Grey water like DEWARTS

COURSE OUTCOME:

On successful completion of this course, the student will be able:

- To understand designing of layout of water supply and sanitation.
- To understand the various systems of sewage disposal and their principles.
- To apply various sanitary fittings through Market survey.

REFERENCES:

1. **S**.C. Rangwala. Water Supply and Sanitary Engineering.
2. Birdie J.S. and Birdie G.S. (1998). *Water Supply and Sanitary Engineering*. Dhanpathray Publishing Company, New Delhi.
3. Burke, Ken. (1982).*Basic Plumbing Techniques*. Ortho Books, Chevron Chemical Company, San Ramon, Canada.
4. Kshirsagar, S.R. Water Supply Engineering, 6th ed. Roorkee Pub., Roorkee, 1980.
5. Husain, S.K. T.B. of Water Supply and Sanitary Engineering, 3rd ed. Oxford and IBH Pub. Ltd., New Delhi, 1994.

Subject: SURVEYING & LEVELLING		
Code: ART306	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

The course intends to give knowledge about different instruments and techniques used in surveying of land tacks.

OBJECTIVES:

- Understand the basic principles of Surveying.
- Learn Linear and Angular measurements to arrive at solutions to basic surveying problems.
- Employ conventional surveying data capturing techniques and process the data for computations.
- Analyze the obtained spatial data to compute areas and volumes and draw contours to represent 3D data on plane figures.

COURSE CONTENT:

UNIT-I: INTRODUCTION
Introduction to surveying, understanding land topography and its relevance in Architecture. Types of surveys in practice, Introduction to survey equipments

UNIT-II: CHAIN SURVEYING
Chain surveying - Principles of survey, equipment required, selection of station, methods of taking offsets. Booking the field notes, obstacles in chaining, errors in chaining, chaining on sloping ground and reciprocal ranging.

UNIT-III: COMPASS SURVEYING AND THEODOLITE SURVEYING
The prismatic compass, its construction and uses. Other types of compasses. Reduced and whole circle bearing, magnetic declamation, effects of local attraction. Compass traverse and balancing the closing error. Theodolite, its temporary and permanent adjustment, measuring of magnetic bearings, horizontal and vertical angles. Theodolite traverse and balancing the closing error.

UNIT-IV: LEVELING
Different types of levels, their temporary and permanent adjustment, leveling staff. Book of the readings and reduction of levels. Errors in leveling. Curvature and refraction reciprocal leveling profile, leveling cross sections.

UNIT-V: PLANE TABLING AND CONTOURING

Plane Tabling - Equipment and methods two points and three point's problems. Contouring **-** Characteristics of contour lines, direct and indirect methods of contouring and interpolation of contours. Interpretation and preparation of contour maps. Site modeling with total station. Exercises in setting out of building works

PRACTICALS:

1. Linear measurement using chain and tape by ranging
2. Setting out different geometric shape in site by using compass
3. Conducting profile leveling
4. Difference in elevation
5. Laying of centerline of a building

COURSE OUTCOME:

On successful completion of this course, the student will be able:

- To possess a sound knowledge of fundamental principles and analysis of Geodetics
- To measure of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
- To analyze the obtained spatial data and compute areas and volumes and interpret as drawings

TEXT BOOKS:

1. B.C. Punmia, "Surveying Vol.1", Laxmi Publications pvt. Ltd., New Delhi – 2009.
2. Kanetkar T P and S V Kulkarni, Surveying and Leveling Part I, Pune Vidyarthi Griha Prakashan, 1988.

REFERENCES:

1. S.K. Duggal, "Surveying Vol.1", Tata McGraw Hill Publishing Co. Ltd. New Delhi. – 2009.
2. K.R. Arora, "Surveying Vol. 1" Standard Book House, New Delhi. – 2010
3. R Subramanian, Surveying and Leveling, Second edition, Oxford University Press, New Delhi.

Subject: CLIMATOLOGY		
Code: ART307	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

The course intends to create awareness that architecture also has influence of climate, by exposing the students to factors of climate, the various climatic zones, heat flow through materials in building envelope for design Considerations.

OBJECTIVES:

- To study global climatic factors and its effect on human comfort.
- To familiarize students with the factors influencing temperature, design and its impact on architectural design.
- To understand the air pattern around buildings and the effect of wind on the building.
- To study on various design strategies for building in different types of climatic zones in the world.

COURSE CONTENT:

UNIT-I: INTRODUCTION
Introduction to the global climatic factors and its effect on human comfort. Macro climate, micro climate, climate and weather, Study of world climatic zones, tropical climate, characteristics of different climatic zones and elements of climate.

UNIT-II: THERMAL COMFORT
Thermal comfort factors, heat exchange of buildings, bio climatic chart. The transfer of heat through building, Definitions – Conductivity, Resistivity, Specific heat, Conductance, Resistance and Thermal capacity – Surface resistance and air cavities – Air to air transmittance (U value) – Time lag and decrement factor.

UNIT-III: SOLAR GEOMETRY AND SHADING DEVICES
Solar geometry, Solar charts, Locating the position of sun – Sun path diagram – Overhead period–Solar shading–Shadow angles – Design of appropriate shading devices, orientation of window, internal blinds and curtains, Special glasses, external shading devices Methods of controlling solar heat gain, building form and heat gain, thermal insulation. Structural controls: Site analysis, Building Orientation and Placement, Effects of Landscaping element on micro climate.

UNIT-IV: DAY LIGHTING
Sky as the source of internal light, day light factor, components of day light factor, the sky component, the external reflected component and internal reflected component,

glare, recommended levels of illumination for different types of buildings (ref. Relevant IS code)

UNIT-V: VENTILATION AND AIR MOVEMENT

Macro and micro climatic wind pattern and air flow, types of ventilation, principles and functions of natural ventilation, air changes, wind flow around buildings and air flow pattern inside the buildings. Window sizes, Stack Effect and thermally induced air currents.

UNIT-VI: SHELTER FOR DIFFERENT CLIMATES

Design strategies in Hot-dry, warm-humid, composite and tropical upland climate, and Climate responsive design exercises in Indian context.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Understanding of Thermal balance in Human beings.
- Analysis of Air flow in Buildings.
- Application and designing of shaded devices.
- Designing climate responsive structure.

TEXT BOOKS:

1. O.H. Koenigsberger and Others, "Manual of Tropical Housing and Building" – Part I - Climate design, Orient Longman, Madras, India, 2010.
2. Kukreja, C.P. Tropical Architecture. Tata McGraw-Hill Pub. Co. Ltd., New Delhi, 1978.
3. Olgyay and Olgyay. Solar Control and Shading Devices.
4. G.Z Brown and Mark Dekay "Sun,wind and light" Architectural Design Strategies
5. Konya, Allan. Design for Hot Climates.
6. Victor Olgyay "Design with climate".
7. Manual on Solar Passive Architecture, IIT Mumbai and Mines New Delhi, 1999.

REFERENCES:

1. Martin Evans, "Housing Climate and Comfort", Architectural Press, London, 1980
2. B. Givoni, "Man, Climate and Architecture", Architectural Sciences Series – Applied Science
3. Publishers Ltd., London, 1981.
4. B. Givoni, "Passive and Low Energy Cooling of building", Van Nortrand Reinhold New York, USA, 1994.
5. Galloe, Salam and Sayigh A.M.M., "Architecture, Comfort and Energy", Elsivier Science Ltd., Oxford, U.K., 1998.
6. Bureau of Indian Standards IS 3792, "Hand book on Functional requirements of buildingsother than industrial buildings", 1987.

Subject: COMPUTER APPLICATION – I		
Code: ARS308	**Credits: 2**	**Hours / Week: 3hrs.**
Progressive Marks: 100	**Examination Marks: NIL**	**Mode of Exam: NIL**

AIM:

To orient the student to create two and three-dimensional objects in space with special emphasis on presentation and visualization of interiors and exteriors of building using different rendering techniques using CAD and sketch up.

OBJECTIVES:

- To explore computer modeling techniques using CAD and sketch up.
- To learn basic skills of modeling, rendering in CAD, and to exercise methods of interface within CAD and sketch up.
- Perceive the basic Cad commands with respect to drawing properties.

COURSE CONTENT:

UNIT – I: STARTING AUTO CAD

Introduction to the menu, starting drawings from scratch, Creating and using templates-starting drawings with setup wizards. Saving and closing a file. Using co-ordinate system: The UCS, Working with Cartesian and polar co-ordinate systems, using displays with key shortcuts.

UNIT – II: SETTING UP THE DRAWING ENVIRONMENT

Setting the paper size, setting units, setting grid limits, drawing limits, Snap controls, Use of paper space and model space.

Basic commands dealing with drawing properties: Layer control, change properties, line weight control, etc. Inquiry methods: Using database information for objects, calculating distance and angle, areas etc.

UNIT – III: DIMENSIONING COMMANDS AND BLOCKS

Dimensioning the objects in linear, angular fashions along with quick time dimensioning etc. Creating and working with blocks, creating symbols, use of blocks in creating a layout of a residential area- one exercise to be done as lab assignment. Plotting, plot styles and printing with the help of layers.

Introduction to 3D modelling, rendering and setting: Create 3D sculpture using 3D primitives (cubes, spheres etc.)

UNIT – IV: INTRODUCTION TO SKETCH UP

a) Using various drawing, editing and dimensioning tools.

b) Using various 3d tools eg: follow me, mirror, rotate. Using layers, sandbox, shadows, and styles.

c) Creating groups, components and using solid tools.

UNIT – V: CREATING WALK THROUGH, 3D RENDERING

Using interfaces such as V-ray, lumion. Application of the above learning in a selected design project done in the previous semester

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Understand the auto cad tools and creating two dimensional forms.
- Explore various CAD blocks and its usage in creating layout.
- Synthesize and apply three-dimensional forms of building using sketch up.
- Create walk through and rendering of architectural spaces

REFERENCES:

1. Teyapoovan, T. Engineering Drawing with Auto CAD 2000. Vikas Pub. House Pvt. Ltd., New Delhi, 2000.
2. Parker, Daniel and Rice, Habert. Inside Auto CAD Daniel. 1987.
3. Georgeomura, Auto CAD Release 2000.
4. AutoCAD 2010 Textbook-AutoCAD 2010: A Problem-Solving Approach-Customizing AutoCAD 2010
5. Beginning AutoCAD 2007- By Bob McFarlane, Robert McFarlane.
6. Ralph Grabowski, "The Illustrated AutoCAD 2002 Quick Reference", 1st edition, Cengage Learing, 2001
7. Sham tikoo, "Autocad 2000: A Problem-Solving Approach",.Delmar Cengage Learning, 1999.
8. Fiorello. J. A., "CAD for Interiors beyond the basics", Wiley publications, 2011.
9. Aidan chopra: "Google sketch up for dummies".
10. Chrisgrover, Google sketch up: "The missing manul".

YEAR II SEMESTER – IV

Subject: ARCHITECTURAL DESIGN - III		
Code: ARS401	**Credits: 10**	**Hours / Week: 10 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: Jury**

AIM:

This course intends to study of the physical, socioeconomic, climatic and cultural aspects of a selected **village** by conducting various surveys to understand the settlement pattern, housing stock and amenities that exist or required

OBJECTIVE:

- To emphasis on the design of simple community-oriented buildings by understanding the vernacular / traditional architecture which involves local materials and construction techniques.
- To consider interrelationship between occupation, social structure and religious beliefs and its physical manifestation in the form of the settlement.
- To develop and design the built forms and open spaces that meets the aspirations of the community.
- Presentation of concepts through 2D ,3D sketches and physical model.

COURSE CONTENT:

Scale and Complexity: Projects involving public and community-oriented buildings - Design of housing prototypes for a particular community / occupation using rural building materials & cost-effective technology with comprehensive analysis of rural settlement in a hierarchical manner. Suggestive Typologies/ projects: Rural projects that involve studies and design at settlement and building level- noon meal centre, market, primary health center; departmental store, higher, secondary school, students center at campus level.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Understand the concept of community, settlement evolution and the built environment as influenced by socio-economic, cultural, climatic, religious and environmental factors.
- Develop understanding the standards of public and community-oriented buildings.
- Understand the settlement pattern, housing stock and amenities through village documentation.

REFERENCES:

1. Joseph De Chiara, Michael J Crosbie, “Time Saver Standards for Building Types”, McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, “Human Dimension and Interior Space”, Whitney Library of Design, 1975.
3. Joseph De Chiara, Julius Panero, Martin Zelnik, “Time Saver Standards for Interior Design and Space Planning”, McGraw Hill, 2001.
4. Ernst Neufert “Architects Data”, Blackwell 2002
5. Ramsey et al, “Architectural Graphic Standards”, Wiley, 2000.
6. Richard P. Dober, “Campus Planning”, Society for College and University Planning, 1996.
7. Kanvinde, “Campus design in India”, American year Book, 1969
8. Kevin Lynch, “Site planning”, MIT Press, Cambridge, 1984.
9. Sam F. Miller, “Design Process: A Primer for Architectural and Interior Design”, Van Nostrand Reinhold, 1995

Subject: BUILDING MATERIALS&CONSTRUCTION - IV		
Code: ART402	**Credits: 6**	**Hours / Week: 6 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 3 hrs.**

AIM:

This course intends to study and understand the construction techniques in RCC framed structures and various properties of material in flooring, plastering and painting.

OBJECTIVE:

- To examine the constructional practice pertaining to different types of RCC floors and roofs with different materials.
- To develop an understanding of design and detailed issues of RCC constructions.
- To gain knowledge about advanced RCC elements**.**
- To familiarize on various materials for water proofing and anti-termite protection systems and their methods of construction.

COURSE CONTENT:

UNIT-I: MATERIALS
Plastering: Plastering-internal, external surfaces, pointing.
Painting: constituents of paints**,** types, characteristics, method of application**,** selection of paints, and storage of paints.
Types varnishes (oil and spirit): characteristics and uses of varnishes. French polish, anti corrosive paint, damp proofing finishes.
Floorings : Introduction, essential requirements of a floor, factors affecting selection of flooring material, Various natural as well as artificial flooring materials like brick, flag stone ,tiled ,cement concrete, granolithic, terrazzo, marble, shah bad stones timber flooring, timber floor supported on RSJ ,flag stone floor resting on RSJ, vitrified tiles, ceramic tiles, , Mosaic, rubber, Linoleum, and PVC and PVA flooring

UNIT-II: FLAT ROOFS/FLOORS
Different Types of Roof / Floor: Brick jack arch, madras terrace, ordinary flat brick floor (used in North India)
RCC SLABS-One way discontinuous and continuous slab -- Two way discontinuous and continuous slab, Cantilever slab, Flat slab, Waffle, Coffer slabs, Ribbed slabs, Filler Slabs

UNIT-III: RCC COLUMNS AND BEAMS
RCC columns –different shapes, different combinations, loading conditions (axial, bending, non axial) and slenderness factor. RCC beams - Single and doubly reinforced beams, T and L beams, continuous beams, lintels and brackets, Retaining wall.

UNIT-IV: TEMPORARY CONSTRUCTIONS

Timbering for trenches – shoring – underpinning – scaffolding - form-work for RCC column and beam, slab, stairs. Formwork-simple shuttering (wooden and metal/sheet) methods for RCC columns, beams, slabs, staircases, Pile cantering / scaffolding.

UNIT-V: **SKYLIGHTS**
Construction – skylight, roof lights, dormer windows in sloped and flat roofs

UNIT-VI: DAMP PROOFING, WATER PROOFING AND ANTITERMITE TREATMENT
Materials for Special Treatments: damp proofing, Water proofing materials and Anti-termite treatment materials.
Construction methods for water-proofing and damp proofing for walls, roofs, basements, retaining walls, toilets, terrace gardens, balconies, swimming pools etc. -Exercises of the above through case studies and drawings**.** Anti-termite treatment to foundation and masonry walls.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Acquaint knowledge on different constructional practice pertaining to different types of RCC floors and roofs
- Familiarize techniques of construction of skylights, temporary constructions and types of RCC columns and beams.
- Apply techniques of anti-termite treatment, damp proofing, water proofing, flooring, plastering and painting.

TEXT BOOKS:

1. Chudley R. (1998). Construction technology. ELBS England.
2. McKay, G.B. (1972). Building Construction (Metric). Longman, London.
3. Barry, R. The Construction of Buildings Vol. 2, 5th ed. East-West Press. New Delhi, 1999.

REFERENCES:

1. Bindra, S P. and Arora, S P. Building Construction: Planning Techniques and Methods of Construction, 19th ed. Dhanpat Rai Pub. New Delhi, 2000.
2. Moxley, R. Mitchell's Elementary Building Construction, Technical Press Ltd.
3. Rangwala, S.C. Building Construction, 22nd ed. Charotar Pub. House, Anand, 2004.
4. Sushil Kumar. T.B. of Building Construction, 19th ed. Standard Pub, Delhi, 2003.
5. Gurucharan Singh. (1981). Building Construction Engineering. Standard Book House, New Delhi.
6. Foster, Stroud. (1963). Mitchell's Advanced Building Construction. Allied Publishers Private Limited, Bombay.
7. Dr.T.S.Balagopal Prabhu. (1987). Building Drawing and Detailing. Spades Publishers Pvt. Ltd., Calicut.

Subject: HISTORY OF ARCHITECTURE– IV		
Code: ART403	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

The course intends to provide an understanding of the evolution of Islamic and Colonial Architecture in India in their various stylistic modes characterized by technology, ornamentation and planning practices

OBJECTIVES:

- To make the students understand contributions to architecture by the Islamic and Colonial period and the varieties of building materials and techniques adopted by them.
- To study the development of Islamic architecture in the west. The advent of Islam into India, Architecture of early Islamic Delhi and the regional variations. Influences of Islamic ideas on secular and religious architecture in India and the Mughal period in India.
- To enable the students to understand the influence of Religion in India and architecture of buildings by studying specific examples.
- To study the evolution of building typologies during different periods with selected examples in India.
- To explain the students the evolution of architecture in relation to time with special emphasis to geographical, geological, social, religious, political, aesthetical and environmental factors.
- To make the students understand the developments in the construction technology in different periods.

COURSE CONTENT:

UNIT-I: INTRODUCTION TO ISLAMIC ARCHITECTURE

Formation and Development of Islamic Architecture - Characteristic Features, History of Islam: birth, spread and principles - Islamic architecture as rising from Islam as a socio cultural and political phenomenon- evolution of building types in terms of forms and functions: Islam and its philosophy, its implementation in various building types such as mosque, tomb, madarasa, palace, caravanserai, market, fort and their elements like domes, minarets, arch etc. Character of Islamic architecture: principles, structure, materials and methods of construction, elements of decoration, colour, geometry, light.

UNIT-II: ISLAMIC ARCHITECTURE IN INDIA - IMPERIAL STYLE

Formation and Development of Islamic Architecture in India - Characteristic Features of Imperial style. Brief reference to religion and culture of Muslim period in India. Salient features of an Indian mosqueand Evolution of the Islamic Arch. Advent of Islam into the Indian subcontinent and its impact including the change in the architectural scene-

overview of development based on political history and the corresponding classification of architecture - Islamic architecture in India: sources and influences establishment of the Delhi Sultanate- evolution of architecture under the Slave, Khilji, Tughlaq, Sayyid, Bahamani, Moghaland Lodhi Dynasties – tombs in Punjab- important examples for each period. Examples – Qutb Minar, Delhi. Varieties of squinch – Alai Darwaza, Delhi - Tomb of Ghiasuddin Tughlaq & Khirki Masjid – Shish gumbad & Purana Quila, Delhi.

UNIT-III: **ISLAMIC ARCHITECTURE IN THE PROVINCES -PROVINCIAL STYLES**

Development of the provincial styles in different regions. Shift of power to the provinces and evolution of regional architecture with their own unique influences: geographic, cultural, political, etc. Example of Punjab style – Tomb of shah Rukni Alam – Example of Bengal style – Chotasona masjid. Gaur – Example of Jaunpur style – Atala masjid – Example of Gujarat style – Jami Masjid, Ahmedabad and Rajasthan – Examples of Deccan style – Golgumbaz, Bijapur, & Charminar, Hyderabad.

UNIT-IV: THE MUGHAL PERIOD IN INDIA

Development of the Mughal style. Mughals in India- political and cultural history-synthesis of Hindu-Muslim culture, Sufi movement -evolution of architecture and outline of Mughal cities and gardens under the Mughal rulers: Babur, Humayun, Akbar, Jahangir, Shahjahan, Aurangazeb- important examples- decline of the Mughal empire. Important examples –Humayuns Tomb, Delhi, Fatehpur Sikhri (lay out, Buland darwaza, Diwani Khas, Tomb of Salim Chisti & Jami masjid) Akbars Tomb at Sikandara – The Taj Mahal, Agra – Red Fort, Delhi (Diwan-i-Am, Rang Mahal).

UNIT-V: ARCHITECTURE IN COLONIAL INDIA

Arrival of British – Early Colonial period, Monumental buildings of Early colonial period – Examples – St.Pauls Cathedral, Calcatta & Bombay Town hall –Architectural character of Indo-Saracenic and Classical revival –University of Madras Senate House & Victoria Memorial hall, Calcatta – Later Colonial period – Contribution of Edwin Lutyens & Herbert Baker to the lay-out and Architecture of New Delhi – Rashtrapathi Bhavan & Parliament House.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Understand the evolution of building typologies during different periods
- Gain perspective of geographical, geological, social, religious, political, aesthetical and environmental factors on development of the provincial styles
- Exhibit the various architectural styles and its construction details.

TEXT BOOKS:

1. Sir Banister Fletcher, “A History of Architecture”, CBS Publications (Indian Edition),1999.
2. G. K. Hiraskar, “Great Ages of World Architecture”, Dhanpat Rai & Sons, Delhi.

3. Spiro Kostof, “A History of Architecture: Setting and Rituals, Oxford University Press, London, 1985
4. Francis D K Ching “Global History of Architecture”.
5. Leland M Roth; “Understanding Architecture: Its Elements, History and Meaning”; Craftsman House; 1994.
6. Emily Cole “Grammar of Architecture”.
7. George Mitchell, “Architecture of the Islamic World - Its History and Social meaning”,
8. Thames and Hudson, London 1978.
9. Robert Hillenbrand, “Islamic Architecture- Form, Function and Meaning”, Edinburgh University Press 1994.
10. Brown Percy, “Indian Architecture (Islamic Period)”, Taraporevala and Sons, Bombay, 1983.
11. Satish Grover, “Islamic Architecture in India”, CBS Pub, New Delhi, 2002.

REFERENCES:

1. Rowl, Benjamin. Art and Architecture of India.
2. Tadgell, Christopher. The History of Architecture in India: from the Dawn of Civilization to the End of the Raj. Om Book Service, New Delhi, 1990.
3. Vistara. The Architecture of India
4. Rustam J Mehta “Master Pieces of Indo-Islamic Architecture”.
5. Thames and Hudson “Architecture of the Islamic World”
6. Rupinder & Reeta Khullar “Delhi, Agra and Jaipur”
7. Henry Stierlin “Islam”
8. Emily Cole “The Grammar of Architecture”.
9. David Watkin “A History of Western Architecture
10. Benevolo, Leonardo. History of Modern Architecture: the tradition of modern architecture Vol.1. Routledge and Kegan Paul, London, 1971.
11. Frampton Kenneth “Modern Architecture”: A Critical History London: Thomes & Hudson, 1980.
12. Curtis, J.R. William. Modern Architecture since 1900. Prentice-Hall, Inc., New Jersey, 2002.
13. Giedion, Sigfried, Space, Time and Architecture: the growth of a new tradition, 4th ed. Harvard Universtiy Press, Cambridge, 1962.
14. Hilberseimer, L. Contemporary Architecture: Its roots and trends. Paul theobald, Chicago, 1964.
15. Pevsner, Nicolaus Oersonem: Pioneers of Modern Design from William Morris to Walter Gropius-.
16. Sharp, Dennis. Twentieth Century Architecture: A Visual History, Facts on File. New York, 1991
17. Norbergschul C., Principles of Modern Architecture, London Andreas papadakes,2000.
18. R.Nath, “History of Mughal Architecture”, Vols I to III - Abhinav Publications, New Delhi, 1985.
19. Catherine Asher, “Architecture of Mughal India”, Cambridge University Press, 2001
20. Monica Juneja, “Architecture in Medieval India: Forms, Contexts, Histories”, New Delhi, Permanent Black, 2001.

Subject: DESIGN OF RCC STRUCTURES – I		
Code: ART404	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 3 hrs.**

AIM:

The course intends to give an in-depth understanding of concept associated with design of different elements of structures

OBJECTIVES:

- To develop an understanding about the design thro.ugh working stress and limit state methods.
- To apply the above two methods for the design of Concrete beams and slabs under various conditions.

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COURSE CONTENT:

UNIT-I: CONCEPT OF RCC DESIGN
Introduction to RCC design, design philosophies: working stress and limit state method of RCC design. Use of design Aids - IS 456:2000 design consideration

UNIT-II: DESIGN OF BEAMS
Design of simply supported singly and doubly reinforced rectangular and continuous beams

UNIT-III: DESIGN OF BEAMS
Design of T-beams, cantilever beams, lintels

UNIT-IV: DESIGN OF SLABS
Behavior of one way and two-way slab. Design of one way, two-way slabs and continuous slab with different end conditions

UNIT-V: DESIGN OF FLAT SLABS
Behavior of flat slab and flat plate, Advantages of flat slab construction – Components of flat slab. Design of flat slab and flat plate

COURSE OUTCOME:

On successful completion of this course, the student will be able to:

- Understand the different concepts of WSM and LSD methods using the IS codes.
- Design RCC beams and slabs.
- Acquaint knowledge on RCC members through site visits.

TEXT BOOKS:

1. A.K.Jain. Reinforced Concrete: Limit State Design, 5th ed. New Chand and Bros., Roorkee, 1999.
2. Ramamrutham. S. and Narayan, R. Design of RCC Structures, 12th ed. Dhanpat Rai Pub. Co. Pvt. Ltd., Delhi, 1998.
3. S.N. Sinha, "Reinforced Concrete Design", Tata McGraw Hill Publishing Co. Ltd, New Delhi, 1998.
4. Shah, "Reinforced Concrete", Vol. 1 and 2, Charotar Publishing House, Anand, 1998.

REFERENCES:

1. P.Dayaratnam, "Design of Reinforced Concrete Structures", Oxford and IBH Publishing Co., 1983.
2. C. Sinha and S.K. Roy, "Fundamentals of Reinforced Concrete", S.Chand & Co., New Delhi, 1983.
3. Dr. B.C. Punmia, "Reinforced Concrete Structures", Vol, 1 & 2 Laxmi publication, Delhi, 2004.
4. IS 456 "Indian Standard, Plain and Reinforced Concrete, Code of Practice, Bureau of Indian Standards, 2000.
5. S.Unnikrishnan Pillai and Devados Menon, " Reinforced Concrete Design" – Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1999.

Subject: ENVIRONMENTAL SCIENCE		
Code: ART405	**Credits: 2**	**Hours / Week: 2 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

The course intends to sensitize students towards sustainable environment.

OBJECTIVE:

- To identify the major challenges in environmental issues and evaluate possible solutions to assist the sustainable development.
- To give students a comprehensive analytical skill, critical thinking and demonstrate socio-economic skills.
- To analyze an overall impact of specific issues and develop environmental management plan.

COURSE CONTENT:

UNIT-I: INTRODUCTION
Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security. Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development

UNIT-II: NATURAL RESOURCES
Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle. Energy – Different types of energy, Conventional sources & Non-Conventional sources of energy solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy.

UNIT-III: ENVIRONMENTAL POLLUTION
Water Pollution, Noise pollution, Land Pollution, Public Health Aspects, Global Environmental Issues: Population Growth, Urbanization, Land Management, Water & Waste Water Management.

UNIT-IV: AIR POLLUTION & AUTOMOBILE POLLUTION
Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures. Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods

UNIT-V: INTRODUCTION TO GIS & REMOTE SENSING
Applications of GIS & Remote Sensing in Environmental Engineering Practices. Environmental Acts & Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs), Environmental Education & Women Education.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Familiarize with the principles of ecology and environmental issues on a global scale.
- Analyze an overall impact of specific issues and develop environmental management plan with reference to Environmental Acts & Regulations
- Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.
- Acquaint knowledge of applications of GIS & Remote Sensing in Environmental Engineering Practices.

TEXT BOOKS:

1. Benny Joseph (2005), "Environmental Studies", Tata McGraw – Hill Publishing Company Limited.
2. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi.
3. R Rajagopalan, "Environmental Studies – From Crisis to Cure", Oxford University Press, 2005.
4. Aloka Debi, "Environmental Science and Engineering", Universities Press (India) Pvt. Ltd. 2012.

REFERENCES:

1. Raman Sivakumar, "Principals of Environmental Science and Engineering", Second Edition, Cengage learning Singapore, 2005
2. P. Meenakshi, "Elements of Environmental Science and Engineering", Prentice Hall of India Private Limited, New Delhi, 2006
3. S.M. Prakash, "Environmental Studies", Elite Publishers Mangalore, 2007
4. Erach Bharucha, "Text Book of Environmental Studies", for UGC, University press, 2005
5. G.Tyler Miller Jr., "Environmental Science – working with the Earth", Tenth Edition, Thomson Brooks /Cole, 2004
6. G.Tyler Miller Jr., "Environmental Science – working with the Earth", Eleventh Edition, Thomson Brooks /Cole, 2006
7. Dr.Pratiba Sing, Dr.AnoopSingh and Dr.Piyush Malaviya, "Text Book of Environmental and Ecology", Acme Learning Pvt. Ltd. New Delhi.

Subject: BUILDING SERVICES – II (Electricals & Acoustics)		
Code: ART406	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

The main aim of this course is to understand the utilization of various types of lights indoor and outdoor and also to understand the application of acoustics principles in and around buildings.

OBJECTIVE:

- To list and explain the various components required in electricity distribution system in campus
- To identify the various types of light requirement for different purpose and lighting scheme for interiors spaces.
- To explain the various characteristics of sound including origin, propagation and auditory sensation of sound.
- To distinguish the behavior of sound for enclosed spaces and open spaces.
- To examine acoustical design criteria for theatres, cinema halls, auditorium, conference halls etc.

COURSE CONTENT:

UNIT-I: BASICS OF ELECTRICALS

Sources of Electricity, Electricity generation, Basic Electrical Distribution System – Substation, transformer, overhead line, underground line. Three phase supply. Electrical distribution in campus

Domestic wiring system, Material, classification, merits and demerits, Electrical accessories, Symbols and representation in architectural layout drawings, Single line-wiring diagram, Safety aspects, protection of buildings against lightning, NBC Recommendations, Earthing, Short circuit and overloading, Preliminary Estimation of Electrical & illumination works

UNIT-II: LIGHTING

Fundamentals of light. Application of lighting and illumination in Architecture. Artificial sources of light; Lamps and their characteristics: Incandescent lamp, Fluorescent lamp, Gas filled lamp, HID lamp. Neon lamp and LED lamp.

UNIT–III: ILLUMINATION

Definition of Light power, light flux Light intensity, Laws of Illumination: inverse square law and Lambert's Cosine law. Application of law of illumination. General formula for illumination.

Standard level of illuminations for various tasks, Basic lighting design, Direct, Indirect and semi-direct lighting. General and local lighting, Glare and glare control.

Lighting design of: Residential units, Shops & Restaurants, general office, conference hall, Art – gallery and Museum Parks & playgrounds Road/area lighting and Landscape Lighting.

UNIT–IV: BASICS OF ACOUSTICS

Introduction to architectural acoustics - Characteristic and measurement of sound, frequency, intensity, decibel scale, auditory range, effects of sound on humans, loudness. Acoustics and acoustical environment, Behaviour of sound in an enclosed space. Principle of geometrical acoustics, Different acoustical defects in auditorium and its solution, reverberation and reverberation time calculations – Sabine's formula and its interpretation, dead and live room.

UNIT–V: DESIGN OF AUDITORIUM

Size, shape, sitting arrangement design criteria for speech and music, acoustical correction design and modification techniques, broadcasting studio, television studio, classroom, lecture hall, church and Cathedral. Electro-acoustical systems, Unidirectional and Stereophonic sound system, Digital and Surround-sound systems, Design criteria for Theatres, Motion picture halls, Multiplexes and Multipurpose Auditoriums. Design of open-air theatre and planning of building.

UNIT-VI: NOISE CONTROL & ACOUSTICAL MATERIALS

Noise sources, air borne and structure borne sound, NC curve, Propagation of noise of mechanical operation and impact noise, sound transmission through wall and partition, Vibration isolation – control of mechanical noise, floor, wall, ceiling treatment. Design Principles- reduction of noise at the source, Reduction of noise near the source. Application of sound absorption material, Reduction of noise by Structural Defense. Planning and analysis of problem. Reduction of noise by Town Planning and Regional Planning consideration. General description of acoustical materials - acoustical tiles, fibreboard, resonator absorption unit absorber, carpets, acoustical plaster, resilient packing composite materials, etc. – Their use, selection criteria and construction.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Apply principles of lighting and illumination in Architecture.
- Master the electrical layouts and acoustic design for different building typologies.
- Understand on various systems of noise control & acoustical materials.
- Familiarize with various Electrical and acoustical materials through market survey.

REFERENCES:

1. Duncan Templeton; *Acoustics in The Built Environment*.
2. J E Moore; *Design for good Acoustics and noise control.*
3. Derek Philips; Lighting in Architectural Design.
4. G.K.Lal, Elements of Lighting, 3-D Publishers.
5. R.G. Hopkinson and J.D.Kay, The lighting of buildings, Faber and Faber, London, 1969.
6. Philips Lighting in Architectural Design, McGraw Hill, New York, 1964.
7. Burris, Harlod. Acoustics for the Architect.
8. Lord, Peter and Templetion, Duncan. The Architecture of Sound: Designing
9. Egan, David. Architectural Acoustics, MC Graw-Hill Book Ccompany, New York, 1988.

Subject: COMPUTER APPLICATIONS – II		
Code: ARS407	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 100	**Examination Marks: NIL**	**Mode of Exam: NIL**

AIM:

To orient the student to create three-dimensional objects in space with special emphasis on presentation and visualization of interiors and exteriors of building using different rendering techniques using software's like Revit Architecture, ArchiCAD, 3Ds max, Lumion.

OBJECTIVE:

- To explore computer modeling techniques using Revit and 3Ds max.
- To learn basic skills of modeling, rendering in 3Ds max, Lumion and to exercise methods of interface within Revit Architecture and 3Ds max.
- Perceive the basic software commands with respect to drawing properties.

COURSE CONTENT:

UNIT–I: INTRODUCTION

To digital theory and this unit equips students with an understanding of the territory of computational design through its theoretical vocabulary and relevant histories.

3d modeling and different types of methods in 3 modeling like polygonal modeling , NURBS modeling ,subdivision surface modeling and building information modeling etc to design and test Architectural built environments virtually.

UNIT–II: SCENE SETUP

involves arranging virtual objects, lights, cameras and other entities on a scene which will later be used to produce a still image or an animation. Image processing and video editing to create Architectural walkthroughs, Digital solar studies

UNIT–III: BUILDING INFORMATION MODELING

3dimensional, real-time, dynamic building modeling software to increase productivity in building design and construction. The process produces the Building Information Model (also abbreviated BIM), which encompasses building geometry, spatial relationships, geographic information, and quantities and properties of building components.

Design and documentation using building information modeling application like Revit Architecture, ArchiCAD, 3Ds max, Lumion

Unit–IV: INTRODUCTION TO PHOTOSHOP

Introduction to the Photoshop tools, working in layers, Rendering and scene setting to create a photo realistic picture, Presentation skills are taught to the students to render plans, sections and views photomontage

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Understand the Various 3D tool of the software and creating 3dimensional building forms using softwares like Revit architecture, 3ds max, etc .
- Gain knowledge on using software interfaces in design projects and presentation.
- Learn the rendering techniques using V-ray, Photoshop and Lumion.
- Learn application of Building Information Modelling in architectural projects.

REFERENCE BOOKS:

1. Catalytic Formations: Architecture and Digital Design. Ali Rahim.
2. BIM Handbook: A Guide to Building Information Modeling for Owners,
3. Managers, Designers, Engineers and Contractors- Chuck Eastman
4. Building Information Modeling – Willem Kymmell
5. Deke McClelland, "Photoshop 7 Bible Professional Edition", Wiley John & Son INC, New York, 2000.
6. A. Watt, "Fundamentals of Three-Dimensional Computer Graphics", Addison Wesley, Massachusetts, 1989.
7. Aouad, "Computer Aided Design guide for Architecture, Engineering and construction", Spon process, 2012.

ELECTIVE – I

Subject: VERNACULAR ARCHITECTURE		
Code: ARE408-1	**Credits: 2**	**Hours / Week: 2 hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs**

AIM:

This course intends to explore importance of Indian vernacular architecture which serves in creating a balance between nature and socio –economic needs of the society.

OBJECTIVES:

- To introduce the study of vernacular architecture as a process and not a product.
- To provide an overview of the various approaches and concepts to the study of vernacular architecture.
- To study the various vernacular architecture forms in the various regions of the country.
- To look at the impact of Colonial rule on the vernacular architecture of India.
- To understand and inculcate the appropriateness in design to the local context in vernacular architecture.

COURSE CONTENT:

UNIT-I: INTRODUCTION

Definition and classification of Vernacular architecture – Vernacular architecture as a process – Survey and study of vernacular architecture: methodology – Sense of Identity, Continuity, Socio-Cultural and Contextual responsiveness of vernacular architecture: an overview.

UNIT-II: APPROACHES AND CONCEPTS

Different approaches and concepts to the study of vernacular architecture: an over view of historical outline, religious context, and social customs aesthetic, architectural, temporal, political and anthropological studies in detail. Vernacular tradition in building serves in creating a balance between nature and society, optimal utilization of natural resources and of local skills and craftsmanship.

UNIT-III: VERNACULAR ARCHITECTURE OF THE WESTERN AND NORTHERN REGIONS OF INDIA

Forms spatial planning, cultural aspects, symbolism, colour, and art, materials of construction and construction technique of the vernacular architecture of the following: Deserts of Kutch and Rajasthan; Havelis of Rajasthan, Rural and urban Gujarat; wooden mansions (havelis); Havelis of the Bohra Muslims, Geographical regions of Kashmir; house boats.

UNIT-IV: VERNACULAR ARCHITECTURE OF SOUTH INDIA

Forms, spatial planning, cultural aspects, symbolism, art, colour, materials of

construction and construction technique, proportioning systems, religious beliefs and practices in the vernacular architecture of the following:

- Kerala: Houses of the Nair & Namboothri community; Koothambalam, Padmanabhapuram palace etc.
- Tamil Nadu: Houses and palaces of the Chettinad region; Agraharams etc.
- Karnataka: Houses of Melkote, Madikere etc.
- Andhra Pradesh – Iktas houses in Nalgonda etc.

UNIT-V: WESTERN INFLUENCES ON VERNACULAR ARCHITECTURE OF INDIA

Colonial influences on the Tradition Goan house - Evolution of the Bungalow from the traditional bungalow, Victoria Villas – Planning principles and materials and methods of construction. Settlement pattern and housing typologies in Pondicherry and Cochin.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Gain insight on various approaches and concepts to the study of vernacular architecture and documentation.
- Acquaint with knowledge on forms, spatial planning, cultural aspects, symbolism, art, colour, materials of construction and construction techniques of various regions of India.
- Familiarize principles of optimal utilization of natural resources through local skills and craftsmanship in vernacular architecture.

TEXT BOOKS:

1. Oliver, Paul Encyclopedia of Vernacular Architecture of the World, vol. 1-11. Cambridge University Press, Cambridge.1997.
2. Madavi Desai, Traditional Architecture: House Form of Islamic Community in Bohras in Gujarat.
3. Amos Rapoport, House, Form & Culture, Prentice Hall Inc. 1969.
4. Amos Rapoport, The meaning of the Built Environment, Sage Publications, New Delhi, 1982.
5. R W Brunskill: Illustrated Handbook on Vernacular Architecture, 1987.

REFERENCES:

1. V.S. Pramar, Haveli – Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd.,Ahmedabad, 1989.
2. Kulbushanshan Jain and Minakshi Jain – Mud Architecture of the Indian Desert, Aadi Centre,Ahmedabad 1992.
3. Acharya Prasanna K, Indian Architecture according to Manasara Silpasastra, Indian, India, Patna: 1979 (Reprint of 1928 ed.).
4. G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Changesince 1850, Oxford University Press, Delhi, 1989.
5. Carmen Kagal, VISTARA – The Architecture of India, Pub: The Festival of India, 1986.
6. S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 2000.

Subject: BARRIER FREE BUILT ENVIRONMENT		
Code: ARE408-2	**Credits: 2**	**Hours / Week: 2 hrs.**
Progressive Marks : 60	**Examination Marks : 40**	**Duration of Exam : 2 hrs**

AIM:

This course intends to inculcate skills required for designing for barrier free built environments for physically challenged persons and techniques involved in making such design provisions.

OBJECTIVE:

- Indian Disabilities Act, is promulgated in 1995 for the purpose of ensuring equal opportunities to persons with disabilities in society for their development through education, training and rehabilitation services.
- The principle objective is to ensure their full participation by preventing discrimination and integrating them into the mainstream of society.
- An Architect plays a very crucial role in this endeavor by designing the needed barrier free environment.
- The objective of this course is to familiarize the students of architecture regarding the various provisions and design issues.

COURSE CONTENT:

UNIT–I: INTRODUCTION
Definition of Barrier free built environment, Introduction to Barrier free built environment terms, Definition of Disability. Type of disabilities - Non-Ambulatory, Semi-Ambulatory, Sight, Hearing. Four major Categories of target group to provide fundamental needs: People with impaired mobility, People with visual impairment, People with hearing impairment, People with Learning Disabilities and Mental Retardation.

UNIT-II: BARRIER FREE BASIC ANTHROPOMETRICS AND MOBILITY DEVICES
Study of dimensions that can be used for guidance when designing facilities and equipment to be used by persons with disabilities like Reach Ranges**-** Forward Reach, Side Reach, White Cane Range, Common Reach Zone, Circulation Dimensions - Wheelchair Dimensions, Walkway Width for Crutch Users, Vision Cone, Heights of People, and Lighting.

UNIT-III: STUDY OF BARRIER FREE DESIGN ELEMENTS
Minimum access provisions required in various types of buildings. Space Allowances – Minimum access provisions, general allowances; Clear or Ground space for wheel chairs; Physical Parameters; Protruding Objects; Ground and Floor Surfaces.
Building Elements like Corridors, Doors and Windows, Stair ways, Elevators, Platform Lifts, Wheel chair lifts, Handrail Requirements, Washrooms, Bathrooms, Shower areas,

Controls and operating measures and other facilities – Counter, Water Fountain, Telephone, Mailbox, and Vending Machine.
Provisions in Public spaces and Site Planning - Building vehicular -Parking and Passenger Loading Zones, Curb Ramps, Walks and Paths, Approach to Plinth Level - Ramped Approach Stepped Approach, Entrance Landing, Entrance and Exit doors, etc.

UNIT-IV: SIGNAGE
Types of Signage, signage requirements, Signage Specifications - Character Proportion, Character Height, Raised / Brailled Characters and Pictogram, Finish and Contrast, Mounting Location and Height, Symbols of Accessibility, Illumination Levels. Signage Design- Language, Sign Typeface, Suggested Sizes for Letters and Symbols, Text Design, Colour and Contrast. Sign Installation -Illumination, Sign positioning.

UNIT-V: DISABILITY ACTS AND NATIONAL POLICIES
Introduction to Provisions of persons with Disabilities (Equal opportunities, Protection of Rights and Full Participation) Act, 1995, National Policy for provisions for elderly persons, Concept of equal opportunity, human rights, social justice and empowerment of physically challenged persons. Introduction to similar efforts in other countries. Initiatives at global and International level for protection of rights of disabled and also elderly person. American disabilities Act 1990
Information on various types of national Institutes, agencies and professional bodies involved in disabled welfare, associated norms and standards thereof. The role of NGO's, professional and outreach.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Gain insight on barrier free environment in different building typologies and campuses.
- Acquaint with knowledge on Standards, guidelines and Act on barrier free spaces for Differently-abled persons
- Familiarize principles in Architecture for creating environment friendly for various types of physically challenged persons and elderly aged group

.

REFERENCES:

1. Ministry of Urban Affairs and Employment. Central Public Works Department, India, "Handbook on Barrier Free and Accessibility", 2014.
2. Unnati. Team "Design Manual for a Barrier – Free Built Environment", Handicap International, December, 2004.
3. ADA Accessibility Guidelines for Buildings and Facilities (ADAAG) US: American Disabilities Act.
4. The National Building Code of India, 2005.
5. Micheal J. Bednar. "Barrier Free Environments", Dowden, Hutchinson and Ross, Ive 1977.
6. Ministry of Urban Affairs and Employment. Central Public Works Department, India, "Guidelines and Space Standards for Barrier Free Environment for Disabled and Elderly Person, 1998.

Subject: Stage and Set Design		
Code: ARE408-3	**Credits: 2**	**Hours / Week: 3 hrs**
Progressive Marks: 100	**Examination Marks: NIL**	**Mode of Exam: NIL**

AIM:

This particular exercise will highlight the role of the designer in the field of backdrop, set design theme Based Design Strategies and Technology Applications.

OBJECTIVE:

- Creating an environment to establish intimacy between the performers and the audience in relation to the theatre and cinemas.
- Examine on the evolution, terminology and theory of stage design.
- Demonstrating on computerized animation, editing, costing and final presentation.

COURSE CONTENT:

UNIT-I: DANCE/ DRAMA/ LECTURE/ THEATRE
Historical Evolution of the stage, degree of encirclement in various types of stage designs such as open air, arena, thrust in and proscenium stages, Script and story board, Terminology and Theory of Stage Design, Technical aspects like Sound, Lighting and Colour scheme, Visualization of and creation of sets e.g. with backdrops and scenery, Set design with appropriate props, Costume design and make up, Expenses.

UNIT-II: FILM SET DESIGN
Film set designs with response to camera positioning and movement**,** Indoor and outdoor shooting, Film sets as a creation of virtual environment appropriate for the scenery and shots, Support structure for film set erection for indoor and outdoor shooting, Architects role in cinematography: visualization, story board frames, Proportions, Computer generated stage set up :Mixing and editing, Exploring various materials of stage props, Budget.

UNIT-III: TABLE TOP SET UP
Stop motion Animation and computerized animation, Concepts or story, Table top miniature box model, Lighting and special effects, Voice over, music and mixing, Overall editing and final presentation, Costing.

UNIT-IV: EVENT STAGE
Concept and design, Ambience lighting and special effect, Stage props:Video wall presentation, sound and acoustics, Cost and estimation.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Understand practical application and presentation. the evolution, terminology and theory of stage design.
- Gain the skill to design the ambience lighting, support structure for film set erection and various materials of stage props.
- Acquaint with knowledge base of Historical Evolution, Costume design and architect's role in cinematography.

REFERENCES:

1. Stage Design: A Practical Guide by Gary Thorne.
2. Theatre Design: Behind the Scenes with the Top Set, Lighting, and Costume Designers by Babak A. Ebrahimian.

Subject: INTRODUCTION TO ART AND ARCHITECTURE		
Code: ARE408-4	**Credits: 2**	**Hours / Week: 2 hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM

The course intends to provide knowledge on exploring art forms, incorporate art forms into architecture.

OBJECTIVE

- To analyze various art forms, and understand the techniques involved in creative thinking.
- To exhibit the study of traditional and contemporary art forms.
- Produce creative works that demonstrate innovation in concepts, language and materials.

COURSE CONTENT:

UNIT-I
Purpose and relevance of art

UNIT-II
Development of art; A survey of history of art forms; pre-historic period to the present times; Changing nature of art through time in terms of content; form and material;

UNIT-III
Exploration of art forms - study of traditional and contemporary art forms - painting sculpture, architecture, decorative arts, design arts, digital art. Relationship between art and architecture from earliest times.

UNIT–IV
Definitions and general understanding of architecture, role of architect in a building project. The changing role of architects, his relation with other consultants, contractors and client, technical knowledge and other skills required as inputs. Various subjects to be learnt by architecture students, their relevance to practice.

UNIT–V
Various factors influencing the architecture of a region, architecture as a response to social, technological and environment forces. Evolution of shelter forms in regions of the world and examples of vernacular architecture in the world, with particular reference to India.

COURSE OUTCOME:

On successful competition of the course the students will be able to:

- Understand traditional and contemporary art forms and relationship between art and architecture from earliest times.
- Acquaint with knowledge on the changing nature of art through time in terms of content; form and material Developing creative products
- Familiarize with the changing role of architects, his relation with other consultants, contractors and client, technical knowledge and other skills.

REFERENCES:

1. Craven, C. Roy. Indian Art a Concise History.
2. Kumar, Raj (Ed.). Essays on Indian Art and Architecture. Discovery Pub., New Delhi, 2003.
3. Fisher, E. Robert. Buddhist Art and Architecture. Thames and Hudson, London, 1993.
4. Ghosh, A (Ed.). Jain Art and Architecture Vol. 1-3. Bharatiya Jnanpith, New Delhi.
5. James C. Snyder, Introduction to Architecture, New York: Mc Graw Hill.
6. Christopher Alexander, Pattern Language, New York: Oxford University Press.
7. Thomas Mitchell, Redefining Designing: From to Experience,
8. James snyder and Anthony Y catanse, Introduction to Architecture, Mc Graw-Hill Book Company, New York, 1979.
9. Rapoport, Amos, House form & Culture.

YEAR-1II SEMESTER-V

Subject: ARCHITECTURAL DESIGN - IV		
Code: ARS501	**Credits: 12**	**Hours / Week: 12 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: Jury**

AIM:

At the intermediate stage to graduate the student further on design of small complexes or buildings involving technology, structural clarity and services in terms of lighting, ventilation, movement pattern, fire safety, security, water supply, sewage etc, Thrust will be also on use of computer for presentation skills and introducing elements and detail for making building barrier free design.

OBJECTIVE:

- To train the student to gather knowledge on the given design project based on books / literature and websites.
- The students are to be exposed to expert lecture from expert architect, for each project or design.
- To make the student understand the complexity, functioning and salient features of the Integration of function: movement, climate, acoustics, structure and services into the building
- Landscaping and site planning.

DESIGN STUDIO:

Small complexes - concept of multi planning and circulation analysis - massing problems involving building technology, - Design and detailing for movement of physically handicapped and elderly persons within and around buildings.
Examples: Shopping centers (Commercial) Home for aged, Health centers, Nursing homes (institutional), Orphanage homes etc.
Introduction to three-dimensional modeling of spaces using Computer. Costruction and manipulation of three-dimensional building databases, Rendering 3 D images and Presentation techniques.

COURSE OUTCOME:

On successful completion of the course, the students will be able to:

- Acquaint with knowledge base on special characteristics of the build environment in an urban context focusing on site planning and landscape having significant architectural feature.
- Understand the complexity in architectural character of the built environment and respond positively through appropriate use of built form, choice of building materials, structural clarity and services, etc.

REFERENCES:

1. Edward D.Mills, Planning, 4 volumes, Newnes, Butterworths, London, 1976.
2. P&D Act 1995.
3. E and O.E. Planning. Lliffee Books Ltd., London, 1973.
4. National Building Code and Bureau of Indian standard publications.
5. Ed.By.Quentin Pickard RIBA - The Architects' Hand Book - Bladewell Science Ltd. – 2002.
6. De Chiara Callender, Time Saver Standard for Building Types, McGraw-Hills Co., 1973.

Subject: BUILDING MATERIALS & CONSTRUCTION - V		
Code: ART502	**Credits: 6**	**Hours / Week: 6 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 3 hrs**

AIM:

The aim of the topic is to deals with principles, methods and construction practices of structural steel work

OBJECTIVES:

To introduce and expose students to various aspects involving roof coverings

- To introduce the use of steel for construction activity of buildings and structures

COURSE CONTENT:

UNIT–I: ROOF COVERINGS

Introduction, requirements of roof, technical terms, classification, types of roof coverings for pitched roof. Roofing tiles and roofing with cement products like A.C. sheet roofs, G.I. Sheets roofs, slates.

Miscellaneous Materials and treatments: Properties and uses of Asbestos, cork, felt, mica, adhesive, china clay, fiber glass, leather, canvass, jute, rubber, Asphalt and Bitumen

UNIT–II: MATERIALS FOR SPECIAL TREATMENTS

Insulation materials – thermal and sound insulation materials, acoustical treatment, Plastics such as polycarbonates, acrylics, PVC polymer films, FRP – types, properties and uses

UNIT–III: FOUNDATION OF STEEL STRUCTURES

Fabrication, erection, fixing of girders, stanchions, Roofing - Large Span Structure: Steel trusses of different spans, lattice girder, and north light glazing, AC sheet or GI sheet covering. Typical details tubular trusses, basic space frames.

UNIT–IV: INTRODUCTION TO PRE ENGINEERED STRUCTURES

Pre coated corrugated MS sheet roofing-crimping to make different curved roofs. Pre-cast concrete trusses: Advantages over steel trusses, truss with castellated girders, rain water disposal.

UNIT–V: ESCALATORS & ELEVATORS

Introduction to different types of elevators and escalators in structures like apartments, hospitals, shopping malls, airports

COURSE OUTCOME:

On successful completion of the course, the students will be able to:

- To familiarize the method of construction of various roof coverings with different materials, and building components using steel and precast concrete.
- To acquaint themselves with the construction methods of foundation of steel structures and pre-engineered structures
- To gain perspective on the properties of material for special treatments like insulation and acoustic - acrylics, PVC polymer films, FRP.
- To provide knowledge on the selection criteria of elevators and escalators in different building types.

REFERENCE BOOKS

1. Chowdary, K.P. Engineering Materials are used in India, 7th ed. Oxford and IBH Pub. Ltd., New Delhi, 1990.
2. Moxley, R. Mitchell‟s Elementary Building Construction, Technical Press Ltd.
3. W.B. Mackey (vol – II) "Building Construction" ; B.C. Punmia "Engineering Materials"
4. Foster Stround Mitchee "Advanced Building Constructions"
5. Bindera and Arora. Building Construction: Planning Techniques and Methods of Construction, 19th ed. Dhanpat Rai Pub., New Delhi, 2000.
6. McKay J.K. Building Construction Metric Vol. 4, 4th ed. Orient Longman Pvt. Ltd., Mumbai, 2002.
7. Mitchell. Advanced Structures.
8. Rangwala, S.C. Engineering Materials: Material Science, 31st ed. Charotar Pub. House, Anand, 2004.

Subject: CONTEMPORARY ARCHITECTURE		
Code: ART503	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

To provide an understanding and appreciation of Contemporary trends in Indian and Western Architecture in terms of Ideas and directions through the works of outstanding architects.

OBJECTIVES:

- To provide an understanding of architecture from Industrial Revolution to the Modern movement and to study various Movements, Schools, Styles, and Influences.
- To orient the students to various developments in the field of architecture for a greater understanding of trends in contemporary architecture.
- To provide the student an in-depth knowledge of modern design philosophies in the evolution of innovative architectural forms and designs.
- To provide an understanding and appreciation of Contemporary trends in Indian and Western Architecture in terms of Ideas and directions through the works of outstanding architects.

COURSE CONTENT:

UNIT-I: INDUSTRIAL REVOLUTION AND ITS IMPACT
Industrial revolution and its impact on the social, economic and political factors, its effects, new requirements of the society. New Materials and Technologies: Emergence of new building typologies - history of steel, glass and concrete.

UNIT-II: MODERN ARCHITECTURE
Historicism, Modernism, Utilitarianism and Functionalism, The Bauhaus, Organic Modernism, Brutalism, Chicago School, Formalism, Structuralism, Expressionism, Minimalism, Futurism, Postmodernism, Deconstructivism. Arts and crafts movement, Art Nouveau, Art Deco, Monumentalism, Expressionism.

UNIT-III: PHILOSOPHIES AND WORKS OF GREAT MASTERS
Le Corbusier, Frank Lloyd Wright, Walter Gropius, Louis Kahn and Mies Van Der Rohe.

UNIT-IV: PHILOSOPHIES AND WORKS OF INDIAN ARCHITECTS
BV Doshi, Charles Correa, Raj Rewal, Achyut Kanvinde, Uttam Jain, Lauire Baker, Anant Raje.

UNIT-IV: PHILOSOPHIES AND WORKS OF INTERNATIONAL ARCHITECTS
Oscar Niemeyer, Richard Meier, Charles Moore, Norman Foster, Santiago Calatrava,

Renzo Piano, Bernard Tschumi, Frank Gehry, Zaha Hadid, Rem Koolhas, Hassan Fathy, Geoffery Bawa, Richard Rogers, Tadao Ando, I.M. Pei, Kenzo Tange.

COURSE OUTCOME:

On successful completion of the course, the students will be able to:

- To study different architectural movements during Modern Architecture Period and study the styles and impact.
- To familiarise the Contemporary trends in Indian and Western Architecture in terms of Ideas and directions through the works of outstanding architects
- To provide in-depth knowledge of modern design philosophies in the evolution of innovative architectural forms and designs.

TEXT BOOKS:

1. Sir Banister Fletcher, "A History of Architecture", CBS Publications (Indian Edition), 1999.
2. G.K.Hiraskar, "Great Ages of World Architectur", Dhanpat Rai & Sons, Delhi.
3. Spiro Kostof, "A History of Architecture:Setting and Rituals, Oxford University Press, London, 1985
4. Francis D K Ching "Global History of Architecture"
5. Leland M Roth; "Understanding Architecture: Its Elements, History and Meaning"; Craftsman House; 1994.
6. Emily Cole "Grammar of Architecture"

REFERENCES:

1. Bhatt, Vikram and Scriver, Peter. Contemporary Indian Architecture after the Masters. Mapin Pub. Pvt. Ltd., Ahmedabad, 1990.
2. Curtis, J.R. William. Modern Architecture since 1900. Prentice-Hall, Inc., New Jersey, 2002.
3. Jencks, Charles.The Language of Post-Modern Architecture, 4th ed. Academy Editions, London, 1984.
4. Frampton, K Tad Ando- buildings, Projects Writings, New York Rizzoli, 1984.
5. Kenneth Frampton, Modern Architecture: A Critical History, Thames and Hudson, London.
6. Sigfried giedion, Space time and Architecture: The Grwoth of a new tradition, Harvard University Press.
7. Manfredo Taferi / Franceso dal co, Modern Architecture, Faber and Faber/ Electa, 1980.
8. Lang, Desai, Architecture & Independence, Oxford University Press, New Delhi.
9. Sarbjit Bahga et all, Modern Architecture in India, Galgotia Publishing Company, New Delhi.
10. Morgan, Ann Lee & Taylor Colin "Contemporary Architecture" by
11. Bahga, Modern Architecture in India: Post Independence Perspective, Galgotia, 1993, New Delhi.
12. Hugh, Pearman, Contemporary World Architecture, Phaidon Press Ltd, 1998, Minneapolis.

Subject: BUILDING SERVICES – III (HVAC, LIFTS & FIRE SAFETY SERVICES)		
Code: ART504	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

Understand the operations of Lifts & Escalators locations, functions and various equipments used in HVAC and application of Fire fighting NBC norms in complex buildings.

OBJECTIVE:

- To identify the factors responsible for cooling load calculation.
- To classify different types of Air Conditioning systems and their suitability for different psychometric conditions.
- To explain the function of mechanical equipments for vertical transportation (elevators and escalators for buildings).
- To explain the different fire fighting methods to be adopted in buildings.
- To plan buildings as per the fire safety norms.

COURSE CONTENT:

UNIT-I: INTRODUCTION
Scope and impact of Mechanical system- Impact on Building design. Mechanical Services required in Buildings. Role of an Architect regarding mechanical Services

UNIT-II: MECHANICAL EQUIPMENTS FOR VERTICAL TRANSPORTATION
Building design and vertical transportation, Demand for vertical transportation. *Lift and Escalators*: types, uses, functioning, automatic control system, Plans & sections to explain different parts of lifts and escalators. Planning for vertical transportation

UNIT-II: PSYCHOMETRIC PROPERTIES
Psychometric chart & its application summer air conditioning system, winter air conditioning system, and year-round air-conditioning system. Conditions for comfort Control of quality, quantity, temperature and humidity of air.

UNIT-IV: PRINCIPLES OF AIR-CONDITIONING
Refrigeration cycle, Introduction to air conditioning, Indoor Air Quality (IAQ), comfort conditions, A/C equipment, compressor heat exchangers, condenser, evaporators, *Types of Air-conditioning:* single zone, multi zone, window air conditioners, split air conditioners, ductable air conditioners, package system and central air conditioning, all air systems and chilled water systems. A/C plant room, Air Handling Units (AHU's) Building ducting, diffusers and grills, Fan Coil units

UNIT-V: FIRE FIGHTING NORMS (NBC) & EQUIPMENTS

Role and Importance, Fire safety design, planning for fire protection. Fire detection & fire fighting. Different fire fighting methods to be adopted in buildings

COURSE OUTCOME

On successful completion of this course, the student should be able to:

- To understand fire safety design, planning for fire protection
- To acquaint with knowledge base of function of mechanical equipments for air conditioning, vertical transportation (elevators and escalators for buildings)
- To familiarise the principle of psychometric chart & its application.
- To understand and study the application of these equipments in different types of buildings depending on the size and scale.

REFERENCES:

1. Roger W.Haines: HVAC system design handbook.
2. Ananthanarayanan PN: Refrigeration and Air Conditioning.
3. ISHRAE: HVAC hand book
4. Architectural Graphic Standard (HVAC System)
5. National Building code.
6. William.K.Y.Tao; "*Mechanical and electrical Systems in Buildings"*
7. V.P.Lang*," Principles of air conditioning*"
8. Rodney R.Alder *;"Vertical Transportation for Building"* .
9. Lord, Peter and Templetion, Duncan. The Architecture of Sound: Designing.
10. Places of Assembly. Architectural Press Ltd., London, 1986.
11. Egan, David. Architectural Acoustics, MC Graw-Hill Book Ccompany, New York, 1988.

Subject: DESIGN OF RCC STRUCTURES – II		
Code: ART505	**Credits: 3**	**Hours / Week: 3 hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 3 hrs.**

AIM:

This course focuses on structural design of different elements of RCC buildings.

OBJECTIVE:

- To use limit state design for the analysis and design of columns.
- To use the limit state method for design of a concrete staircase.
- To enable the learning of design of structural elements like footings and retaining walls.
- To understand the principle, methods, advantages and disadvantages of pre stressed concrete.
- Case studies and models wherever applicable.

COURSE CONTENT:

UNIT-I: DESIGN OF COLUMNS (8 hrs)
Design of columns subjected to uni-axial and bi-axial moment.

UNIT-II: DESIGN OF STAIR CASE
Introduction to different types of stair case. Design of dog legged stair case.

UNIT-III: DESIGN OF FOOTINGS
Introduction to different types of foundations, Design of Isolated, Combined and strip footing.

UNIT-IV: DESIGN OF RETAINING WALL
Introduction to retaining walls. Design of retaining walls

UNIT-V: INTRODUCTION TO PRESTRESSED CONCRETE
Principle of prestressing – methods of prestressing, advantages and disadvantages. Introduction to pre-tensioning and post tensioning of concrete

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Familiarize the different concepts in designing footings, columns, retaining walls and dog legged staircase using LSD (limit state design) methods.
- Apply concepts of Pre-stressed concrete in real cases.

TEXT BOOKS:

1. A.K.Jain. Reinforced Concrete: Limit State Design, 5th ed. New Chand and Bros., Roorkee, 1999.
2. Ramamrutham. S. and Narayan, R. Design of RCC Structures, 12th ed. Dhanpat Rai swPub. Co. Pvt. Ltd., Delhi, 1998.
3. B.C. Punmia, "Reinforced Concrete Structures", Vol. 1 & 2, Laxmi Publications, Delhi, 2004.

REFERENCES:

1. P. Dayaratnam, "Design of Reinforced Concrete Structures", Oxford and IBH Publishing CO., 1983.
2. N.C.Sinha and S.K.Roy, "Fundamentals of Reinforced Concrete", S.Chand and Co., New Delhi, 1983.
3. Krishna Raj, "Prestressed Concrete Structures", 3rd Edition, Tata McGraw Hill, 2005.

Subject: ENERGY EFFICIENT ARCHITECTURE		
Code: ART506	**Credits: 2**	**Hours / Week: 3 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

To make the student understand the traditional techniques of construction for different climatic zones to make the building energy efficient

OBJECTIVES:

- To trace out evolution of energy conscious buildings and techniques from historic period based on climatic zone of the world.
- To enable students, understand solar geometry and heat transfer mechanism in buildings and energy conservation.
- To familiarize the students with simple techniques for design considerations.

COURSE CONTENT:

UNIT-I: CLIMATE AND SHELTER
Historic buildings - pre-industrial, post-industrial and modern architecture - examples from different climatic zones

UNIT-II: SITE PLANNING AND DEVELOPMENT
Landform - vegetation type and pattern - water bodies open spaces and built spaces – urban scape - design strategies. Significance of Energy Efficiency in the contemporary context, Simple passive design considerations involving Site Conditions, Building Orientation, Plan form and Building Envelope - Heat transfer and thermal performance of walls and roofs

UNIT-III: ADVANCED PASSIVE ARCHITECTURE- PASSIVE HEATING
Direct Gain Thermal Storage of Wall and Roof - Roof Radiation Trap - Solarium - Isolated Gain

UNIT-IV: PASSIVE COOLING
Evaporative Cooling - Nocturnal Radiation cooling - Passive Desiccant Cooling – Induced
Ventilation - Earth Sheltering - Wind Tower - Earth Air Tunnels

UNIT-V: RENEWABLE ENERGIES
Innovation technologies for energy efficiency such as Photo Voltaic Cells, Battery Technology and renewable resources techniques such as solar energy, wind energy etc.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- To acquaint with knowledge on traditional techniques of construction for different climatic zones to make the building energy efficient
- To understand climate responsive historic buildings of pre-industrial, post-industrial and modern architecture from different climatic zones
- Define and apply advanced passive architecture, energy efficiency in the contemporary context and passive design considerations involving Site Conditions

TEXT BOOKS:

1. Manual on Solar Passive Architecture, IIT Mumbai and Mines New Delhi, 1999.
2. Arvind Krishnan & Others, "Climate Responsive Architecture", A Design Handbook for Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2001.
3. Majumdar M, "Energy-efficient Building in India", TERI Press, 2000.
4. Givoni .B, "Passive and Low Energy Cooling of Buildings", Van Nostrand Reinhold, New York, 1994.

REFERENCES:

1. Fuller Moore, "Environmental Control Systems", McGraw Hill INC, New Delhi – 1993.
2. Sophia and Stefan Behling, Solpower, "The Evolution of Solar Architecture", Prestel, NewYork, 1996.
3. Patrick Waterfield, "The Energy Efficient Home: A Complete Guide", Crowood press ltd, 2011.
4. Dean Hawkes, "Energy Efficient Buildings: Architecture, Engineering and Environment", W.W. Norton & Company, 2002.
5. David Johnson, Scott Gibson, "Green from the Ground Up: Sustainable, Healthy and Energy efficient home construction", Taunton Press, 2008.

ELECTIVE – II

Subject: WASTE MANAGEMENT AND RECYCLING		
Code: ARE507-1	**Credits: 2**	**Hours / Week: 2 Hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 Hrs.**

AIM:

To convey waste management practices with a strong reclination towards environment and its alternative applications in the industry.

OBJECTIVES:

To provide knowledge about present practice and current scenario of different types of waste management

- To know about the segregations process and need for recycling
- To provide knowledge about sustainability and its approach
- To study about environment laws, rainwater harvesting, techniques, and alternative energy options

COURSE CONTENT:

UNIT-I: INTRODUCTION
Waste in built environment – Traditional practices of waste Management Current Scenario in India – Categorizations to solid, liquid and gaseous wastes – sectors responsible for waste generation.

UNIT-II: WASTE AND BUILT ENVIRONMENTAL
Solid and Liquid waste from residential and commercial buildings – Environmental significance – segregation and treatment of wastes – Industrial case studies – Experiments in construction industry – demolition – Role of NGOS in waste management.

UNIT-III: ALTERNATIVE BUILDING MATERIALS
Need for recycling industrial – byproducts as alternative building materials – use of fly ash, Furnace slag, Quarry dust, silica fume, waste lime and gypsum – Technology required for manufacturing – specification and application in construction industry.

UNIT-IV: RECYCING OF WASTES
Meaning of sustainable approach – Identification and workability of waste - Concept of recycling Solid and Liquid wastes in building industry – Solid waste recycling, Vermi Composting, Biogas production – Liquid waste recycling methods and practices

UNIT-V: ENVIRONMENTAL MANAGEMENT AND ENERGY OPTIONS

Degradation of environment due to waste – Salient features of environmental laws – Rain water harvesting techniques - Biological and Thermal energy options – Refuse derived fuel and other options.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- To acquaint with knowledge on present practices and current scenario of different types of waste management in India.
- To understand sustainable approaches in waste management
- To apply environmental laws which helps in adopting sustainable design techniques to control degradation of environment.

REFERENCES:

1. Ravindrarajah, R.S, Tam. T.C. Properties of concrete made with crushed concrete a coarse aggregate, - Magazine of concrete Research, Vol-37, and March 1985.
2. Arceivala. S.J., "Wastewater Treatment for pollution Control"- Tata-McGraw Hill, New Delhi, 1986.
3. ERM.UK Municipal Solid waste Management, Study for the MMA-Vol-1 Interim Report, August-1995.
4. R.Ambalavanan and A.Roja "Feasibility Studies on Utilisation of Wastelime, Gypsum with Fly Ash - The Indian concrete Journal – Vol. – 70 Nov-1996.

Subject: FURNITURE AND PRODUCT DESIGN		
Code : ARE507-2	**Credits : 2**	**Hours / Week : 2**
Progressive Marks : 60	**Examination Marks : 40**	**Duration of Exam: 2 hrs.**

AIM:

The course provides a framework in understanding the Theoretical, historical functional and human issues of the subject.

OBJECTIVE:

To impart a comprehensive understanding of the general theory and practice of the subject. To inculcate in student a natural curiosity in allied discipline of design.

COURSE CONTENT:

UNIT–I
Understanding of the functional and formal issues in design – study and evaluation of popular dictums such as "Form follows function", form and function are one", "Less is more", "God is in details" etc. Evaluation of visual design for functional objects. Gestalt theory of design: Law of closure, law of proximity, law of continuity etc.

UNIT–II
Human factors engineering and Ergonomic considerations; Principles of Universal Design and their application in furniture and product design.

UNIT–III
An introduction of various manufacturing processes most frequently adopted in furniture and product design such as, Injection Moulding; investment casting, sheet metal work, die-casting, blow- moulding, vaccum – forming etc

UNIT – IV
Signage and Graphics – Environmental graphics: signage categories and materials.

UNIT – V
A detailed study involving the design aspects of any one of the following: Lifestyle accessories, Luminaire design, a piece of furniture, Point of Purchase design, Signage.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- To acquaint with knowledge on various materials and manufacturing process which helps them in developing creative and convenient furniture designs.
- To understand Principles of Universal Design and their application in furniture and product design.

- To apply ergonomics in designing products with maximum comfort, safety and health
- To acquaint with knowledge on advantage of emerging technologies in the field of interiors and architecture.

REFERENCES

1. Héctor Roqueta. Product design, London: te Neues, 2002.
2. Morley, John. The history of furniture: twenty-five centuries of style and design in the Western tradition, Boston: Little, Brown and Company, 1999.
3. Aronson, Joseph. The Encyclopedia of Furniture, 6thprinting, New York: Crown Pub. 1944.
4. Saville, Laurel. Design secrets: furniture, Gloucester, Mass.: Rockport Publishers, 2006.
5. Datschefski, Edwin. The total beauty of sustainable products, Hove: Rotovision, 2001.
6. Papanek, Victor J. The green imperative: natural design for the real world, New York: Thames and Hudson, 1995.

Subject: ARCHITECTURAL JOURNALISM AND PHOTOGRAPHY		
Code: ARE507-3	**Credits: 2**	**Hours / Week: 2hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs**

AIM:

The Course prepares ground for the students to develop critical thinking and analyzing about the effects of architecture on society as well as the tools to enable recording of the same and develop the skill to create articles/presentation capturing the essence through the photographs.

OBJECTIVES:

- To provide basic introduction to the skills relevant to the practice of professional journalism.
- It introduces students to the fundamentals of writing, explaining of various strategies and their criticism.
- Introduction to Photo journalism and the contributions of photography to the professional practice of architecture and develop proficiency in this art using modern photography techniques.

COURSE CONTENT:

UNIT–I: INTRODUCTION
Introduction to journalism, key concepts and objectives of Journalism – Specialized journalism: with emphasis on architectural journalism - Journalism skills: research, reporting, writing, editing, photography, columnists, public relationships, criticism. Issues such as copyright, public art policy, the arts and urban redevelopment. Introduction to local culture scene.

UNIT–II: TECHNOLOGIES IN JOURNALS
Environment, Social Change, Persuasion- Interviewing techniques, Argument and debate as a technique in the investigation of social problems; evidence, proof, refutation, persuasion; training in argumentative speaking. Introduction to software needed in journalism and photography, video coverage, walk-through of buildings, production of contemporary architectural journalism. Understanding the individual demands in the context of newspapers, radio, film, and television.

UNIT–III: CONTEMPORARY ARCHITECTURAL JOURNALISM
Role of the Editor - Editing of Articles, Features and other stories - Editing for online newspaper and magazines - Text preparation, Mode of presentation, Standards and Guidelines for documentation, Code of ethics, Basic knowledge on Press laws, Press Council of India, Multimedia/online journalism and digital developments.

UNIT–V: INTRODUCTION TO ARCHITECTURAL PHOTOGRAPHY

Introduction to architectural photography, history of architectural photography and role of the photographic image in the global world– basic instruction in Architectural Photography Equipment: cameras and lenses – techniques: film speed, exposure measurement, gray scale–photo- finishing and editing digital images. Perspectives: Single Point, Two- Point, Three- Point and methods of correcting distortions –Lighting: External and Interior. Photographic Practices – Realization, Light and Lighting, Exposure Metering and introduction to RAW format.

UNIT-IV: PHOTO JOURNALISM

Definition of Photo Journalism - Brief History - Photographs as social Documentaries - Birth of modern Photo Journalism since 1950s - visual awareness – visual survey - EDFAT methods in using the camera - Equipment required for Photo Journalism. Photo Journalism in perspective - Snap shots - Advance amateur Photography - Art Photography - Photo Journalism - Approach to Photo Journalism – News Papers and Magazine Design elements: Page make -up - Layout - color scheme - Font - Blurb - Pictures – Ads - Other magazines - Documenting of Places - Rural- Urban - Public relations.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- To acquaint with knowledge on different techniques and processes used in documentation in terms of photography, exploration and research.
- To develop skills in design interpretation, perceptional thinking, and creative writing.

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TEXT BOOKS:

1. De Mare, Eric Samuel. Architectural photography, London: Batsford, 1975.
2. Edward Jay Friedlander and John Lee, “Feature Writing for Newspapers and Magazines”, 4th edition, Longman, 2000.
3. Kopelow, Gerry. How to photograph buildings and interiors, 3rd ed. New York: Princeton Architectural Press, 2002.
4. Fuller, David & Waugh, Patricia eds., “The Arts and Sciences of Criticism”, Oxford: Oxford University Press, 1999.
5. Mohd, Al Asad. Architectural Criticism and Journalism Sommer, Robert. Tom Wolfe on Modern Architecture.
6. Foust, James, Online Journalism, “Principles and Practices of News for the Web”, Holcomb Hathaway Publishers, Scottsdale, AZ, 2005.
7. M. Harris, “Professional Architectural Photography”, Focal Press, 2001.
8. M. Harris, “Professional Interior Photography”, Focal Press, 2002.

REFERENCES:

1. Huckerby, Martin., The Net for Journalists: A Practical Guide to the Internet for Journalists in Developing Countries. UNESCO/Thomson Foundation/ Common wealth Broadcasting Association, 2005.
2. Ward, S. J. A. "Philosophical Foundations of Global Journalism Ethics." Journal of Mass Media Ethics., Vol. 20, No. 1, 3-21, 2005.
3. M. Heinrich, "Basics Architectural photography", Bikhauser Verlag AG, 2008.
4. Gerry Kopelow, "Architectural Photography: the professional way", 2007Busch, Akiko. The photography of architecture: twelve views, New York: Van Nostrand Reinhold Co., 1987.

Subject: COST EFFECTIVE TECHNOLOGY		
Code: ARE507-4	**Credits: 2**	**Hours / Week: 2**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

To expose students into the cost-effective materials and construction techniques.

OBJECTIVE:

To make the students aware of the use of conventional and non-conventional resources for cost effective construction techniques.

COURSE CONTENT:

UNIT–I: INTRODUCTION
Introduction to cost effective buildings construction, techniques, system. Case study of cost-effective building project.

UNIT–II: BUILDING TECHNIQUES
An introduction to the subject to understand the various building techniques adopted in different climatic zones of the country, which resulting in varied vernacular expressions. Use of cost-effective technologies through the use of local materials, up gradation of traditional technologies, prefabrication etc.

UNIT–III: COST EFFECTIVE CONSTRUCTION
Need for cost effective construction, both in the rural and the urban sectors. Innovations of building techniques for cost effective construction. Analysis of space norms for cost effective buildings.

UNIT–IV: COST EFFECTIVE MATERIALS
Concepts of cost-effective materials Soil, Fly ash, Ferro cement, Lime, Fibres, Stone Dust, Boulders and oversize metal, Bitumen etc.

Cost effective building material products: - (a) Walls – Stabilised and sun dried, soil blocks & bricks, Hollow concrete blocks, stone masonry blocks, Ferrocement partitions. (b) Roofs – Precast R.C. Plank & Joists roof, precast channel roof, Precast L-panel roof, Precast Funicular shells, Ferrocement shells, Filler Slab, Seasal Fibre roof, improved country tiles, Thatch roof.

UNIT–V: COST EFFECTIVE CONSTRUCTION TECHNIQUES AND EQUIPMENT
(a) Techniques: - Rat trap bond construction, Precast R.C. and Ferro cement technique, Mud Technology. (b) Equipments: Brick moulding machine, Stablilised soil block making machine and plants for the manufacturing of concrete blocks. (c) Cost effective Roads.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Acquaint with knowledge on cost reduction by using improved skills and technologies without sacrificing quality of structure.
- Gain insight on reduction of energy consumption using different techniques.
- Understand principles of sustainable construction practices by using green / sustainable and locally available materials

REFERENCES:

1. Building System for Low Income Housing - A.K. Jain
2. Low Cost Housing in Developing Countries- G.C. Mathur
3. Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkatta Rama Reddy & K S Nanjunda Rao – New Age International Publishers
4. Integrated Life Cycle Design of Structures – By Asko Sarja – SPON Press
5. Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age International Publishers.
6. Buildings How to Reduce Cost – Laurie Backer - Cost Ford

YEAR III SEMESTER - VI

Subject: ARCHITECTURAL DESIGN - V		
Code: ARS601	**Credits: 12**	**Hours / Week: 12 hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: Jury**

AIM:

To enable student to confidently design large complex buildings and campuses, which involves structural synthesis, effective movement systems, within and around buildings, complying with all rules and regulations demonstrated in at least two large projects. Stress also shall be on making such buildings barrier free in terms of movement and details.

OBJECTIVES:

- Understand the design principle of campus planning and large scale projects
- Designs have to respond to climate environmental and ecological factors. Site planning, landscape details, circulation and services, structural viability and interiors have to be addressed.
- To make the student understand the complexity, functioning and salient features of the design project through organizing field visit, train them to document and present the findings.

DESIGN STUDIO:

Design of large structures - Multiuser, multi-span, multilevel (six to eight floors) - building types involving technology and services – Design and detailing for movement and use by physically handicapped people within and around building.

Examples: Institutional, Resorts, IT hubs, Recreational - Mixed use Developments etc.
-Working drawings for any one design Using Computer for presentation Skills

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Acquaint with knowledge on the basic functional aspect of designing complex building types, its relevant site planning and spatial organization.
- Understand different building byelaws, standards and apply the same in designing.
- Gain insight on vertical planning and services of high-rise buildings

REFERENCES:

1. Ed.By.Quentin Pickard RIBA - The Architects' Hand Book - Bladewell Science Ltd. – 2002.
2. De Chiara Callender, Time Saver Standard for Building Types, McGraw-Hills Co., 1973.
3. Edward D.Mills, Planning, 4 volumes, Newnes, Butterworths, London, 1976. P&D Act 1995.
4. E and O.E. Planning. Lliffee Books Ltd., London, 1973.
5. National Building Code and Bureau of Indian standard publication

Subject: Working Drawing & Detailing		
Code: ART602	**Credits: 3**	**Hours / Week: 6 hrs**
Progressive Marks: 100		

AIM:

The aim is to impart skills related to the preparation of drawings meant for construction work on the site and to improve the students' ability of detailing.

OBJECTIVES:

- To impart training in the preparation of working drawings for buildings with specific reference to code of practice as per IS Code No. 962 of 1969 and incorporating specifications as complementary to the working drawings.
- To sensitize the students in preparing finer design details required for buildings.

COURSE CONTENT:

UNIT–I: FLOOR PLANS
Preparation of working drawings: Suitable scales of drawings, methods of giving dimensions: on plans, sections, elevations and other standards. Preparation of Plans Building marking plan, centerline plan, foundation plan, column centerlines drawings, floor plans, terrace floor plan.

UNIT–II: ELEVATIONS AND SECTIONS
Elevation and Sections, Detailed elevations, detailed sections, at least one through staircase and one through toilet, typical wall profile sections and elevations

UNIT–III: LAYOUTS
Furniture Layout, Electrical Layout, Sanitation and Water supply Layout

UNIT–IV: BUILDING COMPONENT DETAILS
Detailing of architectural elements such as staircase, balcony and verandah, shading devices vertical and horizontal components of the building

UNIT-V: DETAILS
Detailing of Doors, windows, and detailed plans, staircases, toilets and kitchens other fixing details, Compound walls, Grills and Balcony railing

NOTE: The above drawings need to be prepared for one design project of any semester handled in an earlier Architectural design studio.
The drawings need to be prepared using any of the CAD techniques and final presentation to be submitted as a hardcopy.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Familiarize with the drawings which are prepared for the actual construction/ execution of the buildings.
- Gain insight on types of technical drawings which are used in the construction and architecture process.
- Produce architectural drawings with the appropriate standards, symbols and conventions for building construction.

REFERENCES

1. Lerrs, Jack. Engineering Construction Specification.
2. Liebing, W. Ralph and Raul, Ford Mimi. Architectural Working Drawings, 2nd ed. John Wiley and Sons, New York, 1983.
3. Macey, W. Frank. Specification in Detail, 5th ed. Technical Press ltd, London, 1955.
4. Shah, M.G., and Others. Building Drawing: with an integrated approach to build environment, 3rd ed. Tata McGraw Hill Pub., co. Ltd, New Delhi,1996.
5. Lewis, R. Jack. Building Construction Specifications. Prentice-Hall, Inc., New Jersey, 1975.
6. Govt. of Maharashtra. Standard Specifications, Government Press, Nagpur, 1972.
7. Datta, B.N. Estimating and Costing in Civil Engineering: Theory and Practice, 23rd ed. UBS Pub. New Delhi, 1993.
8. Wakita, Osamu A. & Linde, Richard M. The professional practice of architectural detailing, 2nd ed. New York: Wiley, 1987.
9. Robert, C. Mc Hugh. Working Drawing Hand Book, New York: VNR, 1977.

Subject: Ecology and Landscape		
Code: ART603	**Credits: 2**	**Hours / Week: 3 hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: 2 Hrs**

AIM:

This course introduces students to landscape design and site planning and relate it to design and planning of built environments. It provides an overview of development of landscape design, site studies, plant studies and application of the knowledge at various levels of design.

OBJECTIVES:

- To develop a conceptual understanding of landscape design and site planning principles.
- To develop skills in integrating landscape design with built environments.

COURSE CONTENT:

UNIT–I: INTRODUCTION & EVOLUTION

Introduction to landscape Architecture and Role of Landscape design in built environment.

Introduction and History of Landscape Architecture. A brief review of Landscape Design and garden design in history in various regions Persian, Spanish, Italian, French, Moghul, English, Japanese Garden styles. Changing perception of mans relationship with nature in various phases of history and its influence on environment.

Evolution of concepts in landscape design after the industrial revolution leading to new theories in integrating built spaces to open spaces. Increasing awareness of ecological variables in landscape design.

UNIT-II: SITE PLANNING & PHILOSOPHIES

Site Studies and Site Planning Principles of site Planning and land use; review of definition applied in typical landscape development situations. Site survey and appraisal – understanding different site characteristics – topography, vegetation, Hydrology, Access, Surroundings etc. documents, site characteristics and establishing relationship with design / Architecture programme requirements. Role of landscape components in modifying micro climate with respect to temperature, humidity, precipitation and percolation. Philosophical and design issues related to site development – sitting of buildings, spatial and contextual relationships of built and outdoor space and circulation, site and its relationship to surroundings. Importance of climate and social factors in development of site. Process of design development. Identifying functional requirements of site. Development of site by mutual exploitation of forms and use of grading principles.

UNIT-III: PLANTS & DESIGN

Plants and Design - Introduction to study of plants in relation to landscape design and architecture. An overview of use of plants in history. Study of Plant material – Botanical Nomenclature anatomy and physiology of plant growth study of trees, shrubs, ground cover, indoor plants in Indian context.

Design with plants – Basic principles of designs. The physical attribute of plants and relation to design. Appearance, functional and visual effects of plants in landscape design and built environment, Selection and management of plant material in relation to built environment.

UNIT–IV: ELEMENTS OF LANDSCAPE DESIGN

Elements in Landscape Design - Use of landform, water and vegetation in landscape design. Hard landscapes: design of paths, roadways streets, terraces etc and use of land form effectively. Soft landscapes: design of lawns, shrubs, hedges, trees – in relation to buildings and other landscape elements.

Design concepts related to use of sculpture, outdoor lightings, Architectural feature, street furniture and grouping them into meaningful compositions for visual and functional effects.

UNIT–V: LANDSCAPE CONSTRUCTION & SERVICES

Landscape Construction and Services - Study of landform its technical expression through grading plan, sections and earthwork computations. Irrigation systems – sprinkler trickle irrigation, drip irrigation and laying irrigation networks. Construction of structure in landscape circulation roads, parking, paths, level changes – walls, steps lamps, construction of screens, trellis, wall fences gales decks, pools etc.

UNIT–VI: CONTEMPORARY & INTERIOR LANDSCAPE DESIGNS

Contemporary concepts and concerns Contemporary attitude to development and design of open spaces – Urban landscape, Parks, Rural landscape etc. Introduction to concepts of green architecture and micro climate planning.

Interior landscape architecture: Interior landscapes in historical perspective. Indoor planting design considerations: criteria for selection of plants, texture, colour, habits and height. Use and behaviour of plants in interiors, Interior courtyards, etc.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Acquaint with knowledge on elements of landscape and the scope of landscape architecture in practice
- Understand the impact of human activities on the environment and the role of architect in mitigating it
- Develop and strengthen the competence in dealing with the analytic, artistic and technical aspects of designing open spaces at different scales..
- To develop design integrating landscape design with built environments with large scale projects and master planning

EXERCISES:

Each unit can entail a small design studio exercise so that the students can get better understanding of the topics or any other relevant exercises appropriately framed by the subject faculty.
For example:
Unit I – Study the different influences of historical gardens in modern day landscapes
Unit II – Document the site analysis for a large-scale project like an institution or office building and propose a master plan.
Unit III – Design a garden only using plant material in various climatic conditions and zones
Unit IV – Design a terrace garden or roof garden using the various elements only
Unit V – Grading exercise to create a natural looking water body.

REFERENCES:

1. Michael Laurie, *an Introduction to Landscape Architecture*, Elsevier, 1986.
2. Geoffrey and Susan Jellicoe, *the Landscape of Man,* Thames and Hudson, 1987.
3. TSS for *Landscape Architecture*, Mc Graw Hill, Inc, 1995
4. Grant W Reid, From Concept to Form in *Landscape Design*, Van Nostrand Reinhold Company, 1993.
5. Brian Hacket, *Planting Design*
6. T.K. Bose and Chowdhury, *Tropical Garden Plants in Colour*, Horticulture and Allied Publishers, Calcutta, 1991.
7. Ian McHarg, *Design with Nature*, 1996

Subject: DESIGN OF STEEL STRUCTURES		
Code: ART604	**Credits: 3**	**Hours / Week: 3 hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 3 hrs**

AIM:

To understand the Structural Design of different elements of Industrial Building in Steel

OBJECTIVES:

- To enable the understanding of the types, efficiency and strength, advantages and disadvantages of Rivet and welded joints in steel.
- Students will get to know about various member connections.
- Case studies and models wherever applicable.

COURSE CONTENT:

UNIT-I: STEEL ROOF TRUSSES
Types of roof trusses – Selection of trusses according to the span – Estimation of gravity loads and wind loads – Use of BIS and book SP-38 in analyzing and design of trusses – gusseted plate connections. (Theory Only)

UNIT-II: DESIGN OF FASTENINGS
Design of bracket connection, Riveted and Welded connection

UNIT-III: DESIGN OF PURLINS
Design of Purlins considering dead load, live load, snow load and wind load

UNIT-IV: ARCHITECTURAL DRAWINGS OF STEEL STRUCTURES
Beam to beam members, Beam to column members, Steel column footing.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Design Tension members for various conditions by applying the IS code provisions.
- Design the steel joints for maximum efficiency and strength.
- Design purlins considering various loads.

TEXT BOOKS:

1. **Ram Chandra**. Design of Steel Structures Vol. I, 10th ed. Standard Book House, Delhi, 1999.
2. **Dayaratnam, P.** Design of Steel Structures. Wheeler Pub., Allahabad, 1992.

3. **Ramamrutham, S. and Narayanan, R.** Design of Steel Structures, 4th ed. Dhanpat Rai and Sons, Delhi, 1995.
4. **N. Subramanian,** "Design of Steel Structures", Oxford Higher Education, 2008

REFERENCES:

1. **S.K. Duggal,** "Limit State Design of Steel Structures", McGraw Hill Education, Private Limited, 2010.
2. **Dr. V. L. Shah,** Prof. Veena Gore, "Structures Publications", Pune, 2012.
3. **S.S. Bhavikatti,** "Design of Steel Structures" by Limit State Method as per IS800-2007, I.K. International Publishing House Pvt, Ltd, 2012.
4. **IS** (Indian Standard codes).

Subject: ESTIMATION, COSTING & VALUATION		
Code: ART605	**Credits: 2**	**Hours / Week: 3Hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs**

AIM:

To provide the in-depth knowledge about various methods of quality surveying, rates analysis of building and valuation and specifications for different materials used.

OBJECTIVES:

- To provide the knowledge about importance of specification, how to write specification – important aspects of the design of a specification.
- To know the concept of abstract and detailed estimates based on measurement of materials and works.
- To provide knowledge about cost control and about valuation and depreciation
- Writing feasibility report of a project.

COURSE CONTENT:

UNIT-I: SPECIFICATION
Definition, purpose and importance of specifications, General or brief specifications, Detailed specifications, writing of specifications, for items like earthwork excavations, foundation, CRS masonry, DPC, PCC, RCC, brickwork, doors and windows (wooden), mortars, plaster, painting, flooring like terrazzo flooring and tiles, ceramic tiles, marble, granite, distemper, snowem, glazing, specification, writing to include materials, tests pre and post installation, modes of measurements.

UNIT-II: ESTIMATION
Types & purpose, approximate estimate of buildings – Bill of quality, factors to be considered, Principles of measurement and billing, contingencies, measurement of basic materials like brick, Wood, concrete and unit of measurement for various items of work – abstract of an estimate.

UNIT-III: DETAILED ESTIMATE
Deriving detailed quantity estimates for various items of work of a building. Like earthwork excavation, brick work, plain cement concrete, Reinforced cement concrete works, wood work, iron works, plastering, painting, flooring, weathering course for a single storied building.

UNIT-IV: RATE ANALYSIS
Cost of materials and labour for various works, data sheet for different items of works, different methods of execution i.e. piece work, daily basis, lump sum, labour rates and percentage etc.

UNIT-V: VALUATION

Introduction- state the purposes of valuation of building explain the terms, market value, book value, capital cost, capitalized cost, years of purchase, list out various methods of estimating the depreciation of building properties, calculate the value of the property by different methods.Methods of contracting and its link to specification drafting - the Business Environment and the Structure in practice.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Prepare detailed material specification for building construction.
- Prepare detailed /approximate estimate for small scale building projects and affordable housing.
- Acquaint with knowledge on rate analysis of materials, labour for various works, valuation and depreciation.

TEXT BOOK:

1. S.C. Rangwala, "Estimating, Costing and Valuation(Professional practice)", 1984
2. B.W. Dutta, "Estimating & Costing" (Revised by S. Dutta), UBS Publishers Distribution P.Ltd. India, 1983
3. M. Chakraborti, "Estimating Costing and Specification", 1984
4. Gurcharan singh & Jagdish singh, "Estimating Costing and Valuation", Standard Publishers Distributors, 2012

REFERENCES:

1. T.N. Building practice, Vol:1 Civil Govt Publication.
2. PWD Standard Specifications. Govt Publication, 2012.

ELECTIVE-III

Subject: Sustainable Architecture		
Code: ARE606-1	**Credits: 2**	**Hours / Week: 2 hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam: 2 Hrs**

AIM:

To make the student understand the challenges, strategies of sustainability, materials to use and future trend for sustainable development.

OBJECTIVES:

- To inform the need to use alternative sources of energy in view of the depleting resources and climate change.
- To familiarize the students with simple and passive design considerations
- To inform about the importance of day lighting and natural ventilation in building design
- To make the students aware of the future trends in creating sustainable built environment.

UNIT-I: INTRODUCTION TO SUSTAINABLE ARCHITECTURE
Definition of sustainable architecture, need, scope & study of, Natural resources & their interrelationship, Historical Perspective: Natural & Physiological factors influencing human civilizations & Settlements

UNIT-II: CHALLENGE OF SUSTAINABLE DEVELOPMENT
Introduction to sustainability, its historical precedence global & local relevance - its correlation to population growth & consumption patterns Human Impact on Earth sustainability: Impact of human civilization on the earth's major ecosystem forests, oceans, & atmosphere;

UNIT-III: STRATEGIES FOR SUSTAINABILITY
Principles of conservation & efficiency as applied to space, energy and material resources; Global treaties & action plans; sustainable role models such as eco-villages; environmental education

UNIT-IV: SUSTAINABILITY APPLICATIONS TO ARCHITECTURE AND PLANNING
Sustainable Architecture and Planning. Preserving and improving the human settlement in harmony with nature. Conservation of natural resource for improving the quality of life on earth and attempting to ensure its continuity for the future of humanity. Eco cities, eco-communities and eco buildings: Archeology. Designing settlements and other man-made eco-systems. Ecological and environmental cities for sustainable future.

UNIT-V: USE OF SUSTAINABLE MATERIALS

Interior materials Green materials and Construction Technology Insulation, paint, wiring; Smart building systems, Technical Standards & Certifications systems: Types of certification systems worldwide – LEEDS, BREEAM, ECOTEL, GREEN GLOBE, ENERGY STAR etc.

UNIT-VI: CONTEMPORARY AND FUTURE TRENDS

Areas for innovation in improving energy efficiency such as Photo Voltaic Cells, Battery Technology, Thermal Energy Storage, Recycled and Reusable Building materials, Nanotechnology, smart materials, and the future of built environment, Energy Conservation Building code.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Expose to alternative sources of energy and to passive design considerations
- Familiarize principles of day lighting and natural ventilation in building design
- Acquaint with knowledge of sustainable architecture examples of various local, national and global project through case studies.

REFERENCES:

1. Fuller Moore, Environmental Control Systems, McGraw-Hill, Inc., New Delhi, 1993.
2. Climatically Responsive Energy Efficient Architecture, PLEA/SPA, New Delhi - 1995.
3. Ms.Sudha, N.K.Bansal and M.A.S.Malik - Solar Passive Building - Pergamon Press.
4. V.Gupta - Energy and Habitat - Wiley Eastern Limited, New Delhi.
5. Donald Watson, Climatic Building Design.
6. PLEA SPA - Climatically Responsive Energy Efficient Architecture - New Delhi - 1995.
7. A.Konya, Design Primer for Hot Climates, Architectural Press, London, 1980.

WEBSITES

www.terin.org/
http://solstice.crest.org/efficiency/index.shtml
http://www.envinst.conu.edu/~envinst/research/built.html

Subject: CONSTITUTION OF INDIA		
Code: ARE606-2	**Credits: 2**	**Hours / Week: 2 hrs.**
Progressive Marks: 60	**Examination Marks: 40**	**Duration of Exam: 2 hrs.**

AIM:

To make students to understand the constitution of Indian- various functions and role of important authorities

OBJECTIVE:

Introduction to the Constitution of India

COURSE CONTENT:

UNIT-I: EVOLUTION OF CONSTITUTION OF INDIA
Preamble to the Constitution of India – Evolution of Constitutional Law. Scope and Extent of Fundamental Rights under Part III – Details of Exercises of Rights, Limitations and Important Cases

UNIT-II: DIRECTIVE PRINCIPLES OF STATE POLICY
Relevance of Directive Principles of State Policy under Part IV.
Significance of Fundamental Duties under part IV (a)

UNIT-III: ROLES AND FUNCTIONS OF AUTHORITIES
Union Executive, President, Vice-President, Prime Minister, Council of Ministers, Parliament and Supreme Court of India. State Executive, Governor, Chief Minister, Council of Ministers, Legislature and High Courts. Constitutional provisions for scheduled castes and tribes; women and children and backward classes.

UNIT-IV:
Emergency Powers, Major Constitutional Amendments.

UNIT-V:
Electoral Process

COURSE OUTCOME:
. On successful completion of this course, the student should be able to:

- Understand the constitutional laws of India enabling the students to enhance the knowledge of fundamental rights of citizen
- Distinguish the role and importance of different authorities.
- Acquaint the significance of Fundamental Duties.

REFERENCE BOOKS:

1. "Introduction to the Constitution of India (Student Edition)" by Durga Das Basu
2. "Constitution of India – Latest Edition" by VN shukla

Subject : Theory of Design		
Code : ARE606-3	**Credits : 2**	**Hours / Week: 2 hrs**
Progressive Marks : 60	**Examination Marks : 40**	**Mode of Exam : 2 Hrs**

AIM:

The courses in design theory aim to evolve a conceptual framework for intelligent appreciation of Architecture and to develop a vocabulary for discussing design ideas.

OBJECTIVES:

- To understand design and the role of the designer in changing society.
- To familiarize the students with methodologies, theories and models of the design process.
- To inform students about the term creativity and introduce techniques which will enable creative thinking.
- To inform the approaches to generate ideas for architectural design and the importance of the participatory approach to design.

COURSE CONTENT:

UNIT-I: INTRODUCTION TO DESIGN
Definition and understanding of design- design in history - changing role of designer on society -different classifications of design according to scale, process, mode of production, etc.

UNIT-II: DESIGN METHODOLOGY MOVEMENTS
Context for the rise of the design methodology movement- theories of the first generation and the second-generation design methodologists- various models of the design process- focus on the design problem: ideas of escalation/regression and wicked problem.

UNIT-III: CREATIVE THINKING
Understanding the term creativity- theories on thinking: left brain/ right brain, convergent and divergent thinking, lateral and vertical thinking- design spectrum from the logical to chance - Blocks in creative thinking- various techniques to generate creativity

UNIT-IV: ARCHITECTURAL CREATIVITY
Design puzzles and traps - approaches to generate ideas for architectural design - types of Concepts - personal philosophies and strategies of individual designers - channels to creativity in architecture. Value judgments in design. Appreciation of designer skills, theories of perception and variability of perception

UNIT-V: DESIGN AND PEOPLE
Concept of pattern language- participatory approach to design - design as process

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Acquaint with methodologies, theories and models of the design process.
- Address contemporary issues in an independent and creative way.
- Acquaint with the techniques of creative thinking

TEXT BOOKS:

1. Geoffrey Broadbent, "Design in Architecture, Architecture and the Human sciences", John Wiley & Sons, New York, 1981.
2. Bryan Lawson, "How Designers Think", Architectural Press Ltd., London, 1980.
3. Anthony Antoniades, "Poetics of architecture", Theory of design, John Wiley & sons, 1992.
4. Paul - Alan Johnson, "Theory of Architecture: Concepts, Themes", Wiley 2008 VNR, 1994
5. Christopher Alexander, "Pattern Language", Oxford University Press, 1977

REFERENCES

1. Edward De Bono, "Lateral Thinking", Penguin, 1990.
2. Christopher Jones "Design methods", Wiley, 1980.
3. Tom Heath, "Method in Architecture, John Wiley & Sons, New York, 1984.
4. Nigel Cross, "Developments in Design Methodology", John Wiley & Sons, 1984.
5. Helen Marie Evans, Dumesnil, Carla Davis, "An Invitation to Design", Macmillan Publishing Co., New York, 1982.

Subject: Structure and Architecture		
Code: ARE606-4	**Credits: 2**	**Hours / Week: 2 hrs**
Progressive Marks: 60	**Examination Marks: 40**	**Mode of Exam : 2 Hrs**

AIM:

To study the structural construction methods during industrial era, present and future trends in different regions of world.

OBJECTIVES:

- To study evolution of structural systems through history.
- To familiarize the students with concepts of structural design through works of architects/ engineers.
- To study architectural expression through relevant case studied.
- To evaluate the understanding of the relationship between form & structure through a seminar.

COURSE CONTENT:

UNIT-I: HISTORY OF STRUCTURAL DESIGN IN THE PRE-INDUSTRIAL ERA

Development of monolithic and rock cut structures- trabeated construction-arcuate construction Vaults and flying buttresses- tents and masted structures and bridges through ancient and medieval history.

UNIT-II: HISTORY OF STRUCTURAL DESIGN IN THE POST-INDUSTRIAL PERIOD

Post Industrial modular construction of large span and suspension structures in steel and concrete- projects of Pier Nuigi Nervi, Maillart, Candella, Buckminster Fuller and Eero Saarinen.

UNIT-III: CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – I

The select case studies could include KCR Terminal at Hung Hom, Hong Kong, B3 Offices in Stockley Park, Sainsbury Centre for Visual Art, Renault Centre and Swindon UK by Normal Foster and Standsted Airport Terminal, London, UK by Fosters/Arup British Pavilion EXPO 1992, Seville, Spain and Waterloo International Terminal by Nicholas Grimshaw

UNIT-IV: CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – II

The select case studies could include Inmos Microchip Factory, Centre Commercial St. Herbtain, PA Technology, Princeton and Fleetguard, Quimper UK by Richard Rogers Athens Olympic Stadium and Village, Bridges and Public Bus Stop in St. Gallen , Railway Station, Lyon, France and Stadelhofen Railway station, Zurich Schweiz by Santiago Calatrava Kansai International Airport, UNESCO Workshop, the Jean-Marie Tjibaou Cultural Center, Menil

Museum, Thomson Optronics Factory, IBM Traveling Exhibition Pavilion, Columbus International Exposition, Genoa Italy and Lowara Officers, Montecchio Maggiore Italia by Reno Piano Building Workshop

UNIT-V: SEMINAR

Seminar to present a study of architectural form and structural expression through select cases which will aid understanding of structural philosophy and analysis, building envelope and services and construction sequence.

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

- Acquaint with knowledge principles of building envelope design and construction sequence.
- Understand and familiarize the concepts of structural design and its impact/ functional dimension in the architectural design of the historic and contemporary buildings.
- Acquaint with the architectural expression, its relation between form and structure through relevant case studies.

TEXT BOOKS:

1. Shigeru Ban,McQuaid, Matilda, Engineering and Architecture: Building the Japan Pavilion, Phaidon Press Ltd, UK, 2008
2. Cox Architects, The images publishing group, Australia, 2000
3. Masted structures in architecture, James B Harris, architect. Kevin Pui-K Li, Oxford; Boston: Architectural Press, 2003

REFERENCES:

1. Martorell, Bohigas & Mackay, Pavilion of the Future, Expo 92, Seville (MBM), 1992.
2. P. COX, Daring Harbour Expo Center, Sydney Australia
3. Enric Miralle & Carme Pinos, Olympic Archery Building, 857072 COH
4. Prada Aoyama Tokyo Herzog & De Meuron. Milan,IT: Progetto Prada Arte Srl, 2003
5. Christopher Beorkrem, Material Strategies in Digital Fabrication, Routledge,Taylor & Francis Group, 2013

YEAR 4 SEMESTER –VII

Subject: PROFESSIONAL TRAINING		
Code: ARS 701	**Credits: 10**	**Hours / Week: Office Training**
Examination Marks: 40		**Mode of Exam: Jury**

COURSE CONTENT:

- Professional training is for a period of 16 weeks.
- Students are required to gain placements under an Architect / Architectural firm, who is registered with the Council of Architecture at least for a period of 5-8 years. The training coordinator will help streamline this process.
- The college will guide the students towards placement and interact with the architectural firms while introducing the student.
- Students will maintain a log-book for recording their studio works, participation in the office on a daily basis. The log book shall be signed by the Architect / Firm at the end of the tenure.
- Upon end of tenure, students should follow up to receive certificate of internship from the office.
- The student is expected to be exposed to preparation of working drawing, detailing, preparation of architectural models, computer applications in design and drafting, filing system in respect of documents, drawing and preparation of tender documents.
- A jury will evaluate the student's works at the end of the semester. Students should present details of work and projects that they have been involved in the office. Clear representation of involvement is to be made known.

Evaluation Criteria

- **Training Report**: This shall contain copies of various drawings done by the student either drafted or designed. It shall also contain other works like photographs of sites visited, models done, computer output produced etc.,

- **Building Study**: A critical appraisal of any ONE project from the training office, a building of the student's choice (after getting necessary approval for the same from the office and occupants/clients), preferably completed and occupied. Report to include documentation and an interview with the Architect and Design team. Analysis to include how the project was initiated, how the programmatic strategies were evolved, revised and finalised, changes that happened from inception to completion. Architectural studies to include functional analysis, influences and responses of statutory rules, climatic & contextual influences, form and space, choice of materials, building systems, agencies involved and the coordination that took place. A chapter to include the experiential quality of the building and reactions from the users/occupants.

- **Building Material Study**: A detailed study of one building material / construction type OR a building system OR an innovative product for the building. (Submission for the semester-end review).

- **Detailing study:** This shall be a study of any interesting detail done in the firm where the student has undertaken training. This shall include sketches and photographs of the detail.

COURSE OUTCOME:

On successful completion of the professional training the student will be able to:

- Acquaint to the working processes of an architectural firm
- Gain knowledge on preparation of drawings for different project typologies at various stages of the project like conceptual, schematic, sanctioning tendering and execution … etc.
- Familiarize with the processes of project coordination with client consultants and site supervision.

NOTES:

- Professional Training should be carried out in a single firm for a period of 16 weeks.
- Student's choice of the architectural firm should be approved by the Department and the HoD.
- The detailed report and drawings prepared during Practical Training by students will be evaluated at a viva-voce by a jury consisting of one external, one internal and head of the department or his nominee.
- After submission of the report the department at its convenience will arrange for the conduct of the viva-voce examination.
- The professional training report shall be submitted to the Department with a day to day record authorized by the Architect prior to external viva-voce
- A candidate failing in the viva examination shall repeat the training afresh for 16 weeks, the starting date coinciding with the beginning of the next successive year.
- After the successful completion of the training, the student has to submit Joining letter, monthly progressive report, completion certificate, portfolio containing works done during the training period. The works to be attested by the Architect/ firm.

YEAR-4 SEMESTER-VIII

Subject: ARCHITECTURAL DESIGN - VI		
Code: ARS 801	**Credits: 16**	**Hours / Week: 16 hrs.**
Progressive Marks: 100	**Examination Marks: 100**	**Mode of Exam: Jury**

AIM

Expose the students to understand the socio – cultural & economic needs of contemporary urban society in housing and the complexity of designing the large campus buildings.

CONTENT:

Scale and Complexity: Buildings and small complexes that address the social and cultural needs of contemporary urban life (residential. Commercial, institutional) with a thrust on experiential qualities; multi bayed, multiple storied and circulation intensive; passive and active energy Areas of concern/ focus behavioral aspects and user satisfaction

- Socio-cultural aspects
- Designing for the differently abled
- Building byelaws and rules
- Appropriate materials and construction techniques
- Climatic design

Typology/ project:

Housing Projects- detached, semi-detached, row housing, cluster housing, apartment; housing and facilities for other user groups- Old age Home, orphanage; Museum/ Art/ Cultural center, Educational campuses (Medical, Engineering, Universities etc.), Malls, etc. Understanding DCR and its applications

- Understanding Campus Planning
- Sensitive to Socio-Economic aspects

COURSE OUTCOME:

On successful completion of the student will be able to:

- Gain knowledge on current scenario of socio – cultural & economic aspects of contemporary urban society in housing and large campus buildings.
- Familiarize with the changing scenario of Housing Projects and Educational campuses and its implication w.r.t. climate responsive inclusive design.
- Acquaint the student with Building byelaws and rules, legal framework, DCR and its applications housing and campus planning projects.

REFERENCES

1. Richard P. Dober, “Campus Planning” - Society for College and University Planning, 1996.
2. Kanvinde, “Campus design in India”, American year Book, 1969
3. Kevin Lynch, “Site planning”, Literary Licensing, LLC, 2012
4. Sam F. Miller, “Design Process: A Primer for Architectural and Interior Design”, Van Nostrand Reinhold, 1995
5. Bye-Laws of the Local Planning Authority
6. Neufert, Ernst. Ernst Neufert Architects Data, Granada Pub. Ltd., London, 1970.
7. Chiara Joseph de and others. Time Savers Standards of Building Types. McGraw – Hill, 1980.

Subject: Professional Practice and Ethics		
Code: ART 802	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs.**

OBJECTIVE:

To understand the Professional responsibilities within the ambit of laws of the land, building codes, contract documents and ethics.
To gain insight into valuation, arbitration and building bye laws.

COURSE CONTENT:

Unit I: The Architect's registration Act. 1972, Salient features of Act- Role of Professional Bodies: Council of Architecture and Indian Institute of Architects. Ethics and etiquette of a professional, Professional duties and responsibilities- conditions of engagement and scale of Charges, setting up of an Office, need for good communication practices, Architectural competitions- Rules and regulations, copyright protection, Professional liability, Consumer Protection Acts and its implication, Elementary accounting Principles.

Unit II: Construction Contracts, Duties responsibilities of parties involved in contract, Concept of primacy of Contract. Contract- Indian Contract law- salient features, Termination of contract- Breach of contract, Conditions and compensation.

Unit III: "Tender- Inviting notices, Opening and acceptance of tender, Preparation of schedule and documents, Type of Tenders.

Unit IV: Arbitration -Definitions, Advantages and disadvantages, Power and duties of Architect, Role of Architect in Arbitration, Award publication and filing of award.

Unit V: Building byelaws, Fire regulations and salient portions from National Building code.

COURSE OUTCOME:

This course is intended to introduce the students to the Professional responsibilities, duties and ethics of architectural practice.
On successful completion of the student will be able to:

- Gain insight to the student with respect tender, contracts, arbitration, architectural awards and competitions.
- Familiarize students with the various types of architectural firms and role of an architect in the execution of various scales of projects.
- Acquaint the student with various acts, building byelaws/regulations from NBC and role of Professional Bodies in the conduct of architecture as a profession in India.

REFERENCES

1.Krishnamurthy K G and Ravindra S V, Professional practice - Prentice Hall India Learning Private Limited (2014)

2. Prof. S.C.Garg & Dr. Yogesh K.Garg, Professional Practice of Architecture - Satya Prakashan, New Delhi; 2014 edition

3. Nanavati, Roshan, Professional Practice: With Elements of Estimating, Valuation, Contract and Arbitration - Lakhani Book Depot; First edition (2016)

Subject: URBAN PLANNING		
Code: ART803	**Credits: 3**	**Hours / Week: 3 hrs**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs**

COURSE OVERVIEW:

Urban planning (urban, city, and town planning) is a technical and political process concerned with the control of the use of land and design of the urban environment, including transportation networks, to guide and ensure the orderly development if settlements and communications. It concerns itself with research and analysis, strategic thinking, urban design, public consultation, policy recommendations, implementation and management.

COURSE CONTENT:

Unit 1: History of town planning
History of town planning: Development of town planning in the historical perspective – Ancient town patterns in India, Impact of industrialization and technology – Evolution of modern planning concepts.

Unit 2: Planning Principles
Planning principles and concepts – enunciated by Patrick Geddes, Ebenezer Howard, Clarence Arthur Perry, Le- Corbusier, Dioxides – their relevance to Indian conditions. Study on radburn layout, satellite towns, Ribbon development and basic concepts in regional planning.

Unit 3: Urban Form
Components of an urban settlement – Land use, zoning, zoning regulation and activity pattern, traffic and road network, density of population and population distribution. Central business district, suburbs and fringe areas. Planning remedial measures of various parts of the urban settlements particularly the CBD and old parts of the settlement.

Unit 4: Planning process
Process of preparation of Master plans and development plans – structure plans – survey techniques and analysis of the various criteria involved in town planning.

Unit 5: Transportation and communication
Principles of planning and design of road network and engineering classification of roads, intersections and elevated roads. Potential and limitations of roadways, railways, airways and waterways in the development of a settlement.

COURSE OUTCOME :

This course is intended to introduce the students to Urban planning and its importance for orderly development of settlements and communications

- To give comprehensive understanding on history of town planning, planning processes and principles.

- To familiarize students with the interdisciplinary role of architecture and provide knowledge base of the emerging theories of Planning process and Transportation and communication
- To equip the preparation and functions of Master plans and development plans which are contextually sensitive to urban environment.

REFERENCE BOOKS:

1. Bhagiratha Rao, E.L.Land Acquisition Manual in Andhra Pradesh.
2. Buch, N. Mahesh. Planning the Indian city.
3. Chand, Mahesh &Puri, Vinay Kumar. Regional Planning in India. Allied Pub. Ltd., Bombay, 1990.
4. Doxiadis, C.L. Ekistics: Introduction to the science of Human Settlement.
5. Gallion, B. Arthur & Eisner, Simon. Urban Pattern: City Planning & Design, 5th ed. Van Nostrand Reinhold, New York, 1986.
6. Hyderabad Urban Development Authority. Hyderabad Urban Development Authority, HUDA, 1981.
7. Khosla, R.K. Urban and Rural Development in India.
8. Patterson, T. William. Land-use Planning Techniques of Implementation.
9. Rama Reddy, Padala&Srinivas Reddy, Padala. Commentates on Hand Reforms Laws in Andhra Pradesh.
10. RameGowda, K.S. Urban and Regional Planning. Univ. of Mysore, Mysore, 1972.
11. Rangwala, S.C. & Others. Town Planning, 18th ed. Charotar Pub. House, Anand, 2003.
12. Rappoport, Amos. House, Form and Culture.
13. Singh, Alok Kumar, & Others (ed). Strategies in Development Planning.

Subject: INTERIOR DESIGN AND DETAILING		
Code: ART804	**Credits: 4**	**Hours / Week: 4 hrs.**
Progressive Marks: 100		

AIM:

To introduce the students to detailed study of History, principles and elements that go into making of an interior space more aesthetic, pleasing and functional with a few projects as practical.

OBJECTIVE:

- To provide emphasis on space planning process (block diagram, concept statement)
- To evaluate the historical process of style and proportion with creative integration of principles and elements
- To make the students understand Anthropometry and Ergonomics
- To enable a student to apply materials, colours and its implied factors like texture, furnishings, lighting etc.
- To document a portfolio which involves free hand sketches, rendering on different software's and exploration of varied graphic compositions

COURSE CONTENT:

Unit-I: Introduction and history

Interior design process, Vocabulary of design in terms of principles and elements, Introduction to the design of interior spaces as related to typologies and functions, themes and concepts - Study and design.

Brief study of the history of interior design through the ages relating to historical context, design movements and ideas etc., Brief study of folk arts and crafts (Vernacular design in India) with reference to interior design and decoration.

Unit-II: Elements and Principles with Anthropometry

Elements: Line, shape, form, texture, color, value

Principles: Unity, harmony, rhythm, proportion and scale, movement, variety, repetition

Composition: Rules for interior layout construction drawings

Perspective: Basic one- and two-point perspective construction for interior architecture and furniture.

Study of Proxemics, Designing the size and form of interior spaces using user – activity, analysis and anthropometrics, effect of enclosure, fenestration, color and lighting on perception of interior space, application of scale, proportion to enhance the quality of interior space, psychological effects of space.

Focuses on physical, psychological behavioral and human settings

Unit-III: Elements of enclosing elements

Introduction to various **elements of interiors** like floors. Ceilings, walls, staircases, openings, interior service elements. incidental elements etc. and various methods of their treatment involving use of materials and methods of construction in order to obtain certain specific functional, aesthetic and psychological effects.

Unit -IV: Applied components of Interior spaces and their elements- Colour, Lighting and Landscapes

Colours in interiors – Colour Theory, Effect of light on colour, various colour schemes like analogues, complementary, triadic etc. Colour symbolism. Psychology of colour, Industrial colour codes. International standards

Interior lighting - different types of lighting - types of lighting fixtures- their effects and suitability in different contexts through change of levels and structural form modulation through artificial and natural lighting, emphasis of focal points and unity in interior design.

Interior landscaping elements: rocks, plants, water, flowers, fountains, paving, artifacts, etc., their physical properties and effects on spaces, plane and fixtures in relation to emphasis of background of space through change of levels and structural form modulation through artificial and natural lighting, emphasis of focal points and unity in interior design

Unit-V: Furniture design

Furniture categories, exploration of the idea of furniture, role of furniture in interior design, Design approaches in furniture design. Brief overview of the evolution of furniture from Ancient to present: Various stylistic transformations. Furniture designers and movements.

Analysis of furniture in terms of human values, social conditions, technology and design criteria

Storage systems: Functional analysis of storage systems and thereby deriving types of cabinets needed for interior spaces – kitchen cabinets, wardrobes closets, book cases, show cases, display systems etc.

COURSE OUTCOME:

This course is intended to introduce the students to varied interior schemes of different functional types and different scales.

- To give comprehensive understanding on the design of interior spaces as related to typologies and functions, themes and concepts
- To equip students with foundation skills of furniture design and applied components of Interior spaces and their elements
- To gain perspective of history of interior design and application of elements and principles of interiors in user centered design of interior spaces

TEXTBOOKS:

1. Francis.D. Ching & Corky Bingelli, Interior Design Illustrared, 2nd edition, Wiley publishers, 2004.
2. Julius Panero & Martin Zelnick, Human Dimension & Interior Space: A source book of Design Reference standards, Watson – Guptill, 1979.
3. Maureen Mitton, Interior Design Visual Presentation: A Guide to Graphics, Models, and Presentation Techniques. John Wiley and Sons, 2003

4. Mark.W. Lin, Drawing and Designing with Confidence: A step-by-step guide, Wiley and Sons, 1993.
5. Robert Rengel, Shaping Interior Space, Fairchild Books & Visuals ,2002
6. “Human Dimension and Interior Space” by Panero Julious & Zelink Martin
7. “Design of Interior Environment” by Alexander and Mercourt
8. “Interior Design Illustrated” by Francis D K Ching and Corky Binggeli

REFERENCES:

1. Steport - De Van Kness, Logan and Szebely, Introduction to Interior Design Macmillan Publishing Co., NY 1980.
2. Inca / Interior Design Register, Inca Publications, Chennai, 1989.
3. Kathryn .B. Hiesinger and George H.Marcus, Landmarks of twentieth Century Design; Abbey Ville Press, 1993.
4. Syanne Slesin and Stafford Ceiff - Indian Style, Clarkson N. Potter, Newyork, 1990.
5. The Impulse to adorn - Studies in traditional Indian Architecture - Editor Dr.Saranya Doshi, Marg Publications, 1982.

ELECTIVE - IV

Subject: ARCHITECTURAL CONSERVATION		
Code: ARE805-1	**Credits: 2**	**Hours / Week: 3 hrs**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs**

AIM

To develop understanding of the significance of historic structures and encourage conservation and preservation of built environment.

OBJECTIVES:

- To develop understanding of the significance of historic buildings and cities.
- To familiarize the students with the status of conservation in India and the various agencies involved in the field of conservation and their policies.
- To outline the status of conservation practice in the country and the various guidelines for the preservation, conservation and restoration of buildings.
- To inform the students about the character and issues in our heritage towns through case studies.
- To develop professional level skills on conservation using various skills

COURSE CONTENT:

Unit I Introduction to conservation
Understanding Heritage. Types of Heritage. Heritage conservation- Need, Debate and purpose. Defining Conservation, Preservation and Adaptive reuse. Distinction between Architectural and Urban Conservation. International agencies like ICCROM, UNESCO and their role in Conservation

Unit II Conservation in India
Monument conservation and the role of Archeological Survey of India –role of INTACH – Central and state government policies and legislations- select case studies of sites such as Hampi, Golconda, Mahabalipuram etc.

Unit III Conservation practice
Brief study on Listing –Grading-Documentation - Assessing architectural character of historic structures. Guidelines for preservation, rehabilitation and adaptive re-use of historic structures

Unit IV Urban conservation
Understanding the character and issues of historic cities in Karnataka. Upgradation programmes in old areas and development strategies for regeneration of inner-city areas– select case studies of towns like Srirangapatna, Mysuru and Bijapur. Historic districts and heritage precincts.

Unit V Conservation planning

Conservation as a planning tool. - Financial incentives and planning tools such as Transferable
Development Right (TDR)-urban conservation and heritage tourism infrastructure facilities.
Conservation management- community participation and financing conservation.

COURSE OUTCOME:

This course is intended to introduce the students to architectural conservation and its importance in design of contextually sensitive urban spaces.

- The students understand importance of heritage, issues and practices of conservation through case studies
- The student will gain understanding on historic materials and their properties various technologies for investigating masonry, foundation and also traditional and modern repair methods
- To assess architectural characteristics and issues in historic site
- To familiarize students with the agencies like UNESCO, ASI, INTACH and its implication on architectural design

REFERENCE BOOKS

1. Donald Appleyard, "The Conservation of European Cities", M.I.T. Press, Massachusetts, 1979.
2. James M. Fitch, "Historic Preservation: Curatorial Management of the Built World" University Press of Virginia; Reprint edition, 1990
3. Robert E. Stipe, a Richer Heritage: Historic Preservation in the Twenty-First Century". Univ. of North Caroling press, 2003.
4. Conservation Manual, Bernard Fielden; INTACH Publication, 1989.

REFERENCES

1. B.K. Singh, "State and Culture", Oxford, New Delhi
2. A.G. K. Men ed. "Conservation of Immovable Sites", INTACH Publication, N.Delhi., 1988
3. Seminar Issue on Urban Conservation
4. Feilden, Bernard M. and Jokilehto, Jukka. (1998). Management Guidelines for World Cultural Heritage Sites. Rome: ICCROM.
5. Tandon, Rajeshwari, editor. (2002). A Case for National Policy for Heritage Conservation & Management. New Delhi: INTACH, August 2002.
6. Feilden, Bernard. (1989). Guidelines for Conservation: A Technical Manual. New Delhi: Indian National Trust for Art and Cultural Heritage (INTACH).
7. Indian National Trust for Art and Cultural Heritage (INTACH). (1999). Architectural Heritage Division, New Delhi. Conserving the Heritage of Our Historic Cities: Pre Seminar Working Document. New Delhi: INTACH.
8. Bisht, A.S., et al. (2000). Conservation of Cultural Property in India. Agam Kala Prakashan, Delhi.

Subject: RESEARCH METHODOLOGY		
Code: ARE805-2	**Credits: 2**	**Hours / Week: 3 hrs**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs**

AIM:

To introduce perspectives on research framework and methods in architectural design which can be quantitative, qualitative as well as techniques in visual, special and contextual evaluation.

OBJECTIVES:

- To introduce research concepts to students enabling them to identify research questions and formulate hypothesis. They should be able to evolve research strategies for their dissertation and thesis projects.
- To inculcate ethical practices in research, report writing and publishing.

COURSE CONTENT:

Unit I Introduction **to research:** Domain of Architectural Research; Understanding the nature of research in architecture- Need & significance; Objectives; Characteristics; Ethics; Research methods in Architecture.

Unit II Research **Process:** Types of research and Aims of research Quantitative and Qualitative research Literature search; Research methods & Research methodology; Research Process; Review of literature, research statement; Research design – need, components and considerations.

Unit III Data Collection & Survey: Primary data and Secondary data; methods of data collection; survey & observation; characteristics; recording, limitations and documentation.
Questionnaires - types, aspects, sequence,
Other Methods of Survey - visual, use of mechanical and digital media and online research devices etc.

Unit IV Data Analysis: Overview of measuring & scaling techniques; Processing & analysis of data - descriptive & inferential; graphical representation of analysis.

Unit V Report, Paper & proposal writing: Purpose, characteristics, guidelines, steps, format, structure, contents, presentation, referencing style, ethical issues: plagiarism etc.

COURSE OUTCOME:

On successful completion of the course the student will be able to:

- Apply the theoretical knowledge in small research projects. They shall be able to prepare research reports and technical papers in accepted formats.
- Familiarize students with recent research in Architecture and related fields of Built environment.
- Publish their report/research paper in journals.

REFERENCES:

1. Groat L.& Wang D. (2002), Architectural Research Methods, John Wiley and Sons Inc
2. Creswell, John W. 2003 Research Design: Qualitative, Quantitative and Mixed Methods Approach Sage Publications
3. Day R A 1989 How to Write and Publish a Scientific Paper Cambridge University Press
4. Kothari C. R. 1990 Research Methodology Sultan Chand & Sons, New Delhi
5. Manna, Chakraborti 2012.Values and Ethics in Business Profession Prentice Hall of India, New Delhi
6. Panneerselvam 2012 Research Methodology Prentice Hall of India, New Delhi
7. Ranjit Kumar 2005 Research Methodology: A step by step Guide for Beginners Sage Publications
8. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
9. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.
10. Fink, A., 2009. Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications
11. Satarkar, S.V., 2000. Intellectual property rights and Copy right. Ess Ess Publications.

Subject: BUILDING AUTOMATION AND MANAGEMENT SYSTEMS		
Code: ARE805-3	**Credits: 2**	**Hours / Week: 3 hrs**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs**

AIM:

The course is designed to impart the basic knowledge about Building Automation & Management System (Intelligent Buildings) w.r.t. safety, security and building automation and integrated building management systems

OBJECTIVES:

- To familiarize the student with minimum safety requirements for a building with exposure to NBC.
- To study fire alarm systems and fire suppression systems and their installation.
- To inform students of various types of security systems and their application in building.
- To outline the importance and objectives of an integrated building management system.

COURSE CONTENT:

Unit I - Introduction

Concept and application of Building Automation and Management system (Intelligent buildings)

Concepts, definitions of intelligent buildings, intelligent architecture and structure, evolution of intelligent buildings,

Unit II – Building Automation System (BAS)

Design issues related to building automation and its effect on functional efficiency

Integrated approach in design, maintenance and management system. Current trend and innovation in building automation systems.

Binary data, digital controller, input and output units, sensors and actuators; architecture and configuration of BAS.

Unit III- Components of building automation system

1. **Components of building automation system:** HVAC, electrical, lighting, modern security system, alarm-system, fire-protection, inter-communication, monitoring devices, mechanical means of vertical and horizontal transportation etc.

   Security and safety control systems: CCTV systems, analogue CCTV systems and IP-surveillance systems; Access control system, different types of access control, intelligent readers and system topologies; Burglar alarm system, functions of burglar alarm systems;

Fire alarm systems: Typical fire detectors, conventional fire panels, and addressable fire panels.
Lighting control systems: Purpose of lighting control, basic components of lighting and lighting control systems, analogue control and digital control, DXM512-A, digital addressable lighting interface (DALI), systems based on common automation protocols, energy management and lighting control strategies

Unit IV – Applications of internet technologies in BMS
Impact of information Technology; Concept of artificial intelligence; Knowledge base and decision support systems.
System for hi-tech buildings.

- Local Area Network (LAN) and BAS communications standards: Local Area Network (LAN), protocol standards and OSI model, medium access schemes, LAN standards, Ethernet, ARC net, Lon Talk, wireless technologies, Zig Bee, application s of wireless technologies in BAS.
- Internet and Internet protocols, convergence networks and total integration Central air-conditioning system control and optimization: VAV and CAV system control and optimization, ventilation control and optimization, Automated mechanical ventilation systems.

COURSE OUTCOME:

On successful completion of the course the student will be able to:

- Apply the theoretical knowledge in their design about building automation and management systems
- Familiarize students with Components of building automation system and Applications of internet technologies in BMS.

REQUIRED READING:

1. Building Automation Systems – A Practical Guide to selection and implementation – Author: Maurice Eyke
2. National Building Code of India 1983 (SP 7:1983 Part IV) – Published by Bureau of Indian
Standards
3. IS 2189 – Selection, Installation and Maintenance of Automatic fire Detection and Alarm System – Code of Practice (3 Revision) – Published by Bureau of Indian Standards.

REFERENCES:

1. The Principles and Practice of Closed-Circuit Television – Author: Mike Constant and Peter Turnbull
2. Rules of Automatic Sprinkler Installation – 2 Edition – Published by Tariff Advisory Committee.

3. Fire Suppression Detection System – Author: John L. Bryan
4. Design and Application of Security/Fire Alarm system – Author: John E. Traister.
5. CCTV Surveillance – Author: Herman Kruegle
6. Security Systems and Intruder Alarm Systems – Author: Vivian Capel
7. "Automation Systems in Smart and Green Buildings (Modern Building Technology)" by V. K. Jain
8. Intelligent Buildings and Building Automation, Shengwei Wang

ELECTIVE - V

Subject: EARTHQUAKE RESISTANT STRUCTURES		
Code: ARE806-1	**Credits: 2**	**Hours / Week: 3 hrs**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs**

AIM

To understand the importance of earthquake resistant structures and application in building construction.

OBJECTIVES

- To understand the fundamentals and the basic terminologies of Earthquake.
- To expose the student to grasp the idea about vibration control techniques.
- To make student understand the effects of earthquake and response of structures to earthquake.
- To familiarize the students with design codes and building configuration.
- To apply the knowledge gained in an architectural design assignment.

COURSE CONTENT:

Unit I

Elements of Seismology – Causes of Earthquake – Plate Tectonic theory – Elastic rebound Theory – Characteristic of earthquake -Magnitude and intensity of earthquakes-Seismograph - prominent earthquakes of India

Unit II

Vibration Control - Tuned Mass Dampers – Principles and application, Basic Concept of Seismic Base Isolation – various Systems- Case Studies of Important structures.

Unit III

Site planning, building forms, horizontal and vertical irregularities, mass and stiffness Irregularities, soft storey effects, Architectural design concepts for earthquake resistance, shear

Unit IV

Walls, redundancy, setbacks, torsion, pounding. Behavior of ground, buildings, power plants, services in the past earthquakes, types of failure, Liquefaction, social and economic consequences of earthquakes, concepts of repair and seismic

Unit V

Strengthening, methods of retrofitting, seismic base isolation, construction quality control Seismic detailing provisions – RCC structures, masonry and adobe. Design and detailing as per IS: 13920 – 1993.

COURSE OUTCOME:

On successful completion of the course the student will be able to:

- Apply architectural design concepts for earthquake resistance
- Familiarize students with principles and application of design and detailing as per IS codes in seismic zones

REFERENCES

1. Roberto Villaverde, "Fundamental Concepts of Earthquake Engineering",CRC Press Taylor
2. & Francis Group, 2009.
3. IS 1893: 2002, (Part I) "Criteria for Earthquake Resistant Design of Structures - Part 1 :General Provisions and Buildings", BIS, New Delhi, 2002.
4. IS 13920: 1993," Ductile detailing of reinforced concrete structures subjected to seismic forces - Code of practice", Reaffirmed,2003, BIS, New Delhi, 2003
5. Short term course on "Seismic Retrofit of Multistoreyed Reinforced concrete Buildings", National Programme on Earthquake Engineering Education (NPEEE), IIT, Madras, July, 2005.

Subject: MODULAR COORDINATION		
Code: ARE806-2	**Credits: 2**	**Hours / Week: 3 hrs**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs**

AIM

To understand the importance of prefabrication and application of modular coordination in building construction.

OBJECTIVES

- To provide an introduction to conventional modular principles and practices in India and abroad.
- To ensure the dimensional co-ordination between installation and erection.
- To enable buildings to be so dimensioned that they can be erected standard components without undue restriction on freedom of design.

COURSE CONTENT:

Unit I Introduction to Modular systems

Various elements of buildings that could be modular walls, roofs, doors and windows, partitions, etc. Various materials used in modular architecture. Pre-stressed and post-tensioned modular systems.

Unit II Development of Modular Architecture

Development of theories of modular architecture. Advantages, scope and limitations of modular architecture.

Unit III Modular Architecture and Coordination

Basic management policies in modular co-ordination. Prefabricated structures: their uses with examples and techniques of constructions.

Unit IV Introduction and the origins of the Industrial Concept

Principles of prefabrication of cellular structures, Space frames, tensile structure, pneumatic structure. Definition of Industrialization. Study of historical background of industrialized building in other countries and Indian experience. Study of CBRI and SERC works. Use of latest construction techniques like Tunnel form system, Triple S System, etc.

Unit V Aspects of Industrialization

Case Studies of Industrialized Buildings in India and abroad. Scope & limitations on applicability in industrial housing etc. Socio-economic situations, spatial requirements. Application of Industrialization in Mass Housing.

COURSE OUTCOME:

On successful completion of the course the student will be able to:

- Provide basic knowledge of the role of different material and techniques adopted in modular construction.
- Familiarize students with various aspects of prefabricated structures.
- Acquaint knowledge on construction techniques through live case studies of the known architects.
- Acquaint knowledge on model making of Industrialized Buildings, Space frames, tensile structure, pneumatic structure etc. to get better understating.

TEXT BOOKS

1. Akvert, G.H Dietz Culter Lawrence (ed) 'Industrial Building system for Housing'
2. Bauverlag& Wiesbaden 'Manual of Precast Concrete Construction System Buildings with Large panels'

REFERENCES

1. W. Minich, J. Pekala, Modular Coordination in Industrial Building: Standard Regulations; Preliminary Scheme; ISO/TC 59
2. National Building Code of India, 1983
3. Heki.K (ed) 'Shells, Membranes and space frames' Elsevier, .Sarja A. 'Open and industrial Buildings'
4. Gabind , Fracols 'Beyond the Cube The Architecture for Space Frames and Polyhedral'

Subject: URBAN SOCIOLOGY AND ECONOMICS		
Code: ARE806-3	**Credits: 2**	**Hours / Week: 3 hrs**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs**

AIM

Familiarizing students with the basic concepts of Sociology and their influence on Architecture.

COURSE CONTENTS

Unit – I
Nature, scope and utility of Sociology; relation between Sociology and society. Essential elements of society; bio-social and socio-cultural system. Rural and urban communities and their characteristics.

Unit – II
Migration and its impact on urbanizations, social problems of urbanization, problems relating to public health, public transport and public housing, sociological understanding of slums, social survey and research.

Unit – III
Definition of urbanization – patterns of life and influence of urbanization on rural life, urbanization process in India. Issues relating to public health, public transport and public housing.
Origin, growth and influence of cities. Industrialization.

Unit – IV
Citing example of self-developed-cities – effect of social structure on form and growth of cities – Introducing concepts of typology etc.

Unit – V
Definition of Economics, economic organization of society. Consumption wants, laws based upon them. Urban land values, land utilization, factors involved in development of urban land. Cost and cost indices, preliminary for building. Concepts of life cycle costing with reference to buildings. Time value of money-present worth and inflation. Sources of finance for buildings.

COURSE OUTCOME:

On successful completion of the course the student will be able to:

- Provide basic knowledge of concepts of urban sociology and economics and their influence on Architecture.
- Familiarize students with urbanization process in India and sources of finance for buildings.

- Acquaint basic knowledge on socio-cultural system, rural and urban communities and their characteristics.

REFERENCES

1. A R Desai (1984), Rural Sociology, Popular Prakashan, Bombay
2. Neil J Smelsa (1981) Sociology, Prentice Hall, New Jersey
3. Mclvar R M and Page Charles (1974) Sociology-An introduction analysis, Macmillan India, New Delhi
4. R P Mishra and Bhoosan B S (1979) Human settlements in Asia, Heritage Publishers, New Delhi
5. Urban Economics by Warner Z Hirsch.

YEAR-5 SEMESTER-IX

Subject: ARCHITECTURAL DESIGN - VII		
Code: ARS 901	**Credits: 16**	**Hours / Week: 16 hrs.**
Progressive Marks: 60%	**Examination Marks: 40%**	**Mode of Exam: Jury**

OBJECTIVES

- To learn about reading and documenting urban contexts and to understand the idea of urban space. To understand the difference between urban design and urban development.
- To understand the role of architecture in shaping urban fabric and to create architecture which fits into a specific urban context.

COURSE OUTLINE

The role of urban space as a public realm and the need to create such spaces as extension of private domain in a public building shall be investigated and shall become one of the architectural goals of the project.

Students are exposed to the urban design exercise involved in inner city/ historic/ core area/ CBD/ heritage area/ precincts/ streets/ urban design elements/ old market studies or urban renewal projects etc. Study part of the studio shall be documented and shall be reviewed as part of the viva.
Example of **Projects**: Bus Terminal, Shopping Complex, Art galleries, Cultural centre, Sports stadium, Performing Arts Centre, Exhibition Pavilion etc.

Note: The design shall be sensitive to the needs of disabled, aged people and children.
One major project and one minor/ time problem to be tackled in the semester.

COURSE OUTCOME:

This course is intended to introduce the students to the role of architecture in shaping urban fabric

- To enable the student in reading and documenting urban contexts and to understand the idea of urban space.
- To equip students with foundation skills that enable creation of architecture which fits into a specific urban context
- To gain perspective on the role of urban space as a public realm in influencing architecture.

REFERENCES

1. De Chiara and Callender, Time Saver Standards for Building Types, McGraw Hill Company, 1980

2. Neufert Architect's Data, Rudolf Herg, Crosby Lockwood and Sons Ltd, 1970
3. Carmona, M., Heath, T., Oc, T. and Tiesdell, S. (2010). Public Places Urban Spaces. Oxford: Architectural Press
4. Lang, J. T. (2005). Urban Design: A Typology of Procedures and Products. Oxford: Elsevier/Architectural Press.
5. Lynch, K. (1984). Good city form. Boston: MIT Press.

Subject: URBAN DESIGN AND RENEWAL		
Code: ART 902	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60%	**Examination Marks: 40%**	**Mode of Exam: 2hrs Exam**

AIM:

1. To introduce students to concepts in Urban Design & Renewal
2. To sensitize them on issues facing urban areas and the shaping and uses of urban public space

OBJECTIVES:

1. To introduce students to concepts in arrangement, appearance and functionality, the shaping and uses of urban public space.
2. To sensitize them on issues of Urban design that blends architecture, landscape architecture, and city planning together to make urban areas functional and attractive.

COURSE CONTENT:

UNIT I
Definition and scope of urban design.
Introduction to the process and profession of Urban Design
Basic glossary of urban design terms and terminologies
Introduction to the concepts and implementation of Urban Design.
Relationship between Architecture, Urban Design and Town Planning.
Perception of city form and pattern – Townscape elements
Methods of urban design surveys

UNIT II
The Heritage of Urban Design: Roots of Urban Design from pre-history to modern times.
Role of Space in Historical Towns: Comparative analysis of public spaces, their organization and articulation in pre-history, early, medieval and renaissance periods in west and east.
Comparisons of the cities of ancient India and with medieval development, the colonial city and the modern city. Study and compare their social, cultural and geographical aspects.

UNIT III
Objectives of Urban Design: Character, Continuity & Enclosure, Quality of the public realm, ease of movement, legibility, adaptability and diversity and aspects of development form.

UNIT IV
Introduction to Public Spaces and Urban Spaces, Ideas of Good Cities, the essential qualities and values an effective public space possess

UNIT V

Renewal and redevelopment: Objectives, programs of urban renewal, public involvement and participation.

Comparative Practice: Townscape policies, Techniques, regulations and methods adopted for urban design

COURSE OUTCOME:

At the end of the course, the students shall able to:

- Familiarize the basic glossary of urban design theories and terminologies
- Apply specific graphics and representation techniques for urban design
- Provide knowledge base of methods of urban design surveys, concepts of making a base map, cognitive mapping and layering

REFERENCES:

1. Kevin Lynch, The Image of the City**,** M.I.T. Press, 1964
2. Jan Gehl and Brigitte Svarre, How to Study Public Life, Island Press, 2013
3. Christopher Alexander, Sara Ishikawa, and Murray Silverstein, A Pattern Language: Towns, Buildings, Construction, Oxford University Press, 1976
4. Donald Watson, Alan Plattus, Robert G. Shibley, Time-saver standards for urban design, McGraw-Hill, 2003
5. Jon Lang, Urban Design- A Typology of procedures and Products, Architectural Press, 2005
6. Edmund Bacon, Design of Cities, Thames and Hudson, London 1967
7. Kevin Lynch, Good City Form, MIT Press, London, 1959
8. Jane Jacobs, The Death and Life of Great American Cities, Random House, New York

Subject: DISASTER MITIGATION AND MANAGEMENT		
Code: ART 903	**Credits: 3**	**Hours / Week: 3 hrs.**
Progressive Marks: 60%	**Examination Marks: 40%**	**Mode of Exam: 2hrs Exam**

OBJECTIVE

To create an understanding of the causes and consequences of disasters and increase awareness to disaster resistant design issues as a significant source of inspiration to facilitate the integration of structure and architectural design.

COURSE CONTENT:

Unit I- Introduction: Disaster Management & its necessity; Types, characteristics, causes & impacts; Natural disasters, Manmade disasters, Epidemics; Institutional & Legal arrangement; NDMA; Financial arrangement; Role of Architect at all stages of Disaster Management.
Unit II- Disaster Prevention & Mitigation: Risk Assessment & Vulnerability Mapping; Long-term measures; Review & revision of building bye-laws & codes; Hospital Preparedness; Retrofitting; Mitigation strategies, Trigger Mechanism; Capacity building; Awareness programs. Architectural Design considerations.
Unit III- Preparedness: Forecasting & Early Warning Systems: Plans of action for probable disasters; emergency, medical, casualty management systems; Resources needed; Training, Simulation & Mock Drills; Partnerships for Mitigation & Preparedness; Audit of buildings & infrastructure; Architectural Design considerations.
Unit IV- Response: Role of various agencies; Standard Operating Procedures (SOPs); Levels of Disasters; Incident Comm & System (ICS); First & Other Key Responders; Medical Response; Information & Media Partnership; Search & rescue; Architectural Design considerations.
Unit V- Relief & Rehabilitation: Temporary Relief Camps; Management of Relief Supplies; Provision of Intermediate Shelters; Relocation & reconstruction, repair & retrofitting of buildings & infrastructure; Socio-cultural-economic considerations; Capacity building for self-help construction; training & awareness programs. Architectural Design considerations.

COURSE OUTCOME:

On successful completion of the course each student will be able to:

- Acquaint knowledge on Socio-cultural-economic considerations of disaster resistant design.
- Familiarize the role of architect at all stages of disaster management, preparedness, relief & rehabilitation, relocation & reconstruction
- Gain perspective on the role of various agencies involved in disaster prevention, risk assessment & vulnerability Mapping.

REFERENCES:

1. Mary C Comerio; Disaster Hits Home, New policy for Urban Housing Recovery, Oxford University Press, London; 2001
2. Proceedings – Learning from practice- Joint US and Italy Workshop- October 18- 23; 1992; National Science Foundation; US
3. Earthquake Resistant Design and Construction of buildings- Code of Practice- Bureau of Indian Standards; 1993
4. Encyclopedia of Disaster Management Policy and Administration, Vol. I, S. L. Goel, Deep of Deep Publication Pvt. Ltd., New Delhi, India.
5. Encyclopedia of Disaster Management Policy and Administration, Vol. II, S. L. Goel, Deep of Deep Publication Pvt. Ltd., New Delhi, India.

Subject: PRE-THESIS		
Code: ART 904	**Credits: 4**	**Hours / Week: 4 hrs.**
Progressive Marks: 100		

AIM

To equip the students with the required architectural design research methods for the realization of their thesis projects of adequate complexity.

OBJECTIVES

- Understanding the importance of literature review / study and/or case - study methodology for a preparation of a Dissertation / Thesis report on any topic in architecture (relevant to any chosen objective or any aspect of the Thesis Project).
- Understanding of Presentation techniques [for presenting dissertation / outcome of the study] and techniques of Thesis / Dissertation / Project Report writing.
- Preparation of the initial synopsis for the selected thesis project.

COURSE CONTENT:

The course contents are so ordered that they enable students to understand the basic prerequisites of undertaking a Thesis project such as the difference between design thesis and design studio, selection of topics for architectural design thesis and selection of topics based on building typologies, preparation of Synopsis and methodology of design thesis.

Unit I: Identification of areas of Interest
The work involves students discussing with the faculty to identify an area of interest or specific types of buildings and thus arrive at a set of probable design problems of suitable scope and scale which can be considered for development into the Thesis project.

Unit II: Special Study
Each student shall prepare an Abstract on a topic in architecture relevant to their Thesis Project. It shall be submitted in the form of a report with appropriate referencing, bibliography etc. and the highlights shall be also presented as a seminar.

Unit III: Report writing and presentation
The following skills regarding Thesis report writing and presentation, essential in carrying out a successful Thesis project will be imparted to the students:

- Formats for presentation of data, case studies and analysis.
- Report Writing: Techniques for presentation of contextual information relevant to interpretation of the data collected; reporting the design development from concept to design solution, to convey the relationship between the design solution and the design problem through an eloquent yet precise Thesis report.

Unit IV: Synopsis

Each student shall submit three proposals for the project, he/she wants to undertake in order of preference from which the final topic may be selected. The project can either be a live one or it may be a hypothetical one subject to approval from the Head of the department.

Unit V: Project Introduction and Case studies

After the thesis topic is finalized, the student has to present a seminar on his/her topic.
The introductory seminar will include a presentation on the topic detailing the design problem along with selection of relevant case studies and literature studies which are to be completed before the commencement of the thesis semester.

COURSE OUTCOME:

On successful completion of the course each student will be able to:

- synthesize literature studies and develop methodology for the thesis project .
- Demonstrate the optimum scale, context of setting and typologies of architectural design projects which decide the feasibility of a student Thesis project.
- Assimilate and analyze data relevant to handle a design thesis project independently.

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ELECTIVE - VI

Subject: URBAN HOUSING		
Code: ARE905-1	**Credits: 2**	**Hours / Week: 3 hrs.**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs.**

AIM

To sensitize students about the need for, demand and supply of housing in India, to expose the role or function of various housing agencies, the typologies of housing and the delivery mechanism of housing along with basic environmental issues.

OBJECTIVES

- To understand the need, supply and demand for housing based on statistical data, various housing agencies in housing development, along with their activities.
- To know about the social and economic factor influencing housing design and the various schemes in housing promotion in the Indian context.
- To create awareness about the various standards backed by BIS, NBC, and DCR including layout conditions, Buildings rules related to housing.
- To understand different types of housing in housing design and pattern. The components in housing design, through case studies.
- To study about the various stages involved in development of housing, its management, and how to make the same user friendly through participatory approach.

COURSE CONTENT:

Unit I Housing Issues – Indian context

Definition & concept of Housing-Types of housing- Detached, semi-detached, row, town house, apartment Farmhouses - Form of Housing provision: Plotted, Group Housing, Cooperative, Self Help, Leasehold, Rental Housing -Need and Demand - National Housing Policy - Housing Agencies and their role in housing development - Impact of traditional life style.

Unit II Socio-Economic aspects

Social factors influencing Housing Design, affordability, economic factors and Housing concepts - Slum Up gradation and Sites and Services.

Unit III Housing standards

Standards and Regulations - DCR relevant to housing - Methodology of formulating standards - Performance standards.

Unit IV Housing Design

Traditional patterns - Row Housing and Cluster Housing - Layout concepts - Use of open spaces - Utilities and common facilities - Case studies - High Rise Housing.

Unit V Housing process

Various stages and tasks in Project Development - Housing Management - Community participation - Environmental aspects - Technology

COURSE OUTCOME:

On successful completion of the course each student will be able to:

- Understand issues relating to Housing policy and its impact on housing development in Indian context.
- Acquaint knowledge on different types of housing in housing design and pattern. the components in housing design, through case studies
- Gain knowledge about evolution of settlement pattern, assess various stages and tasks in housing design as per regulations with relevance to technological and environmental aspects.

REQUIRED READINGS:

1. Richard Kintermann and Robert small, "Site planning for Cluster Housing", Van Nastrand Reinhold Company, Jondon /New York 1977.
2. Joseph de Chiara and others, "Time Saver Standards for Housing and Residential Development", McGraw Hill Co, New York 1995.
3. Forbes Davidson and Geoffrey Payne, "Urban projects Manual", Liverpool University Press, Liverpool 1983.
4. HUDCO publications – Housing for low income, sector model.

REFERENCES:

1. Christopher Alexander, "A pattern Language", Oxford University press, New York 1977
2. Leuris (S), Front to back: "A Design Agenda for Urban Housing", Architectural Press, 2006.
3. Mohanty. L.N.P., Mohanty. S, "Slum in India" APH Publications. 2005
4. Saxena A. K., "Sociological Dimensions of Urban Housing and Development ", Common Wealth Publications, 2004
5. Geol. S. L. Dhaliwal. S. S. "Slum improvement through participatory Urban based Community
Structures", Deep & Deep Publications, 2004.
6. Karnataka state Housing Board - MANE - Publication - 1980

Subject: CONSTRUCTION TECHNOLOGY AND MANAGEMENT		
Code: ARE905-2	**Credits: 2**	**Hours / Week: 3 hrs.**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam : 2 hrs.**

OBJECTIVE:

To introduce modular and fabricated systems, green technology and new innovative materials.

COURSE CONTENT:

Unit I
Planning – Cast in situ construction (ready mixed pumped etc.) – Reinforcement concrete and prestressed concrete constructions pre-cast concrete– Structural schemes.

Unit II
Offsite and onsite conditions for prefabricated construction. Different types of precast elements, modular coordination, typification, finishes.

Unit III
Equipment for materials handling, transportation and erection. Uses of the following: Tractors, bulldozers, shovels drag lings, cableways and belt conveyors, batching plants – Transit mixers and agitator trucks used for ready mix concrete pumps. Guniting equipment's – Air compressors – welding equipment – cranes and other lifting devices Choice of construction equipment for different types of works

Unit IV
Construction management techniques, Construction Planning, Scheduling and Controlling Phases. Use of Management techniques – Project Cost Analysis using CPM

Unit V
Properties, Application, specification and standards (Indian and International) Teflon, special glasses, aluminum composite panel etc. - Nano technology applications in construction.

COURSE OUTCOME:

On successful completion of the course each student will be able to:

- Gain knowledge on different types of precast elements, modular coordination, typification and finishes.
- Distinguish different types construction equipment for different types of works Offsite and onsite conditions for prefabricated construction
- Acquaint with concepts of Construction management techniques, project cost analysis using CPM and Nano technology applications in construction.

REFERENCES:

1. “Innovative Constructional Materials”, proceedings of seminar on Innovative Construction Materials, VeeramataJeejabai
Technical
Institute, Mathuga Mumbai, Jan 20-21, 2001
2. Directory of Indian Building Materials Products Building materials and Technology Promotion Council and Centre for Symbiosis of Technology, Environment Management, Bangalore, 2000-2001,
3. HenrikMissen, “Industrialized Building and Modular Design”, C&CA UK, 1972.
4. KonzT,“Manual of Precast concrete Construction”, Vol, I, II, III Banverlag GMBH, 1971.
5. William P. Spence, Construction Materials, Methods, and Techniques ,2006

Subject: VASTUVIDYA		
Code: ARE905-3	**Credits: 2**	**Hours / Week: 3 hrs.**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs.**

AIM:

To provide theoretical knowledge base on the uniqueness of Indian traditional Architecture principles, the meaning of space, the manifestation of energy etc.
To sensitize students about the purpose, nature and scope Vastu principles and its affect, art of building as per vastu.

OBJECTIVES:

- To expose the students to the importance of vastu and various theoretical and practical aspects of this area of architecture
- To expose to student on traditional understanding of a good site, the zoning of site to relate to human and how space could be articulated for bringing life into the building.
- To make students understand about the importance of orientation natural features in and around site and how the celestial grid types could be used at different context.

COURSE CONTENT:

Unit I - Introduction
Traditional definition - Concepts of Vastuvidya; Definition; Resource materials: achievements in India - Meaning of Vastu and Vaastu - its classification - Relationship to earth. Planning, designing & construction aspects of traditional Architecture in India- evaluation with the Understanding of context- relevance.

Unit II – Space Theory
Classification of villages & towns; types of planned settlements, Land use patterns; position of temples & other uses, street patterns; Planning of residential buildings, Evolution of residential types from Vastupurusha Mandala.
Features of good building site - good building shapes - macro, micro, enclosed and material spaces - relationship between built space, living organism and universe - impact of built space on human psyche.

Unit III – Measurement and built space
Units of measurement - Tala system and Hasta system of measures - Musical measurements compared to space measurements - resultant ambience in built space

Unit IV – Vibration, Time, Rhythm Interface
Theory of vibration - vibration as time, equation of time and space - Time space relationship and measurement of the same

Unit V – Site Planning and Cosmo gram

Orientation of building, site, layout and settlement - positive and negative energies - importance of cardinal and ordinal directions - the celestial grid or mandala and its types. Concept of Mandala, technology in Vastuvidya,

Assembly & joinery; Construction methods- Foundations. Walls, columns, utharam & roof structure, the system of proportional measurements & thumb rules.

Sequence of construction as per Vaastu rules

COURSE OUTCOME:

On successful completion of the course each student will have knowledge of

- Basic glossary of vasthu terms and terminologies,
- Concepts of making space as per Vastu principles and its affect.
- Case studies and practical remedies for houses and commercial building as per vastu etc.
- Vastu principles and modern architecture and its purpose nature and scope

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REFERENCES

1. Dr.Prasanna Kumar Acharya Manasara - Oxford University Press 1927 (English version)
2. K.S.Subramanya Sastri - Maya Matam - Thanjavur Maharaja Sarjoji saraswathi Mahal Library - Thanjavur 1966.
3. Stella Kramresh - the HinduTempleVol. I & II Motital Banarsidass Publishers Pvt. Ltd., Delhi - 1994.
4. Bruno Dagens - Mayamatam, Vol.I & II IGNCA and Motilal Bamarsidars Publishers Pvt. Ltd., Delhi
5. Dr. V. Ganapathi Sthapathi - Sthapathy Veda - Dakshina Publishing House - Chennai – 2001
6. Hindu Architecutre(Vastu silpa sastra), Govind Krishna Pilai
7. Indian Architectural Theory and Practice: Contemporary Uses of Vastu Vidya, Vibhuti Chakrabarti

ELECTIVE - VII

Subject: GREEN BUILDING AND TECHNOLOGY		
Code: ARE906-1	**Credits: 2**	**Hours / Week: 3 hrs.**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs.**

AIM

Enabling students on developing an understanding of environmentally responsible green buildings which will have minimum adverse impact on the natural environment. Emphasis will be given towards understanding the principles to achieve green building rating through innovative building solutions, technological initiatives and current practices.

OBJECTIVE

- Understand the principles, complexity, functioning and salient features of green buildings.
- Develop skill to invent eco-friendly materials, techniques and practices
- To make the student recognize rapidly emerging building solutions, technological innovations and current innovations to achieve human comfort and energy consumption goals.

COURSE CONTENT:

Unit I: Introduction
Basic understanding about Green Building, Green Building Materials and Equipment in India, the key Requisites for Constructing a Green Building, Green Building Movement in India, Opportunities and benefits experienced in Green Buildings, Launch of Green Building Rating Systems and its impact on Market Transformation, Green Building Features.

Unit II: Green Building Rating Categories
Various rating categories of Green buildings, Sustainable Sites, Water Efficiency, Energy efficiency, Materials and Resources, Indoor Environmental Quality (including Day lighting) etc. IGBC, ECBC, BEE, LEED and Griha rating systems.

Unit III: Material Conservation
Handling of non-process waste, waste reduction during construction, materials with recycled content, local materials, material reuse, certified wood, Rapidly renewable building materials and furniture;

Unit IV: Indoor Environment Quality and Occupational Health:
Air conditioning, Indore air quality, Sick building syndrome, Tobacco smoke control, Minimum fresh air requirements, improved fresh air ventilation, Measure of IAQ, Reasons for poor IAQ, Measures to achieve Acceptable IAQ levels.

Unit V: Building Resources

Concepts of green field development, brown field development, environmental impact and ecological balance, sustainable site development, landscape elements, services and technologies, rain water harvesting, on site sewerage retention, treatment, recycle and reuse.

COURSE OUTCOME:

On successful completion of the course each student will be able to:

- Distinguish different types Green Building, Green Building Materials and Equipment in India and its impact on market transformation.
- Acquaint with different types construction techniques in green field development, brown field development with relevance to Material Conservation, health and environment.
- To acquaint with various rating categories of Green buildings like IGBC, ECBC, BEE, LEED and Griha rating systems.

References:

1. Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers, 2009.
2. Green Building Hand Book by Tomwoolley and Samkimings, 2009.
3. Complete Guide to Green Buildings by Trish riley
4. Standard for the design for High Performance Green Buildings by Kent Peterson, 2009
5. Energy Conservation Building code 2017, Ministry of power, Government of India

Subject: INDUSTRIAL ARCHITECTURE		
Code: ARE906-2	**Credits: 2**	**Hours / Week: 3 hrs.**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs.**

AIM

This course attempts to create necessary awareness to student on the importance of Design of industrial structure as a specialization of architecture. It focuses on the need for it, the programming aspects involved, the importance of structural involvement to arrive at a new typology based on the materials, constructional technology and requirements of industry.

OBJECTIVE

• The student will be able to understand the distinction between industrial architecture and industrialized building and get an exposure of all emergence of this typology in U.K, U.S.A and other Industrialized Countries.
• To students are exposed to factors which influence the design process such as storage, requirements, circulation, movement, areas, linkages and environment in a general manner.
• The students are exposed to the process and importance of programming aspects including waste management and various zoning, regulatory and legal framework in India.

COURSE CONTENT:

UNIT I Definition and historic context
Meaning of industrial architecture, scope, context and distinction between it and industrialized buildings – impact of industrial revolution – origin in the context of Britain and the United states – Impact of materials and technology in 1900's and emergence of new aesthetics in architecture.

Unit II Evolution and Process
Automation techniques and impact on process circulation and area requirements – influence on design – internal and external environment control – Precautions at site.

Unit III Pioneers and Architect's role
Study of examples of pioneer to include Peter Behrens, Max Berg, Hans Poelzig's and P.L.Nervi – impact of expressionism and international style – Responsibility of architects in – innovative corporate image, understanding building engineering and understanding industrial environments through Indian case – studies.

Unit IV Design principles and programming
Zoning principles, factories Act and Rules (1948) – in India – Role of pollution control boards, organizing principles – Programming aspects to include need, spatial relationships, Access, Layout and user facilities – Automation and its impact on space and performance – Environmental control to include working conditions, atmospheric control, visual factors and waste management.

Unit V Contemporary trends and future

Analytical approach involving – technical, social, geographical aspects, corporate philosophy, worker management relations, and manufacturing equipment, critical issues involving master plan, Material handling, Functional process, Time and cost and structural resolutions – Flexibility in planning, design and technology.

COURSE OUTCOME:

On successful completion of the course each student will be able to:

- Acquaint with knowledge on various internationally known architects' contribution and the philosophy of functionalism and international style which contributed to this typology through case – studies.
- Distinguish between industrial architecture and industrialized building, contemporary trends and future industrial architecture
- Gain knowledge on automation techniques, Factory Act and Rules and impact of industrial architecture on technical, social and environmental aspects.

TEXT BOOKS

1. James F. Munce – Industrial Architecture – F. W. Dodge Corporation – New York - 1980
2. Grant Hildebrand – Designing for Industry – The M.I.T. Press, Cambridge, New York – 1984.

REFERENCES

1. United nation Volume – Trends in Industrialization of Buildings – New York – 1970.
2. Kenneth Reid – Industrial Buildings – F.W. Dodge Corporation, New York – 1961.
3. Friedmank Wild – Design and Planning Factories – Van Nostrand Reinhold / New York – 1982.

Subject: HIGH RISE STRUCTURES		
Code: ARE906-3	**Credits: 2**	**Hours / Week: 3 hrs.**
Progressive Marks: 60 %	**Examination Marks: 40 %**	**Duration of Exam: 2 hrs.**

OBJECTIVES

Understanding the special systems required in mechanical, electrical and Fire safety services. The ability to design vertical transportation systems, HVAC systems and Fire protection systems in line with the various standards, building codes and safety requirements

COURSE CONTENT:

Unit I- Introduction: Classification; History & evolution; Significant works; Planning criteria; Codes & Byelaws; Construction techniques; Current Innovations.

Unit II- Structural Systems & Forces: Horizontal & vertical forces; Structural Systems; Seismic considerations; Wind loads; Wind behaviour around tall buildings, Design of building envelope; Wind tunnel tests.

Unit III- Building Services: Service Core, Service Floors; Provisions for-plumbing, electrical supply, HVAC, firefighting, surveillance & vertical transportation.

Unit IV- Socio-Cultural & Economic Concerns: Impact on urban infrastructure & civic amenities; Health impact; Psychological impact; Community living & shared spaces, Ownership, management, maintenance.

Unit V- Environmental Concerns: EIA; Resource management; Sustainable practices; Bioclimatic designs; Vertical green neighborhood; Energy efficiency.

COURSE OUTCOME:

On successful completion of the course each student will be able to:

- Gain basic knowledge of history & evolution of high-rise structures with significant examples of Construction techniques and Current Innovations
- Understand Environmental Concerns with case studies on Resource management; Sustainable practices; Bioclimatic designs; Vertical green neighborhood; Energy efficiency
- Acquaint with various design considerations for high rise structures like seismic and wind load, structural systems & forces, building services: service core, service floors with relevance to planning criteria; codes & byelaws

REFERENCE BOOKS

1. Francisco Asensio Cerver – The architecture of Skyscrapers – Hearst Book International - New York, 1997
2. Bennetts Ian & others – Tall building structural systems
3. Proceedings of the council for tall buildings – vol 1 & 2

YEAR-5 SEMESTER- X

Subject: ARCHITECTURAL DESIGN THESIS		
Code: ARS 1001	**Credits: 18**	**Hours / Week: 18 hrs.**
Progressive Marks: 200	**Examination Marks: 200**	**Mode of Exam: Jury**

COURSE OVERVIEW

The semester is focused on getting the student to reflect the knowledge gained from all the courses undertaken by the student in all the previous semesters.

OBJECTIVES

- To demonstrate an ability to comprehend the nature of architectural problem and create a brief which sets the frame work for design.
- To develop design abilities for demonstration of research & base work studies done in Pre-Thesis stage for the identified domain.
- To develop the investigative skills of students, through researching one of the topic areas covered in the course.

COURSE CONTENT:

Unit I: Synopsis and Project Brief
Each student is expected to prepare a project brief based on the preliminary work undertaken during Pre-Thesis, under an approved guide/adviser by the department along with submission of the revised/updated synopsis undertaken in the previous semester.

Unit II: Preliminary Investigative analysis
Detailed Literature should be made in terms of facilities and areas along with Literature case studies and Primary case studies (Minimum 2) in order to draw inferences for application as design guidelines apart from preparing a detailed design Program.
Each student has to elaborate on the **special study** conducted and submit presentations showcasing its relevance to their topic, scope of influence and the inferences gained from the respective study.

Unit III: Design development
Design Development will have contents such as form development, stress on focus, development of spaces, aesthetics, services, Landscape, sustainability, barrier free etc. It will be represented through various mediums such as sketches, conceptual drawings, design drawings, technical drawings, models & report
The following are the basic guidelines for planning the thesis design project and its submissions:

1. Detailed site study of existing site conditions and context and evolving design directives and concept.
2. Case studies to be clubbed with library research and surveys.

3. Site restrictions should be followed as applicable for building byelaws of parking, FAR, fire, security and other services.
4. Initial concept stage to experiment with shapes and forms to evolve a built volume through block model studies.
5. Incorporating landscape to understand interaction between built and open space.
6. Study and address issues like movement of people and traffic, services, waste disposal management etc.
7. Develop details for use of materials, lighting, landscape and services.
8. Final proposal to include specialized aspects of service details, assessment of environmental impact, innovative structural systems and materials etc.

Unit IV: Finalization of project drawings/Submission of report-drawings
After finalization of the design process, Presentation drawings shall be prepared along with working drawings, detailed drawings and study model as part of the requirements for submission.

The department shall have a continuous system of evaluation through periodical reviews involving the thesis guides/ advisers, Thesis Coordinator, and HOD, after which the students shall proceed for the final jury to be held at the end of the semester.

The final jury will be conducted by a panel of internal and external examiners.

METHOD OF SUBMISSION

The student, at the end of the semester will have to submit **all original drawings** prepared as per the department's specifications with **three copies of the report** in the specified format along with **a model** and a soft copy of the entire project in a CD after obtaining the approval of the respective guides / advisers.

COURSE OUTCOME

On successful completion of the course each student will be able to:

- Provide solutions to an architectural speculative proposition of design
- Demonstrate a design proposal with cultural, contextual, historical, technological, programmatic concerns of the project which display the skills gained by the student throughout the program.
- Execute advance level design and ability to convert the brief set forth earlier into a design proposal addressing all the dimensions of architecture.