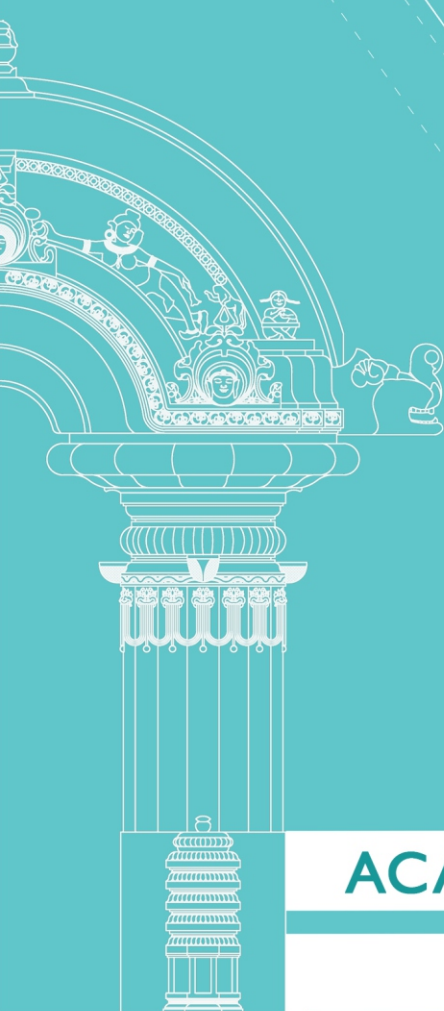


SCHOOL OF ARCHITECTURE & PLANNING



**KALINGA INSTITUTE
OF INDUSTRIAL TECHNOLOGY**

Deemed to be University U/S 3 of UGC Act, 1956



ACADEMIC CURRICULUM - B.ARCH

2019-20

School of Architecture & Planning

Kalinga Institute of Industrial Technology
KIIT Deemed to be University



Syllabus
for
Bachelor of Architecture (B. Arch)
(Implemented from 2019-2020)

Bachelor of Architecture (B. Arch)

Programme Educational Objectives (PEOs):

The B. Arch program aims to prepare the graduates with the following objectives:

1. **PE01**-To inculcate best practices in pedagogy with Innovating use of technology.
2. **PE02**-To be a champion for social good and inclusiveness and engage themselves with ethical practices.
3. **PE03**-To remain at the forefront of technology and keep themselves abreast with the latest trends and use it to make informed decisions through planning, design and implementation.
4. **PE04**-Understand the built environment issues to find solutions through appropriate skills of design, engineering services, technology, behavioral studies, etc.
5. **PE05**-To recognize the challenges of environmental depletion and arm themselves with the right approach to protect, nurture and restore the damage through sustainable principles.
6. **PE06**- To be aware of resources and their uses.
7. **PE07**-To have participation of professionals & Industry experts from core and allied areas, International Partnerships and Industry Collaborative workshops , Training the trainers by Industry, Joint Publications, Participation in Student competitions.
8. **PE08**- To recognize the deep-rooted heritage of human civilization and be an ambassador of historic preservation and take the cultural values to a new level.

Programme Outcomes (POs):

The Programme Outcomes are:

1. Understanding the basic philosophy and fundamental principles of the multidimensional aspects and multi-faceted nature of architecture.
2. Preparing the students to acquire and enhance creative problem solving skills including critical thinking and assessment and developing design concepts and solutions and presentation of these skills.
3. Performing standard proficiencies, in harmony with the scope of local practice of architecture in particular and the global practice in general i.e. making the student market ready or employable.
4. Preparing the students to work effectively in a multi-disciplinary/inter-disciplinary team in the building industry, by providing 360 degree knowledge of architecture.
5. Directing and focusing the thrust of architecture education to the needs and demands of society and its integration for social, economic, cultural, and environmental aspects of nation building.
6. Instilling receptiveness to new ideas and knowledge and infusing a sense of scientific research.
7. Developing the overall personality and professional confidence of the student towards all the stakeholders in the building industry.

COURSE STRUCTURE

SEMESTER I

	Theory					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 113	History of Architecture-I	03	00	00	03
2.	AR 123	Building Material-I	03	00	00	03
4.	AR 133	Introduction to Architecture	03	00	00	03
3.	HU 142	Professional communication	02	00	00	02
	Sessionals					
5.	AR 154	Basic design-I	00	00	06	04
6.	AR 164	Building construction-I	00	00	06	04
7.	AR 173	Descriptive Geometry- I	00	00	04	03
8.	AR 182	Workshop	00	00	03	02
		Total	11	00	19	24

SEMESTER II

	Theory					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 213	History of Architecture-II	03	00	00	03
2.	AR 223	Building Material-II	03	00	00	03
3.	CE 233	Structure - I	03	00	00	03
4.	CE 243	Surveying & Levelling	03	00	00	03
	Sessionals					
5.	AR 254	Basic design-II	00	00	06	04
6.	AR 264	Building construction-II	00	00	06	04
7.	AR 273	Descriptive Geometry- II	00	00	04	03
8.	AR 283	Forms and Elements of Art	00	00	04	03
9.	AR 292	Field trip & Measured drawing	00	00	03	02
		Total	12	00	23	28

SEMESTER III

	Theory					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 313	History of Architecture-III	03	00	00	03
2.	AR 323	Building Services-I	03	00	00	03
3.	CE 333	Structure - II	03	00	00	03
4.	AR 343	Climatology	03	00	00	03
5.	HU 352	Behavioural Architecture -I	02	00	00	02
	Sessionals					
6.	AR 366	Architectural Design-I	00	00	08	06
7.	AR 374	Building Construction-III	00	00	06	04
8.	AR 382	Computer Aided Design- I	00	00	03	02
		Total	14	00	17	26

SEMESTER IV

	Theory					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 413	Contemporary Architecture	03	00	00	03
1.	AR 423	Building Services-II	03	00	00	03
3.	CE 433	Structure - III	03	00	00	03
4.	HU 442	Behavioural Architecture -II	02	00	00	02
	Sessionals					
8.	AR 453	Working Drawing-I	00	00	04	03
5.	AR 466	Architectural Design-II	00	00	08	06
6.	AR 474	Building construction-IV	02	00	04	04
7.	AR 482	Computer Aided Design- II	00	00	03	02
		Total	13	00	19	26

SEMESTER V

	Theory					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 513	Vernacular and South East Asian Architecture	03	00	00	03
2.	AR 523	Building Services-III	03	00	00	03
3.	CE 533	Structure - IV	03	00	00	03
4.	AR 543	Estimation & Specification	03	00	00	03
5.	AR 553	Architectural Conservation	03	00	00	03
	Sessionals					
5.	AR 566	Architectural Design-III	00	00	08	06
8.	AR 573	Working Drawing-II	00	00	04	03
		Total	15	00	12	24

SEMESTER VI

	Theory					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 613	Landscape Architecture	03	00	00	03
2.	AR 623	Building Services-IV	03	00	00	03
3.	CE 633	Earthquake resistant Structures	03	00	00	03
4.	AR 643	Green Architecture	03	00	00	03
5.	AR 652	Universal design	02	00	00	02
	Sessionals					
5.	AR 666	Architectural Design-IV	00	00	08	06
6.	AR 673	Landscape Design	00	00	04	03
		Total	14	00	12	23

SEMESTER VII

	Theory					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 713	Speciality Building Design	03	00	00	03
2.	AR 723	Advanced building Services	03	00	00	03
3.	AR 733	Construction Project Management	03	00	00	03
4.		Departmental Elective I	02	00	00	02
	Sessionals					
5.	AR 768	Architectural Design-V	00	00	10	08
6.	AR 773	Interior Design	00	00	04	03
		Total	11	00	14	22

SEMESTER VIII

	Theory					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 813	Theory of Architecture	03	00	00	03
2.	AR 823	Principles of Town Planning & Urban Design	03	00	00	03
3.	AR 833	Housing	03	00	00	03
4.	AR 843	Real Estate Valuation	03	00	00	03
5.		Department Elective II	03	00	00	03
	Sessionals					
6.	AR 878	Architectural Design-VI	00	00	10	08
		Total	15	00	10	23

SEMESTER IX

	Sessionals					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 916	Professional Training	16 Weeks			06
2.	AR 923	Site Supervision Training				03
3.	AR 932	Field observation Studies				02
4.	AR 942	Critical Appraisal of building projects				02
5.	AR 953	Field documentation and architectural details				03
		Total				16

SEMESTER X

	Theory					
Sl. No.	Course Code	Subject	Contact periods			Credit
			L	T	P	
1.	AR 1013	Building Bye-laws & Professional Practice	03	00	00	03
2.		Department Elective III	03	00	00	03
3.		Department Elective IV	02	00	00	02
	Sessionals					
3.	AR 10610	Architectural Design-Thesis	00	00	12	10
4.	AR 1072	Viva Voce	00	00	03	02
5.	AR 1082	Seminar	00	00	03	02
		Total	08	00	18	22

LIST OF ELECTIVES DEPARTMENTAL ELECTIVES

Elective –I

Sl.No	Subject Code	Subject Name	Credit
1.	AR 742	Ergonomics & Product Designing	02
2.	AR 752	Prefabrication & Modular Co-ordination	02

Elective –II

Sl.No	Subject Code	Subject Name	Credit
1.	AR 853	Disaster resistant Architecture	03
2.	AR 863	Cost effective housing	03

Elective –III

Sl.No	Subject Code	Subject Name	Credit
1.	AR 1023	Real Estate Management	03
2.	AR 1033	Industrial Architecture	03

Elective –IV

Sl.No	Subject Code	Subject Name	Credit
1.	AR 1042	Architecture Journalism	02
2.	AR 1052	Aesthetics & Art Appreciation	02

DESCRIPTION OF CODING:

AR:	Represents Architecture
CE:	Represents Civil
HU:	Represents Humanities
First Digit:	Represents Semester
Second digit:	Represents serial no. of that particular subject
Third digit:	Represents Credit

Total No. of Credits: 234

Total No. of Teaching Hours: 254

SEMESTER –I

AR 113 HISTORY OF ARCHITECTURE-I

INTENT

- To provide an insight to the European Architecture.
- To study forms, purposes, and most importantly the evolution of significant historical buildings.
- To visualize a building or city as more than a visual phenomenon and to understand how architecture influences society and its culture.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Do a comparative analysis of various civilizations, appreciating chronological developments along the timeline and across geographies.
2. Develop an understanding of how different architectural styles evolved within the restraints imposed by prevalent social and cultural environment, availability of materials, climate and geography.
3. Understand the factors that influence the evolution of early forms of the Christian church in Europe, West Asia and the Far East.
4. Distinguish place- and period-specific architectural styles, technology, and ornamentation of religious architecture in Europe, West Asia and the Far East.

CONTENT

Module I: River valley cultures

- a) Early civilisations along the Indus valley. Characteristics of cities, e.g Mohenjodaro & Harappa, House plan, Great Bath, Granary.
- b) Mesopotamia Civilisation- Sumerian culture, art & architecture.e.g Ziggurats at Warka & Ur Assyrian culture- e.g Palace of Sargon
- c) Ancient civilization along Nile river-Egyptian civilization. E.g Mastaba Tombs, Pyramid of Cheops at Giza, Temple of Khons.

Module II: Classical Greek Period

- a) Greek orders, Doric, Ionic and Corinthian
- b) The Acropolis at Athens, Parthenon
- c) Propylaea, Theatre, Stadium and Agora

Module III: Classical Roman Period

- a) Roman vaults & domes
- b) Roman Orders, Tuscan and Composite
- c) Temples: Temple of Pantheon
- d) Basilicas: Basilica of Trajan
- e) Roman Bath: Thermae of Caracalla
- f) Amphitheatre: Colosseum

Module IV: Early Christian Period

- a) Architectural Character, various typologies of churches
- b) Eg: Basilica church, Baptistry at Nocera

Module V: Byzantine Period

- c) Architectural Character, pendentive domes
- d) Eg: Hagia Sophia

Module VI: Gothic Period

- a) Early Gothic style and Late Gothic style, towers & spires, pointed arches.
- b) Eg Notre Dame, Paris

Reference books:

- 1) Sir Fletcher Banister, A History of Architecture: University college of London, The Antholone Press, 20th edition, 1996.
- 2) Kostof S., A History of Architecture: Settings & Rituals; Oxford University Press, 1985.
- 3) Crouch Dora P., History of Architecture: Stonehenge to Skyscrapers: McGraw-Hill Press, September 1, 1984.
- 4) Risebero Bill, the Story of Western Architecture: Herbert Press Ltd, November 30th 2001.

AR 123 BUILDING MATERIALS-I

INTENT

General introduction to buildings and to develop knowledge of material science and behavior of various materials like clay, bricks, terracotta, stones used in construction.

COURSE OUTCOMES

With the successful completion of the course student should able to

- 1. Understand manufacturing Process of Products.
- 2. Access the quality of material by Laboratory/ Field testing.
- 3. Understand the behavior of material or product for its adaptability at site or construction.
- 4. Understand construction or manufacturing procedure.
- 5. Understand the chemistry of material composition to access its durability.
- 6. Understand History of rock formation and its quarrying operation.

CONTENT

Module I

Properties of Building Materials

- a) Physical and mechanical properties
- b) Types of Building materials: abrasive, Adhesive, Covering, Flooring, fuels etc

Soils: Formation – Index property, Specific gravity, grain size distribution,

plasticity, characteristics and phase relationship, Identification, Local names, I.S.I. Classification, Sources and uses of sand, fineness modulus.

Module II

- a) **Stones:** Types and their qualities and their methods of quarrying.
- b) **Bricks:** Types and their qualities and their manufacture.

Module III

- a) **Lime:** Fat and Hydraulic lime, their uses and properties, manufacture of lime, preparation of lime mortar, functions and requirements of good mortar, mix proportions of various works.
- b) **Cement:** Type, properties, composition and manufacturing process and setting of cement composition of cement mortar. Plastering. Brief idea on Reinforced Cement Concrete.

Module IV

- a) **Cement Products :** Mosaic tiles, CC work etc., Proportions, constitute materials of plain cement concrete including light weight concrete , aerated , cellular, form and such other types of cement concrete products , artificial stone.

Text books:

1. Rangwala, S.C., Engineering Materials: Charotar publishing house, Anand, 1982

Reference books:

1. Rangwala, S.C., Engineering Materials: Charotar publishing house, Anand, 1982
2. Rangwala, S.C., Building Construction; Charotar publishing house, Anand.
3. Bailey, Harold, Hancock David W., Brickwork and Associated studies, Vol I-III ; Palgrave Mcmillan,1990
4. Harold, Rosen J., Construction Materials for Architecture; Krieger Pub Co 1991.
5. Merritt, Frederick, S. & Ricketts, Jonathan, T., Building Design and Construction Handbook; Mcgraw-hill, ISBN: 9780070419995, 6th edition.

AR 133 INTRODUCTION TO ARCHITECTURE

INTENT

- The students will get introduced to the various layers of Architecture, their synthesis and Architecture as a physical act of making in the environment.
- The students will become aware of the fundamental tools necessary to think, assess, and act in shaping the built environment.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the various layers of Architecture, their synthesis as a physical act of making in the environment.
2. Aware of the fundamental tools necessary to think, assess, and act in shaping the built environment.

3. Introduce to various construction materials and techniques of building.
4. Gain knowledge on branching subjects like landscaping, city planning and urban design etc.
5. Know about master architects and their works around the world as well as, Indian architects and their practices.
6. Think critically by looking and analyzing the elements of a building.

CONTENT

Module I: Placing Architecture:

- a) Site & Orientation
- b) Climate
- c) Forms and Spaces
- d) Understanding the City & landscape

Module II: Construction

- a) Materials
- b) Elements of Construction
- c) Prefabrication & Reinvention
- d) Sustainability & Innovative Materials

Module III: Contemporary Ideas

- a) Universal Ideas and Principles
- b) Functionalism
- c) Sculptualism and Monumentalism

Module IV: Eminent Architects – Brief history & TWO of their best works

- a) Le Corbusier
- b) Philip Jhonson
- c) B.V.Doshi
- d) Charles Correa
- e) Laurie Baker
- f) Zaha Hadid
- g) Patrick Geddes
- h) F.L Wright
- i) Walter Gropius
- j) Frank Gehry
- k) Alvar Aalto
- l) Louis I kahn
- m) Antoni Gaudi
- n) Mies van der Rohe

Module V: Realisation

- a) The Project Timeline
- b) Contributors and Their Roles

- c) The Brief & Concept
- d) Site Analysis
- e) The Design Process
- f) Detail Development
- g) The Finished Building

Reference Books:

1. Farrelly, Lorraine, Fundamentals of Architecture; AVA Publishing, 2007.
2. Snyder, James, C., Introduction to Architecture; McGraw-Hill, 1979.
3. Lewis, Roger, K., Architect? A Candid Guide to the Profession; The MIT Press; revised edition edition, 1998.
4. Roth, Leland, M., Understanding Architecture: Its Elements, History, and Meaning; Icon Editions 1993.
5. Ching Francis D.K. ; Architecture: Form Space and Order; Van Nostrand Reinhold Co., (Canaa), 1979.

HU 142 PROFESSIONAL COMMUNICATION

INTENT

The students will develop skills in effective communication – both written and verbal.

COURSE OUTCOME

With the successful completion of the course student should be able to

1. Communicate formally.
2. Express their ideas comprehensively (verbal & written)

CONTENT

Module I:

Simple grammar: using appropriate words, filling of blanks, completing of sentences, active and passive voice, correcting mistakes in texts. Use of proverbs, metaphors.

Module II:

Reading and listening comprehension: to develop the ability to read and listen with understanding and draw reasoned conclusions.

Module III:

Interpretation of materials: such as questionnaires, application forms, analysis of materials such as texts, reports, technical literature.

Module IV:

Writing: To develop the ability to write concisely and correctly and present ideas in a logical manner.

Reference Books:

1. Leech Geoffrey and Swartvik Jan, A communicative Grammar of English: Longman 2002.
2. J.D. O'connor, Better English Pronunciation; Cambridge University Press,1980
3. J.K. Chand, J.K., and Das B.C., A Millennium Guide to writing and Speaking English; Friends' Publishers
4. Sealy, John, Oxford Guide to Writing and Speaking English, Oxford University Press, 2nd edition, 2005.
5. Bovee, Courtland, L., Thill, John & Chatterjee, Abha, *Business Communication Today*; Pearson Education,12th Edition.

AR 154 BASIC DESIGN – I**INTENT**

1. The students will get familiarized with the Basic design elements & principles.
2. Sensitized students to be more observant to their surroundings and environment.

COURSE OUTCOMES

With the successful completion of the course student should have capability to

1. Analyse basic design elements and 2D form exploration.
2. Familiarize with the concepts of materiality and application of textures on forms & spaces.
3. Be observant of their surroundings and environment through sketches and color theory.
4. Understand the scale and anthropometry.

CONTENT**Module I: Introduction to Design**

- a) Elements of design like line, shape, form, colour, texture.
- b) Exploration of patterns with 2 D compositions.
- c) Exploration of forms with 3 D compositions.

Module II: Introduction to Painting

- a) Use of Painting tools and materials like easels, brushes, paper, water colour, poster colour etc., Colour theory, colour wheel, Primary, secondary and tertiary colours, colour schemes, exercises in understanding of colour value and intensity.

Module III: Study of Anthropometrics

- a) Exercises to understand human scale.
- b) Short exercises on form and shape where Anthropometrics can be used.

Reference Books:

1. Parmar, V.S., Design fundamentals in Architecture, Somaiya publications private limited, New Delhi.
2. Ching Francis D.K., Architecture-Form, space and order, Wiley Publication, 2nd edition, 1996.
3. Wong, Wucious, Principles of two dimensional design; John Wiley & Sons, 1972.
4. Meisis, Von, Elements of Architecture: From Form to Place; Taylor and Francis, 1990.
5. Krier, Rob, Architectural Composition; Edition Axel Menges; Reprint edition, 2010.
6. Itten, Johannes, Design and Form: The Basic Course at the Bauhaus and Later, Revised Edition, 1975.

AR 164 BUILDING CONSTRUCTION - I**INTENT**

To make students aware of different masonry techniques and surface finishes using brick, stone and concrete blocks.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Identify and differentiate various building elements and their use.
2. Understand Masonry Construction of bricks, stone, concrete block as per their use in building.
2. Understand the different surface finishes and their application.

CONTENT**Module I: Brick Nomenclature**

Nomenclature associated with Brick masonry, Brick Sizes: Modular and Local Bricks, Brick types: Solid, Hollow Bricks, Bats and Closures, Orientations,

Module II: Brick Work

Types of bonds: Stretcher, Header, English, Flemish, Decorative, Rat Trap Bond, Brick Columns, Joints in walls. Concept of plumb line, perpend, mortar (both half brick and full brick wall thicknesses).

Representation of Bricks in Architectural Drawings. Corbelling, String courses, Lacing courses, sill course etc. Idea about techniques of laying bricks, workmanship, plastering and pointing

Module III: Stonework

Nomenclature Associated with Stone masonry, Dressing types; Random Rubble and Ashlar masonry, Stone bonds, Dry masonry, mortar joints, Corbelling, String courses, Cornices and Copings, . Idea about stone foundations and laterite work.

Module IV: Concrete Blocks

Hollow and Solid.

Reference Books:

1. Ching Francis D.K, Building Construction Illustrated; Wiley Publication, 4th Edition, 2008.
2. McKay W.B, Building Construction, Vol I to IV; Orient Blackswan, 1971, ISBN 812500940X, 9788125
3. Barry.R., The Construction of Buildings. Vol.I-1-Vol-V; Blackwell Science, 1996.
4. Chudley.R., Greeno Roger, Building Construction Handbook; Butterworth-Heinemann, 2008, ISBN 0750686227, 9780750686228
5. S.C. Rangwala, Engineering Materials , Charotar publishing house, Anand, 1982

AR 173 DESCRIPTIVE GEOMETRY-I

INTENT

- This subject is for familiarizing students with geometric forms and making them comprehend and visualize them in three dimension.
- The exercises they will do during these sessions will help them gradually develop their understanding of geometry of simple lines to complex solids, which is the very foundation of architectural education.

COURSE OUTCOMES

With the successful completion of the course student should have capability to

1. Understand geometry, tools and their application in architecture.
2. Know hand drafting skills and its importance, and various methodologies to be used in higher semesters.
3. Apply various methodologies of architectural representation.

CONTENT

Module I: Introduction

Introduction to Drawing Instruments, and their uses.

Module II: Lettering & Scale

Exercises on architectural lettering. Engineering and Graphical Scale, Representative Factor.

Module III: Geometrical Construction

Concept and types of lines and angles. Line thickness. Dimension lines, Construction of Lines, Construction of planes like triangles, Quadrilaterals, polygons, ellipse. Construction of curves like parabola, hyperbola and involutes.

Module IV: Orthographic Projections

Definition, Meaning & concept, Principles and Methods of projection, Planes of projection. First angle & Third angle projection.

Module V: Projection of points, lines & planes.

Module VI: Projections of solids.

Text books:

1. Bhatt N.D. & Panchal V.M., Engineering Drawing; Charotar Publishing House, Anand, 2004

Reference books:

1. Bhatt N.D. & Panchal V.M., Engineering Drawing; Charotar Publishing House, Anand, 2004.
2. Bhatt N.D., Elementary Engineering drawing; Chartor publishing house, 1990.
3. Parkinson A.C., A First year Engg. Drawing; Sir Issac Pitman and sons, London, 1959.
4. Black, Earl, D. Engg. and Technical Drawing; Van Nostrand Reinhold Company, 1972.
5. S.C.Sharma, S.C., Engg.. Drawing; S.Chand & Company, New Delhi.

AR 182 WORKSHOP

INTENT

- Get trained to the Basic skills of Carpentry.
- The basic model making materials and helping them perceive various 3D forms.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand the basic skills of carpentry
2. Perceive various 3D forms to enhance their understanding of basic principles of design, materials, and stability
3. Familiarize with basic model-making materials
4. Reuse and recycle waste materials.
5. Enhance their creativity by blending music and other arts with visual arts.

CONTENT

Module I: Carpentry Tools

Introduction to the use of different types of tools used in carpentry.

Module II: Timber Joints

Different types of joints, joinery details (which are commonly used in timber construction and interiors.

Module III: Exposure to model making materials

Making of Geometrical Forms using Mount Board, Thermocol, Wire, Mud, and POP.

SEMESTER –II

AR 213 HISTORY OF ARCHITECTURE-II

INTENT

- Insight on the evolution of Indian Architecture and its eras.
- Understand different architecture solutions that evolved within the restraints imposed by prevalent social and cultural setup, available building materials, climate and geography of particular region.

COURSE OUTCOME

With the successful completion of the course student should be able to

1. Know about the origins of Indian Architecture and its eras. Understanding of Hindu mythological spaces, architecture, space planning and city planning/civilization.
2. Overview and understand the timeline of Indian rulers and their various Influences and Culture prevalent in Indian Architecture, starting from Indus Valley Civilization (Aryan Invasion).
3. Understand and Analyse the Three widely categorized 'styles of temple architecture', i.e Nagara (North Indian style), Vesara (Central Indian style), Dravidian style (South Indian).
4. Analyse the earliest of temple plans to the most evolved temple plans and spaces like the Kandariya Mahadev temple etc.
5. Have final hand experience of visiting and sketching Kalinga Style Architecture in Old Town of Bhubaneswar.
6. Know various small elements and details of the temple elements and its spatial planning.

CONTENT:

Module I: Ancient India

Aryan Invasion and characters of Aryan culture and Vedic religion, early settlements of Vedic period, their railings and entrances and their influence on later periods, the Mauryan Dynasty, wooden palace and fort.

Module II: Buddhist Architecture

Productions of Ashokan School, Buddhist monuments, Ashokan pillar, Sarnath, Sanchi stupa. Rock cut Architecture, Viharas and chaitya halls in the Hinayana and Mahayana periods. E.g Chaitya at Karle and Viharas of Ajanta caves, Great stupa at Sanchi.

Module III: Jain Architecture

General planning, sitting and decorative treatment of Jain Temples.

Module IV: Early experiments in Hindu Architecture

The evolution in Hindu Architecture, Role of Gupta period, early experiments of Hindu temples, e.g, Udaigiri caves, Temple at Tigawa, temple no 17 at Sanchi, cave temples at Badami, Mahakuta temple at Badami, Ladkhan temple at Aihole, Durga temple at Aihole.

Module V: Indo Aryan Style Architecture

Cosmic theories behind Hindu Architecture, Temple plan and form, Lingaraj temple at Bhubaneswar, Sun temple at Konark & Modhera, Kondariya mahadeva temple at Khajuraho.

Module VI: Dravidian style architecture

Hoysala Architecture: Characters of Hoysala Architecture, the constellated plan. E.g Chana keshav temple at Belur.

Pallava style: Early experiments, E.g Shore temple at mammalapuram, Pancharathas at mahabalipuram, Vaikuntaperumal temple at Kancheepuram.

Chola style: Brihadeswar temple at Tanjavur

Pandya style: Evolution of Gopurams, Annamalaiyar temple at Tiruvannamalai

Vijayanagar style: Unique Architecture style, Hazara rama temple at Vijaynagar

Reference Books:

1. Sir Fletcher Banister, A History of Architecture: University college of London, The Antholone Press, 20th edition, 1996.
2. Brown Percy, Indian Architecture: Buddhist and Hindu periods; D. B. Taraporevala, 1965.
3. Grover, Satish, Architecture in India, Buddhist & Hindu; Vikas Publishing 1980.
4. Thapar Bindia, Manto Surat Kumar, Bhalla Suparna, Introduction to Indian Architecture (Periplus Asian Architecture Series); Periplus editions 2005.
5. Tadgell, Christopher, The History of Architecture in India; Longman Group, U.K. Ltd., London, 1990

AR 223 BUILDING MATERIALS –II

INTENT

- The students will learn and understand the various materials available in the current day and their uses and specifications.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand Manufacturing Process of Products.
2. Access Advantage and Limitation of material/product.
3. Understand the behaviour of material or product for its adaptability at site or construction.
4. Understand Storage and Preservation procedure.
5. Understand the Chemistry of material composition to access its Durability.
6. Understand Economics for use of Products depending on application.

CONTENT

Module-I

Timber:

Meaning of timber, Converted, Rough and Standing Meaning, Classification of trees. Basic idea of structure of a tree. Timber yielding trees: Teak, Sal, Sissoo, Gumar, Mahogany, Bamboo, Deodar with uses of timber from each. Felling of trees. Uses, advantages and disadvantages of timber construction and characteristics of timber, conversion of timber, seasoning, and preservation of timber. Defects in timber, Quality of good timber, factors affecting strength. Industrial timber: Plywood, block board, fibre board.

Module II

Iron and Steel: Cast iron, Steel and wrought iron with properties and uses, brief idea of manufacturing process using Bessemer converter and Open hearth Process. Mild Steel, Medium Carbon Steel and High Carbon Steel and their uses. Physical properties and Magnetic properties. Mechanical Treatment and Heat Treatment
Basic idea with sketches on market forms of Steel.

Module III

Paints and Varnishes:

Definition, Characteristics of ideal paint, PVC number, Bases and vehicles for oil bound paints and functions of each constituents manufacture and properties and uses of ordinary paints, Brief knowledge about Aluminium Paints, cement paints, Emulsion paints, Rubber paints, Enamel Paints, Plastic Paints. Tools and guidance for painting various surfaces (Plastered, wood and Metal) failure and defects. Varnishes, Distempers, Wall Papers, white washing and colour washing.

Module IV

Glass: Types of glass like plate, Composition and properties, Manufacturing process, Treatment of glass,
Special types of glasses: bullet proof, wired, Structural Glass, Glass blocks, Float Glass, Photochromatic, perforated glass, shatter proof glass.
Plastics, Nylon, PVC, Polythene, glass fiber reinforced plastic, UPVC

Text Book:

1. Rangwala, S.C., Engineering Materials: Charotar publishing house, Anand, 1982

Reference book:

2. Rangwala, S.C., Engineering Materials: Charotar publishing house, Anand, 1982
3. Rangwala, S.C., Building Construction; Charotar publishing house, Anand.
4. Bailey, Harold, Hancock David W., Brickwork and Associated studies, Vol I-III ; Palgrave Mcmillan, 1990
5. Harold, Rosen J., Construction Materials for Architecture; Krieger Pub Co 1991.
6. Merritt, Frederick, S. & Ricketts, Jonathan, T., Building Design and Construction Handbook ;
Mcgraw-hill, ISBN: 9780070419995, 6th edition

CE 233 STRUCTURE – I

INTENT

1. Get an introduction to basic principles of structural behavior of building elements.
2. Understand loads and loads on building principles of load analysis.
3. Understand strength of material of building elements.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the structural behavior of building components under loaded condition.
2. Understand in a building structure, the process of load dispersion, from super - structure to foundation soil strata.
3. Understand various types loads applied to building structure.
4. Access the load application and idealization mechanism in building structure to ensure stability of building components and structure as a whole.
5. Investigate various types of load profiles applied to structural members.
6. Access the strength of building materials like steel, concrete (RCC).

CONTENT:

Module 1

- a. Understanding behavior of structural elements in compression, tension, bending and torsion.
- b. Introduction to types of building elements – footing, column, beam, slab etc.
- c. Understanding process of design of building elements; tributary load, load path and load transfer in frame structure.
- d. Types of loads and loads for building considered for design.

Module 2

Principles of statics – force (definition, characteristics, types, and units), composition and resolution of concurrent forces in 2D, resultant force, equilibrium of forces in 2D, moment, couple.

Module 3

Centre of gravity and calculating C.G. of plane figures of various geometrical shapes, composite figures.

Module 4

Moment of inertia of plane figure- parallel axis and perpendicular axis theorem, application of M.I. , calculation of M.I. of composite sections and other geometrical shapes (triangle, circular and semicircular sections etc.)

Module 5

Basic understanding of stress, strain ,Hooke's law, modulus of elasticity, stress in composite bar, thermal stress, linear and lateral strain, Poisson's ratio, shear stress and strain.

Module 6

- a. Types of loads on beam, supports, type of beams, concept of shear force and bending moment, free body diagram of structure.
- b. Shear force and bending moment diagram for simple cases of beams and for concentrate and distributed loads.

(Important guideline: Teachers shall explain the theory with simple numerical examples only)

Reference Books:

1. Bansal R.K, Bhansal Sanjay , Engineering Mechanics Laxmi Publications , 5th edition 2008
2. Bhavikatti S. S., Rajashekarappa K. G. Engineering Mechanics New Age International publication.
3. Williams Martin, Todd J D Structures : theory and analysis ,Mac Millan publications
4. Bhavikatti SS, Strength of material Vikas Publication 3rd edition 2008
5. Khurmi R S, Khurmi N, Strength of materials S. Chand publications 24th edition

CE 243 SURVEYING & LEVELLING

INTENT

- To illustrate the role of Surveying and Leveling in Architecture.
- And get introduced to the Tools and Equipment for Land Surveying.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Illustrate the role of surveying in architecture.
2. Understand to the tools and equipment for land surveying.

CONTENTS:

Module I: Introduction

Introduction to surveying, understanding land topography and its relevance in Architecture. Types of surveys in practice. Introduction to survey equipment.

Module II: 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.

Module III: Compass Surveying

The prismatic compass, its construction and uses. Other types of compasses. Reduced and whole circle bearing, magnetic declination, effects of local attraction. Compass traverse and balancing the closing error.

Module 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.

Plane Tabling: Equipment and methods. Two points and three points' 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.

Module V: Theodolite Surveying

Theodolite, its temporary and permanent adjustment, measuring of magnetic bearings, horizontal and vertical angles. Theodolite traverse and balancing the closing error.

Module VI: Tachometric Surveying

General instruments, different systems of tachometric measurements, stadia method, Sub tence method.

Text Book:

1. Purnia, B.C., Surveying - Vol – I; Firewall Media, 01-Jan-2005.

Reference books:

1. Kanetkar, T.P., & Kulkarni, S.V., Surveying & levelling Vol – 1; Pune Vidyarthi Griha Prakashan, 1988
2. Purnia, B.C., Surveying - Vol – I; Firewall Media, 01-Jan-2005.
3. Husain, S.K., & Nagraj, M.S., Surveying; S. Chand, Limited, 2000.
4. Clancy, John, Site Surveying and Levelling; Edward Arnold, 1991.
5. Basak, N.N., Surveying And Levelling; Tata McGraw-Hill Education, 1994.

AR 254 BASIC DESIGN – II

INTENT

- Familiarization with ordering principles of Basic design.
- To sensitize students about form generation, anthropometrical correlations with spaces..

COURSE OUTCOMES

With the successful completion of the course student should have capability to

1. Analyse of basic design elements and 3D form exploration for the students.
2. Familiarize to the concepts of materiality and application of textures on exterior and interior spaces.
3. Synthesize complex geometry and form based spaces.
4. Apply the scale, proportion & anthropometry with space.

CONTENT

Module I: Principles of Architecture

Principles of architectural composition unity, balance, proportion, scale, rhythm, contrast, harmony, accentuation, restraint, definition, repose, vitality, strength.

Module II: Exploration of Forms

Exploration of forms & shapes using above mentioned principles.

Module III: Anthropometrics & Human circulation

User's data, Movement and circulation diagrams. Exercises to understand movement, circulation. Short exercises in design like plazas, bus shelters using design principles, circulation, and anthropometrics.

Reference Books:

- 1.Parmer,V.S., Design fundamentals in Architecture, Somaiya publications private limited, New Delhi.
- 2.Ching Francis D.K., Architecture-Form, space and order, Wiley Publication, 2nd edition, 1996.
- 3.Wong,Wucious, Principles of two dimensional design; John Wiley & Sons,1972.
- 4.Meisis, Von, Elements of Architecture: From Form to Place; Taylor and Francis, 1990.
- 5.Krier, Rob, Architectural Composition; Edition Axel Menges; Reprint edition, 2010.
- 6.Itten, Johannes, Design and Form: The Basic Course at the Bauhaus and Later, Revised Edition, 1975.

AR 264 BUILDING CONSTRUCTION - II

INTENT

Get introduced to fenestration in Building skin.

COURSE OUTCOMES

With the successful completion of the course student should able to

- 1.Identify and differentiate types of windows as per the material, operation, usage, joinery, finishes, etc.
- 2.Understand the different types of lintels as per the material, structural strength, usage, shape.
- 3.Understand the forms, material, and structural performance of different types of arches in buildings.
- 4.Understanding the use, location and construction details of skylights in building.
- 5.Understand the function, types and details of curtain wall in the external facade of the building.

CONTENT

Module I: Doors

Types of doors, construction techniques, decorative panel doors, glazed doors, flush doors and calculation of woodwork.

Module II: Windows

Detail of timber frames & shutters, fixed shutters, Calculation of woodwork.

Module III: Lintels

Module IV: Arches

Module V: Skylights

Module VI: Curtain Wall detailing

Reference Books:

1. Ching Francis D.K, Building Construction Illustrated; Wiley Publication, 4th Edition, 2008.
2. McKay W.B, Building Construction, Vol I to IV; Orient Blackswan, 1971, ISBN 812500940X, 9788125
3. Barry.R., The Construction of Buildings. Vol.1-Vol-V; Blackwell Science, 1996.
4. Chudley.R., Greeno Roger, Building Construction Handbook; Butterworth-Heinemann, 2008, ISBN 0750686227, 9780750686228
5. Rangwala S.C., Engineering Materials, Charotar publishing house, Anand, 1982

AR 273 DESCRIPTIVE GEOMETRY-II**INTENT**

- Understanding complex forms, their surface development, angular projections & sciography.
- Application of the same in development of basic design skills.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand complex geometrical fundamentals and their application in architecture.
2. Aware about the 3 dimensional geometrical projections.
3. Understand and Apply perspective drawing techniques, its geometrical and architectural implementation.

CONTENT**Module I: Section of Solids**

- a) Section plans, Sections, True shape of a section.
- b) Section of solids (Prisms, Pyramids, Cylinders, Cones, Spheres.)

Module II: Development of Surfaces:

- a) Introduction and Methods of development of surfaces.
- b) Development of lateral surfaces of right solids like Cubes, Prisms, Cylinders.
- c) Method of drawing the development of the lateral surface of a pyramid & Cone.

Module III: Isometric Projections:

- a) Introduction/ Meaning of Isometric Projections.
- b) Isometric drawing of Solids.

Module V: Axonometric Projections:

- a) Introduction/ Meaning of Axonometric Projections.
- b) Axonometric drawing of Solids.

Module V: Perspective Projections:

- a) Introduction/ principles of perspective Projections.
- b) Definition of Perspective elements like Ground plane, Station point, Horizontal plane etc.
- c) Methods of drawing 2 point Perspective view.
- d) Methods of drawing one point perspective.

Module VI: Sciography:

- a) Introduction/ Meaning of sciography
- b) Projection of sciography in plan and elevations.

Text Book:

Bhatt N.D. & Panchal V.M., Engineering Drawing; Charotar Publishing House, Anand, 2004.

Reference books:

1. Bhatt N.D. & Panchal V.M., Engineering Drawing; Charotar Publishing House, Anand, 2004.
2. Bhatt N.D., Elementary Engineering drawing; Chartor publishing house, 1990.
3. Parkinson A.C., A First year Engg. Drawing; Sir Issac Pitman and sons, London, 1959.
4. Black,Earl, D.. Engg. and Technical Drawing; Van Nostrand Reinhold Company,1972.
5. S.C.Sharma,S.C, Engg.. Drawing; S.Chand & Company, New Delhi.

AR 283 FORMS & ELEMENTS OF ARTS

INTENT

- Free expression & creativity and develop an insight towards sensibility and aesthetic appreciation of the surrounding.
- To develop a practical understanding of and competence in the principles and skills underlying visual and constructional design and problem-solving.

COURSE OUTCOMES

With the successful completion of the course student have capability to

1. Appreciate free expression & creativity and develop an insight towards sensibility and aesthetic appreciation of the surrounding.
2. Develop a practical understanding of and competence in the principles and skills underlying visual and constructional design and problem-solving.
3. Understand and apply rendering techniques of architectural drawings and views.

CONTENT

Module I: Painting

The student will be expected to use various mediums of paints, with selection and care of brushes, to carry out colour mixing (primary, secondary, tertiary and complementary), to apply smooth coats, textured paint, and washes, to analyse and paint local colour: and these should be learnt in conjunction with basic pictorial composition from observation and imagination, using foreground and atmospheric perspective to create depth and form, as well as linear perspective.

Module II: Mural making

Students will be creating murals from their own observations and imaginations using various

materials and colours.

Module III: Photography

Students will be introduced to various elements of Photography, types of Cameras, Development, and Darkroom Equipment & Processing. They will be exposed to use camera for the still life & moving objects.

Module IV: Three Dimensional Art, Craft and Design

Three-dimensional work to include examples from fine art sculpture, clay modeling, Pottery and Metal Craft. In this module, students will be able to understand the concept of modeling and importance of volume in the space. They will be able to make 3D miniatures of objects available in their surroundings or from their own visualisations. They will develop skills to use the tools available, the quality of material, their behavior, maintenance and durability.

Module V: Textile Design

Basic understanding of Fundamental of Textile Design and exposure to weaving Texture & Design, Block Printing & Screen printing.

Module VI: Art Appreciation

Introduction to various types of Art forms. Learning to appreciate Art works.

AR 292 FIELD TRIP & MEASURED DRAWING

INTENT

Understanding building construction via careful documentation of Historical, Vernacular and Contemporary architecture.

COURSE OUTCOMES

With the successful completion of the course student have capability to

1. Understand the building and its various components.
2. Analyse a historic building, site/ensemble & precinct.
3. Measure all components and detailing of all elements.
4. Present the findings in documentation format, i.e, drawings and video documentation.

CONTENT:

Vacation Assignment/ Study tour is to be undertaken after the end of II semester exam and before the commencement of IIIrd semester classes. This assignment could be a measured drawing and documentation of a noted building or a study tour for visiting places of architectural interest. The choice of the building to be documented and the places to be visited is left to the concerned department. The assignment may be given as group work (4 to 6 students per group). The students have to submit a report on the measured drawing or the study tour within 15 days from the beginning of the IIIrd Semester. The reports are to be assessed by the departments for progressive marks.

SEMESTER –III

AR 313 HISTORY OF ARCHITECTURE-III

INTENT

Understanding of the evolution of Islamic architecture in its various stylistic modes, characterized by technology; ornamentation & planning practices.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the evolution of Islamic Architecture in its various stylistic modes
2. Understand the technology, ornamentation and planning practices
3. Analyse the Design Application
4. Identify Context specific Architecture
5. Learn the importance of Islamic period and Colonial period towards developing the Architecture
6. Develop the Design Application

CONTENT

Module I

1. Development of Islamic Architecture in India.
2. Characteristic feature of Islamic Architecture (Islamic Architecture in Delhi)
 - a) Qutb Complex
 - b) Jama Masjid
 - c) Humayun's Tomb
 - d) Red Fort

Module II

3. Islamic Architecture of Agra and Fatehpur Sikri
 - a) Agra Fort
 - b) TajMahal
 - c) Moti Masjid , Agra
 - d) Jami Masjid , Fatehpur Sikri
 - e) Panch Mahal, Fatehpur Sikri
 - f) Diwan-e-Khas, Fatehpur Sikri
4. Provincial Style of Bijapur: Characteristic feature
 - a) Gol Gumbaj
 - b) Ibrahim Rouza
 - c) Jami Masjid

Module III

5. Provincial Style of Gujrat: Characteristic feature
 - a) Jama Masjid of Ahmedabad

Module IV

6. Provincial Style of Bengal: Characteristic feature Adina Mosque

Module V

7. Provincial Style of Golkunda and Malwa: Characteristic feature and examples
- a) Golkunda
 - b) Charminar
 - c) Malwa-jahaz mahal

Module VI

8. Colonial Architecture in Delhi and Bombay: Characteristic feature
- a) Rastrapati Bhawan
 - b) Victoria Terminus

Reference Books:

1. Sir Fletcher Banister, A History of Architecture: University college of London, The Antholone Press, 20th edition, 1996.
2. Brown Percy, Indian Architecture-Islamic Period, Apt Books, 1956.
3. Grover, Satish, Islamic Architecture in India; CBS Publisher, 2nd edition.
4. Thapar Bindia, Manto Surat Kumar, Bhalla Suparna, Introduction to Indian Architecture (Periplus Asian Architecture Series); Periplus editions 2005
5. Tadgell, Christopher, The History of Architecture in India; Longman Group, U.K. Ltd., London, 1990

AR 323 BUILDING SERVICES- I

INTENT

The importance and techniques of Plumbing System.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Comprehensively understand the water supply system
2. Understand the domestic water piping systems
3. Understand the sanitation and plumbing system
4. Comprehensively understand the sewer appurtenances and its application
5. Understand rain water harvesting system

CONTENT:

Module I: Water supply

Sources of water supply, Domestic water demand, Objects of treatment, Water treatment process. Methods of Water distribution system - Gravity system, Pumping system, combined Gravity and Pumping system, Layouts of distribution system – Dead end or Tree system, Grid Iron, Circular or Ring and Radial system, Overhead and Underground reservoirs, capacity of overhead tanks and calculation of water consumption.

Module II:

Introduction to Plumbing system, Uses of valves, taps, cocks and their different types. Layout of water supply lines in a domestic house. Provision for firefighting as per NBC code.

Module III:

Basic principles of drainage system, different types of pipes with their sizes, Traps- Floor trap, gully trap, intercepting trap, grease trap, silt trap. Plumbing systems -one pipe, two pipe, partially ventilated single stack system and single stack system. Disposal of sewage. Details of a Septic tank and capacity calculation. Schematic diagram of Sewage treatment process at domestic lvl.

Module IV:

Manholes, Drop Manholes, Lamp holes, Street Inlets, Flushing Tanks, Catch basins or pits, Overflows and Regulators. Ventilation of Sewers. Minimum slope of sanitary drainage lines.

Module V: Rain water Harvesting

Rain water harvesting Technique and its benefits. Schematic diagram of Rain water harvesting process. Value of Run off coefficient for various types of surfaces.

Text Book:

1. Rangwala, S.C., Charotar Publishing House, Anand, 2005, ISBN- 388 601, 1989

Reference books:

1. Punmia, B.C., Firewall Media, 1995.
2. Rangwala, S.C., Charotar Publishing House, Anand, 2005, ISBN- 388 601, 1989.
3. Kulkarni G. J.,;
4. Birdie, G. S., Birdie, J. S., Water supply and sanitary engineering, Dhanpat Rai, 1992.

CE 333 STRUCTURE - II**INTENT**

- To study behavior of structural elements under loads in different structural forms.
- To study method and principles of structural analysis for different structural forms.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Know the behaviour of various structural forms in one, two and three dimensions.
2. Know the behaviour of structural elements under loads in different structural forms.
3. Understand the force response of structural elements.
4. Understand deformation response of structural elements.

CONTENT:**Module 1**

- Introduction to statically determinate/indeterminate structures with reference to 2D and 3D structures, free body diagram of structures.
- B.M. and S.F. diagrams for different loading on simply supported beam, cantilever, propped cantilever and overhanging beams.

Module 2

Deflection: Different methods- moment area method, slope deflection method, Castiglione's theorems, conjugate beam method.

Module 3

Analysis of propped cantilever & to draw SFD and BMD, analysis of continuous beams by three moment theorem and to draw SFD & BMD, analysis of continuous beam by moment distribution method and to draw SFD and BMD.

Module 4

Introduction to three hinged arch, two hinged arch, fixed arch, suspension cable -application, load path and load transfer.

Analysis of trusses – definition of perfect, deficient and redundant trusses. Analysis of determinate trusses by method of joints and method of sections (only theory and simple problems)

Module 5

Columns and struts – effective length, critical load, slenderness ratio, Euler's equation for different end conditions.

(Important guideline: Teachers shall explain the theory with simple numerical examples only)

Text Book:

1. Bhavikatti SS, Structural Analysis Volume 1 Vikas Publication 3rd Edition

Reference books:

1. Reddy C. S., Basic Structural Analysis, TMH Publisher 2nd edition 1996
2. Vairani V N, Ratwani, MM Duggal S K, Analysis of Structure vol 2 Khanna Publishers

AR 343 CLIMATOLOGY

INTENT

The climatological aspects associated with the Architectural Design.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand the atmospheric conditions that cause weather patterns and temperature changes over time
2. Understand the relationship of built environment and climate in details
3. Know the importance of Climatology since it helps determine future climate expectations and its impacts on buildings and urban spaces
4. Decipher the climatic aspects in details related to buildings with proper analysis and calculations.

CONTENT:

Module I: Introduction

- a) Concept of weather and climate,
- b) Factors that determine climate of a place
- c) Global Climate classifications: Koppen and Thornwaite schemes, classification applicable to India
- d) Macroclimate , microclimate & site climate
- e) Climatic elements- temperature, wind, humidity, cloud, precipitation etc.

Module II: Solar Radiation

- a) Earth-Sun relationship, ecliptic and equatorial plane, rotation and revolution of the earth, equinox, solistics.
- b) Movement of sun- Introduction to Sunpath diagram
- c) Solar radiation & its impact
- d) Solar shading techniques
- e) Heat transfer through buildings- Conduction, convection & radiation
- f) Time lag & decrement
- g) U Value and R Value in respect to the building materials
- h) Day lighting- sky as the source of internal light, day light factor, Components of daylight factor -the sky component, the external reflected Component, glare, recommended levels of illumination for different types of building interiors.

Module III: Wind Movement

- a) Fundamentals of wind movement and prevalent wind characteristics, coriolis force, Windrose
- b) The effect of topography on wind patterns
- c) Ventilation and air flow principles – Stack & Venturi effect
- d) Principles of natural ventilation
- e) Air movements inside & around buildings

Module IV: Human Comfort

- a) Human thermal comfort
- b) Human body heat loss balance
- c) Effects of climatic factors on human body heat loss, Bioclimatic chart
- d) Effect of external factors of climate - Humidity, Precipitation, Noise, Disasters on built forms

Module V: Landscape Impact

- a) Landscape & Climatology, Site Planning, Building Orientation and Placement
- b) Landscape and its impact on temperature & air movement
- c) Windbreak
- d) Landscape and its impact on humidity, precipitation, noise

Module VI: Design for various climates

- a) Shelter for Hot & Dry climate- Building orientation and control on openings.

- Thermal insulation of building, Techniques of thermal insulation of roofs.
- b) Shelter for Hot & Humid climate- Doors and ventilators. Introduction to passive techniques of thermal comfort in design.
- c) Shelter for Composite climate

Reference Books:

1. OH Koenigsberger and others, Manual of Tropical housing and building (Part-I) Climatic design; Longmans. London-1974.
2. Evans,M., Housing, Climate and Comfort; Architectural Press. London 1980.
3. Konya,A., Design primer for hot climates; Architectural Press London,1980.
4. Sealey, Anthony, Introduction to Building Climatology; Commonwealth Association of Architects, 1979
5. Kukreja, C.P., Tropical Architecture; McGraw-Hill Education, 1978.
6. Olgyay,A. and Olgyay,V., Solar Control and shading devices; Princeton University Press, 1957
7. IS:3362-1977 Code of Practice for natural ventilation of residential building

HU 352 BEHAVIOURAL ARCHITECTURE – I

INTENT

Human beings are in constant interaction with the environment. With the growth of civilization, men are making more and more artificial environments, and architects and planners play a significant role in this process.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the concept of Environmental psychology and its relation to Architecture.
2. Exploring Psychology.
3. Understand Historical concepts of Psychology in Architecture.
4. Understand Psychology in Modern Architecture.

CONTENT:

Module I: Environmental psychology

What is it and its relation to Architecture and Planning. Meaning of environment. Measurement of environmental stimuli from psychological aspect.

Module II: Behavioral effects of Environmental conditions

1. Physical - Noise, Temperature and air pollution
2. Social- Overcrowding and isolation.
3. Extra ordinary- Catastrophe.

Module III: Perceptual factors of environment

Perception of distance. Size and Movement. Meaning of colour and form. Social and Cultural influences on environmental perception.

Module IV: Personal space

Individual and situational as determinants of personal space. Consequences of too much or too little of personal space. Personal space and environmental space as implications for design aspects.

Module V: Psychological aesthetics

Measurement of communication through art; determinations of pleasantness and unpleasantness as psychological factors in environmental design.

Module VI: Adaptation to environment

Behavioral aspects of adaptation to familiar and unfamiliar environment.

Reference Books:

1. Ching Francis D.K. ; Architecture: Form Space and Order; Van Nostrand Reinhold Co., (Canaa), 1979.
2. Wong, Wucius, Principles of colour design; Wiley Publication, 1997.
3. Ramsey, Charles, George, Sleeper, Harold Reeve , Hoke, John Ray & American Institute of Architects, Ramsay and Sleeper, Architectural Graphic standards; John Wiley,2000.
4. Parmer, V.S.,Design fundamentals in architecture.
5. Bell, P.A Fisher, J.D. Leomis, R.J, Environmental psychology; Belmont, CA: Wadsworth. Bleda, P., & Bleda, S.,1978
6. Munn, N.C., Psychology, Fundamentals of Human adjustment; Houghton Mifflin, 1966.

AR 366 ARCHITECTURAL DESIGN-I

INTENT

- Introduction of issues related to design of the human habitat, its components and space standard, in contextual environments.
- Study of vernacular architecture of different regions in India.

COURSE OUTCOMES

With the successful completion of the course student have capability to

1. Develop a sense of scale w.r.t human proportions.
2. Apply the commonly used design process in architectural design.
3. Introduce the process of selecting an appropriate Case study and conduct its critical appraisal.
4. Understand about the meaning of the architectural design project.

CONTENT

1. Evolution of form in relation to surrounding and site consideration.

2. Experimentation with Form & Shape using principles of Architecture.
3. Analysis and formulation of design criteria and concepts for design problems such as kiosks, Snacks Corner or Simple residences. Data collection and analysis considering socio economic conditions and user requirements.
4. Minimum two Projects must be conducted.

Reference Books:

1. Time saver standards for building types, DeChiara and Callender, Mc Graw hill company
2. Neufert Architect's data, Bousmaha Baiche & Nicholas Walliman, Blackwell science ltd.
3. National Architectural graphic standards, Ramsey / Sleeper, The American Institute of Architects
4. National Building Code – ISI
5. New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press.

AR 374 BUILDING CONSTRUCTION -III

INTENT

- Introduction to various type of Staircases & Ramps in a Building.
- Introduction to various types of Foundations and their uses.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the component of building with their function.
2. Understand construction techniques of different components of building and site and services.
3. Decide foundation and selection criteria of it based on soil condition, site exploration and load of the structure.
4. Understand and integrate various types of staircase in the building design.

CONTENT:

Module I: Requirements of staircase

Types of Staircases, Parts of Staircase, calculation of tread and riser sizes. Calculation of Slope of Ramps.

Module II: Construction methods

Masonry staircase, timber staircase, RCC staircase, steel Staircase and composite staircase, Study of fire escape staircase.

Module III: Types of Foundation

Foundation – Functions of foundations, types of foundations. Simple load bearing foundations in brick and stone. Study of principles and methods of construction of RCC foundations and columns, Raft foundations, Grillage foundations and combination.

Reference Books:

1. Ching Francis D.K, Building Construction Illustrated; Wiley Publication, 4th Edition, 2008.
2. McKay W.B, Building Construction, Vol I to IV; Orient Blackswan, 1971, ISBN 812500940X, 9788125
3. Barry.R., The Construction of Buildings. Vol.I-V; Blackwell Science, 1996.

4. Chudley.R., Greeno Roger, Building Construction Handbook; Butterworth-Heinemann, 2008, ISBN 0750686227, 9780750686228
5. Rangwala S.C., Engineering Materials, Charotar publishing house, Anand, 1982

AR 382 COMPUTER AIDED DESIGN-I

INTENT

To make students learn the basics of 2D Drafting.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the basics of 2D drafting on AutoCAD.
2. Apply the various uses of 2D drafting.
3. Produce standard printed drawings using “ctb” and other tools.

CONTENT:

Module I: Introduction

Introduction of various software available for Architectural application, like Auto CAD, Architectural desktop, Revit etc. Stress should be given on Auto CAD.

Module II: Basic commands for 2-D AutoCAD

Learning basic 2D commands their function and application. Working on layers and colors. Understanding of Text, and dimension styles etc, supported with suitable exercise. Understanding complex commands like Pline, spline, x-refs, Attributes, Model space & Paper space etc.

At least one working plan, elevation and section should be completed. Exercise on wire mesh modeling.

Module III: Presentation drawings

Introduction to presentation drawings of architectural design project with plans, elevations, sections showing landscape, human figures, accessories and street furniture etc.

SEMESTER –IV

AR 413 CONTEMPORARY ARCHITECTURE

INTENT

- History to be studied as development of built form and ornamentation, structural solutions, construction methods, plan and building facade organization in relation to esthetic/religious/social philosophy and environmental factors.
- The study should focus on the general trends and not on specific examples of buildings.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand early architectural developments around Europe and western regions
2. Understand the timeline of contemporary architecture based on material development, technology development and other theories and architectural ideologies.
3. Learn about various styles and ideas of contemporary architecture and the architects involved with different styles.
4. Know Indian architectural insights post-independence and postmodern global architecture.

CONTENT:

Module I: Introduction to Contemporary Architecture

Module II: Invention of building materials and techniques

Early glass and iron construction, Introduction of steel frame, influence of prevailing architectural styles in the continent. Industrial revolution and Iron Age. Invention of building materials and techniques. Great exhibitions and achievements in technology and expression.

Module III: French revolution and industrial revolution

Search for new forms; Rationalism, Engineering tradition. Art and Craft ideals and Art Nouveau movement. American development, Chicago school, Louis Sullivan, Architectural system of Frank Lloyd Wright, response to mechanization-Deutscher Werkbund, Futurism and Amsterdam school.

Module IV: New space conceptions

Cubism, Le Corbusier's quest for ideal form, Bauhaus movement and international style.

Module V: Indian Architecture

Detailed discussion on Indian architects' works-emphasis on modernity and tradition in the regional context,

Module VI: Post modernism and beyond.

Birth of post modernism, Deconstruction and Architecture in the age of electronic media,

emerging concepts. Futuristic vision about human habitat.

Reference Books:

1. Blake Peter, Frank Lloyd Wright- Architecture and space; Penguin books 1960.
2. Frampton Kenneth, Charles Correa; Thames & Hudson, 1997
3. Sorkin, Michael, Hardy Holzman Pfeiffer (Monographs on contemporary architecture); Whitney Library of Design, 1981
4. Sanderson, Warren, International Handbook of Contemporary Developments in Architecture; Greenwood; First Edition, 1981.
5. Tadgell, Christopher, The History of Architecture in India, Longman Group, U.K. Ltd., London, 1990
6. Curtis, W.J., Modern architecture since 1900, Paidon Press Ltd, Oxford, 1982.

AR 423 BUILDING SERVICES – II

INTENT

The schematic layout of simple electrical, illumination etc. for domestic and office buildings.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the Basic Theory and Design Importance and need of System.
2. Select Sizing / Capacity Required and of Type of System / Equipment.
3. Design space required for the installation of Equipment & Allocation of Space during Architectural Design / Drawing Stage.

CONTENTS:

Module I: Basic Principles of Electricity

Laws of electrical circuit, Ohm's and Kirchoff's laws and basic principles. Circuits- series and parallel.

Module II: Domestic Installations

Common domestic installations- water heater, radiator etc.

Module III: Wires

Specifications and carrying capacity and calculation of electrical loads. Types of switches, sockets and fixtures. Distribution boards, circuit breakers, fuses, electrical meters and their layout.

Module IV: Design Considerations

Design considerations for electrical installations. Protection against overload, short circuit, earth fault, lightening conductors and other safety measures for buildings.

Module V: Wiring systems

Methods of wiring, joint and loop, types of electrical wiring- batten, capping & casing, concealed conduits etc. Wiring material- types, sizes and specifications, main switch, MCB, DB meter.

Module VI: Illumination

Light and its propagation, reflection, radiation, transmission and absorption. Definitions and units of flux, solid angles, luminous intensity, brightness. Laws of illumination, types of illumination schemes – direct, semi direct, indirect and diffused lighting and their design considerations. Light flux method for calculation of number of lamps for illumination. Incandescent, sodium vapor, mercury vapor, fluorescent and neon lamps etc. Types of Luminaries for interior and exterior lighting. Residential, commercial, industry, flood and street lighting.

Reference Books:

1. Hopkinson, R.G. and Kay, J.D., The lighting of building, Faber and Faber, London, 1969.
2. International Lighting Review - quarterly Journal.
3. Lal, G.K. Elements of Lighting, 3-D Publishers.
4. Philips Lighting in Architectural Design, MC Graw Hill, New York, 1964.
5. Handbook for Building Engineers in Metric systems, NBC, New Delhi, 1968.

CE 433 STRUCTURE – III

INTENT

- To study methods of design of structural element with concrete and steel as composite material.
- To study composition and properties of a structural concrete.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand composition and properties of structural concrete.
2. Understand methods of design of structural elements in RCC.

CONTENT:

Module 1

Concrete : Composition, Basics of mix design, water cement ratio, strength, durability, workability requirements, Relevance of RCC in Architectural practice, advantages of RCC over other conventional structural practices, steel for RCC – plain & twisted bars, IS 456 code provisions.

Module 2

Working stress method of design – basic concept, types of loads, assumption, and calculation of Moment of Resistance for a singly RC beam.

Module 3

Limit state method of design – Necessity and philosophy of limit state design, different limit states, difference between limit state method and working state method. Limit state design of Rectangular beam, 'T' beam.

Module 4

Design of one way and two way slabs by limit state method of design, load calculation and design procedure.

Module 5

Design of RCC column and footing by L.S. method.

Module 6

Design of Dog legged and open well stairs by L.S. Method.

Reference Books:

1. Raju N Krishna, Pranesh R N, Reinforced Concrete Design , New Age international Publishers
2. Krishna Jai , Jain O P, Plain and Reinforced concrete , Nem Chand and Bros 8th edition 1980
3. P C Varghese, Limit State design of reinforced concrete vol 1; Prentice hall of India P Ltd 2nd edition.

HU 442 BEHAVIOURAL ARCHITECTURE- II

INTENT

- To understand socio-physical environment & its implication to architectural space planning & design.
- To give emphasis on concepts and idea in sociology & to relate to elements of settlement of built form.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand the link between psychology (BA-1) and sociology and establishing link with built environment.
2. Understand socio-physical environment & its implication to architectural space planning & design.
3. Emphasise on concepts and idea in sociology & to relate to elements of settlement of built form, through case studies.
4. Understand how society functions and what their various nuances are and then intervene in public space design.

CONTENT:

Module I: Introduction

Man, his social & physical environment, social groups & social structure, utility and relation with architecture. Indian communities. Rural & Urban communities, their social structure and problems, cultural heritage, rituals and community gatherings etc.

Module II: Urbanization

Trends and characteristics, dynamics of urban growths and social changes, urban attitudes, values and behaviour, review of commissions report etc.

Module III: Physical environment

Social aspects of physical environment, Its implications and application in buildings, neighbourhood planning, slum improvement & city fabrics etc. significance of public opinion

and participation.

Module IV: Case studies

Sociological studies of communities with their habitat and built environment.

Reference Books:

1. Vidya Bhusan, Sachdeva D.R., Fundamentals to sociology; Pearson, I edition, 2012.
2. Aggarwal, G.K., principle of sociology.
3. Spencer Herbert, principle of sociology; D. Appleton and Company, 1881.
4. Altman, I. The Environment and Social Behavior: Privacy, Personal Space, Territory, Crowding. Monterey, CA: Brooks/Cole, 1975
5. A.R.Desai, Rural Sociology, Popular Prakashan, Bombay, 1984.
6. Neil J.Smelsa, Sociology, Prentice Hall, New Jersey, 1981

AR 453 WORKING DRAWING-I

INTENT

Get training in the preparation of working drawings for buildings with specific reference to the code of practice for architectural and structural drawings as per IS code no. 962 of 1969.

COURSE OUTCOMES

With the successful completion of the course student have capability to

1. Prepare working drawings for load bearing structure buildings
2. Understand and apply the code of practice for architectural and structural drawings
3. Understand the importance of Working Drawing in Building Construction Process

CONTENT:

Preparation of working drawings of load bearing structure to suitable scales indicating clearly:

Module I:

The method of giving dimensions: architectural and structural, on plans at various levels, elevations and sections.

Module II:

The brief specification of materials of finishes on the drawings.

Module III:

Architectural details to a large scale showing application of materials of finishes and other constructional details.

Module IV:

Location of built up areas in the site plan showing approach roads, paths and layouts of all services such as water supply, sewage disposal and electrical connections.

AR 466 ARCHITECTURAL DESIGN-II

INTENT

Methods of space programming, behavioral survey, formulation of design criteria, application of climatic data, behavioral aspects and structural considerations; Site analysis and design concepts, Design evaluation and application of building services .

COURSE OUTCOMES

With the successful completion of the course student have capability to

1. Address the study of built form and its relationship to the site, surroundings and climatic setting.
2. Acquire knowledge of designing and experimenting with multifunctional, built and open spaces
3. Analyse the function, understand the architectural structures and building services in context of the design problem.
4. Coordinate through a comprehensive solution of the design of a complex building in the urban context.

CONTENT:

Design projects related to different climatic conditions

The projects would address the study of built form and its relationship to the site, surroundings and climatic setting. Design proposals to address sensitivity to climatic and physical settings. The design problem would induce students to experiment with built and open spaces.

Introduction to Design Problem of buildings like Multi storeyed residential housing, Architect's Office, Old age home Etc.

Reference Books:

1. Time saver standards for building types, DeChiara and Callender, Mc Graw hill company.
2. Neufert Architect's data, Bousmaha Baiche & Nicholas Walliman, Blackwell science ltd.
3. National Architectural graphic standards, Ramsey / Sleeper, The American Institute of Architects.
4. National Building Code – ISI.
5. New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press.

AR 474 BUILDING CONSTRUCTION -IV

INTENT

To expose students with construction practices pertaining to various Roofs, their construction techniques and materials.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand the principles and methods of construction of RCC, one-way, two way slabs-

cantilever slabs, sloping RCC roof, vaults, domes including form-work techniques and reinforcement details.

2. Understand the construction with materials alternative to RCC
3. Comprehensively understand of Vaults, Domes, Trusses, and Tensile Structures

CONTENT:

Module I:

Study of principles and methods of construction of RCC, one way, two way slabs-cantilever slabs, sloping RCC roof, vaults, domes including form-work techniques and reinforcement details.

Module II:

Construction with materials alternative to RCC.

Module III:

Exposure to Vaults, Domes, Trusses, Tensile Structures.

- a. Roofs and Trusses: Steel Trusses.
- b. Detail of terracing for flat roofs.
- c. Water proofing and rain water disposal.

Reference Books:

1. Ching Francis D.K, Building Construction Illustrated; Wiley Publication, 4th Edition, 2008.
2. McKay W.B, Building Construction, Vol I to IV; Orient Blackswan, 1971, ISBN 812500940X, 9788125
3. Barry.R., The Construction of Buildings. Vol.1-Vol-V; Blackwell Science, 1996.
4. Chudley.R., Greeno Roger, Building Construction Handbook; Butterworth-Heinemann, 2008, ISBN 0750686227, 9780750686228
5. Rangwala S.C., Engineering Materials, Charotar publishing house, Anand, 1982

AR 482: COMPUTER AIDED DESIGN-II

INTENT

The use of software available for architectural applications.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Learn the basics of preparation of Professional Drawings.
2. Learn the basics of graphics softwares.
3. Produce presentations (2D & 3D).

CONTENTS:

Module I: Introduction

Introduction of various software available for Architectural presentation such as Photoshop & Sketch up.

Module II: Basic commands for 2-D Graphics:

Learning of software like Photoshop. Understanding the basic composition in 2D and prepare attractive compositions using software's.

Module III: Commands for 3-D Graphics:

Learning of software like Sketch up for getting complex 3D Compositions.

SEMESTER V

AR 513 VERNACULAR AND SOUTH EAST ASIAN ARCHITECTURE

INTENT

To understand the fundamentals of traditional features and constructional techniques of architecture in India and South-East Asia.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Familiarize students with different types of vernacular expressions in India and their contextual variations.
2. Introduce to south-east Asian countries and their historical and climatic similarities and maritime connections with India.
3. Introduce to various expressions of south-east Asian vernacular and traditional architecture.
4. Understand construction techniques and importance of symbolism, culture and customs in south-east Asian vernacular architecture and its similarity with Indian counter-part.
5. Develop perspective on application of vernacular architecture in modern context and introduce them to – tropical modernism movement and its associated architects.

CONTENT:

Module I: Study of vernacular shape of India;

Grammar and allied geo anthropological studies. Architecture & social relations symbolism and ornamentation. Technological & cultural heritage of India. Regional Architectural feature & methods of construction.

Module II: Introduction to Chinese Architecture:

Introduction to Shang and Han Dynasty. Influence of various building materials and styles. Their emphasis on horizontal axis, use of yellow roof tiles. E.g Forbidden city.

Module III: Korean Architecture:

History, Architecture style and evolution of Architecture. Koryo, Choson and Yuan dynasty. Examples of palaces and temples like Namtaemun Gate, Tongdosa.

Module IV: Ancient kingdoms in South East Asia

Ancient kingdoms in Southeast Asia. Agrarian kingdoms and their extent and characteristics. Examples: Van Lang and Khmer Empire. Angkorian architectural style and their religious structures.
Trading links between India and China. Development of polities around the Mekong delta in today Southern Vietnam and Cambodia, E.g. Funan and its successor Chenla.

Module V: Port Towns and their Hindu Influence

Port towns in maritime Southeast Asia and their Hindu and Buddhist influences from India. Early Hindu kingdoms in Indonesia Kutai, Tarumanagara in West Java and Kalingga in Central Java. Culture of Asian Hindu-Buddhism architecture and architecture of Oceania.

Spread of Islam.

Module VI: European Colonization

Portugal and its conquest in Sultanate of Malacca. Spain and its colonization in Philippines. Dutch infiltration and its conquest on Jakarta and Malacca. Establishment of Qing Empire. Singapore as a key trading port for Britain.

Reference Books:

1. Jain Kulbushan & Jain Meenakshi , Architecture of the Indian desert; Aadi Centre, Ahmedabad
2. Michell George, The Royal Palaces of India, , Thames and Hudson Ltd., London,1999.
3. Paul, Oliver, Encyclopaedia of Vernacular architecture of the World; Cambridge University Press, 1998.
4. Tillotsum, G.H.R. The Tradition of Indian architecture – Continuity & Controversy – Change and the politics of style since 1850, Yale University Press, 1989.
5. Rappoport , Amos , House, Form & Culture; Prentice Hall Inc, 1969.
6. Crouch,Dora, Traditions in Architecture: Africa, America, Asia, and Oceania; Oxford University Press; 1st edition,2001.
7. Yanxin Cai, Chinese Architecture (Introduction to Chinese Culture); Cambridge University Press; 3 edition, 2011.
8. Alexander B.Griswold, M.C.Subhadradis Diskul Elizabeth Lyons, Theodore Robert Bowie, The Arts of Thailand: A Handbook of the Architecture, Sculpture and Painting of Thailand;1960
9. Made Wijaya, Architecture of Bali;Thames & Hudson,2011.
10. Sathāpitānon, Nithi, Mertens, Brian. Architecture of Thailand: A Guide to Traditional and Contemporary Forms, Editions Didier Millet, 2005.

AR 523 BUILDING SERVICES -III

INTENT

To understand the mechanism of simple air conditioning system for domestic and office buildings.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the Basic Theory and Design Importance and need of System
2. Apply Proper Selection, Sizing, Capacity, and Space Requirement at Architectural Design / Drawing Stage, Type of System Equipment, Installation and use of various Codes.
3. Have practical understanding of the system.

CONTENTS:

Module I: Comfort Conditions

Principles of air conditioning, Psychometric chart, comfort zone.

Module II: Heating of Spaces

Methods of cooling and heating, - local and central heating- heating equipment Thermal conductivity, and insulation. Evaporative cooling systems of air conditioning.

Module III: Ventilation

Mechanical ventilation in buildings, Mechanical Ventilation in Basements Fans, blowers, air handling Unit air conditioners and central air conditioning plants. Standards and prescribed locations for various parts. Descriptive details of plants and duct layout. Refrigeration cycle and air cycle. Cooling load for AC.

Module IV: Air distribution system-

Fans, filters, ductwork, outlets, dampers. Natural and artificial ventilation.

Reference Books:

1. Gupta, J.K., and Khurmi, R.S., Text of Refrigeration and Air conditioning, S. Chand, 2005.
2. Jones, W.P., Air conditioning Application and design, Prentice Hall, 2005.
3. Lang, V.P., Principles of Air conditioning.
4. National Building code of India, Bureau of Indian standards, 2005.

CE 533 STRUCTURE -IV

INTENT

To get familiarized with the structural design philosophy, load path and load combinations. And appreciate the design of steel structure.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand Loads on structure
2. Understand Steel products of various metallurgical properties and their suitability to use for various construction types.
3. Comprehend Design procedure of various structural members per relevant IS codes.
4. Access choice of method for design.
5. Understand mechanical behaviour of Steel.
6. Understand the durability Criteria of structure based on Codal guidelines.

CONTENT

Module I:

Introduction Properties of Indian standard rolled steel section – Use of IS 800 and steel tables – Permissible stresses in tension, compression and shear. **Connections:** Welded and riveted connections. Types of failure – Design of welded and riveted connections for members subjected to axial forces.

Module II: Tension and Compression members

Steel structures – Tension and compression members – Design of single angle and double angle sections in tension – Design of compression members – Slenderness ratio – Design of simple and compound sections. Design of lacing and battens.

Module III: Beams

Principal beams, allowable stresses, General specifications, Design of laterally supported **beams**.

Module IV: 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).

Text books:

1. Ramachandra .S, Design of steel structures Vol. I, Standard publication, New Delhi, 1992

Reference books:

1. Ramachandra .S, Design of steel structures Vol. I, Standard publication, New Delhi, 1992
2. Vazirani .V.N, and Ratwani .M.M, Steel structures, Khanna Publications, New Delhi, 1995
3. Arya .A.S, Ajamani .J.L, Design of Steel Structures, Nem Chand and Bros, Roorkee, 1999
4. Duggal, Design of Steel structures, Tata McGraw Hill Company, New Delhi, 2000
5. Lin .T.R, and Scalzi .J.B, Design of Steel structures – Bressler Weley Eastern Pvt. Ltd., New Delhi, 1960
6. Dayaratnam .P, Design of Steel Structures, Wheelers Publishing Company Co. Ltd, 1990
7. Handbook of Typified Designs for Structures with steel roof trusses, SP 38 (S&T) – 1987, BIS, New Delhi, 1987.
8. Negi,L.S., Design of Steel Structures, Tata McGraw Hill, 1997.
9. Raz, S.A., Structural design in Steel; New Age International Publications, 2012.

AR 543 ESTIMATION AND SPECIFICATION

INTENT

To develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Study the importance of Estimating and Costing as Professional practice.
2. Develop skills for preparation of Estimates.
3. Develop skills for Costing of a Project.
4. Develop skills in writing specifications for various types of Buildings.

CONTENT:

Module I:

Introduction, importance of estimation, Definitions and terms used principles of measurements in estimating. Methods of preparing approximate estimates on plinth area and cubic contents (volume) basic differences and advantages. Method of obtaining detailed quantities for earth works, building items and other allied structures (P.W.D. system to schedule of rates, standard mode of measurements. Example and exercise in obtaining all items from excavation to painting including RCC and steel works.

Module II: Specification

Standard specification of different types of building work. Percentage of various materials used in building items like cement, steel, rubble, metal, sand, brick, tiles etc. Abstract and detailed specifications for various materials and items of work used in building.

Module III:

Detailed clause writing of specifications of any three items of work for a normal standard building with at least three other items as part of the internal assessment from the following:

- a) Earth work excavation in all types of soils including blasting operations.
- b) Foundation in CRS and UCRS in RCC
- c) Superstructures in brick masonry.
- d) RCC work in slabs, sunshades, lintels, etc.
- e) Doors and windows in wood and steel.
- f) Finishing work
 - a) painting,
 - b) flooring

Module IV: Manufacturer's specification

Knowledge of manufacturer's specifications as a database for writing specifications for the following materials, components of the building based on surveys: • Glass • Plywood and laminates • Hardware • Electrical wires and accessories • Water supply and plumbing: fittings and fixtures • Flooring and cladding.

Text books:

Dutta, Estimating and Costing, S. Dutta and Co., Lucknow 1983.

Reference books:

1. Chakraborti, M., .Estimation, Costing, Specification and Valuation in Civil engineering, 24th edition.
2. Dutta, Estimating and Costing, S. Dutta and Co., Lucknow 1983.
3. Rangawala, S.C., Estimating and costing,
4. Standard Schedule of Rates – C.P.W.D

AR 553 ARCHITECTURAL CONSERVATION**INTENT**

To understand the various concepts in conservation and expose them to various techniques of conservation, preservation and restoration.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Adopt new ways of 'seeing' the built environment.
2. Sensitize and enable the students to understand the concept of heritage conservation.
3. Be equipped with a comprehensive knowledge of dealing with design issues of existing architecture, old monuments, natural and urban heritage.
4. Analyse and interpret heritage resources.
5. To understand bye-laws & legislature related to heritage and physical planning.

CONTENT

Module I: Heritage:

Heritage definition, classification of heritage (UNESCO), world heritage sites

Module II: History and theory of conservation:

Conservation, concepts, history, principles and methods, development of theory conservation and various International charters like Charter of Venice (1964) and the Burra Charter.

Module III: Types of threats,

Causes of Decay in Cultural Property, External Causes of Decay, Biological and Botanical Causes, Natural disasters and manmade causes of decay

Module IV: Role conservation architect,

Documentation, norms for grading and enlisting, parameters for consideration for world heritage sites by UNESCO. Values in conservation, Ethics of Conservation, Degrees of intervention such as prevention of deterioration, preservation, consolidation, restoration, rehabilitation, reproduction and reconstruction.

Module V:

Basic principles and its approach to conservation: Broad concepts of terms such as reuse, rehabilitation, revitalization, regeneration, upgradation, redevelopment of historic areas and cities.

Module VI: Concept of integrated conservation:

Planning and management such as inspecting of historic buildings, inventory, initial inspection of buildings, new constructions in heritage/ conservation areas/ planning for conservation and urban management.

Module VII: Conservation scene in India:

Conservation Practice and Legislations in National & local levels i.e., Andhra Pradesh State, INTACH Charter. Recent works case studies, different agencies of conservation in India.

Reference Books:

1. Feilden, B.M., The conservation of historical buildings, Architectural Press, 2003.
2. Menon, A.G.K. and Thapar B.K., Historic Towns & Heritage Zones (1988); Indian National Trust for Art and Cultural Heritage INTACH, New Delhi
3. Xavier Graffe, Managing Our Cultural Property; Aryan book International, New Delhi, 1992.
4. Rojas Eduardo and Castro Claudio de Moura, Lending for Urban Heritage Conservation: issues and opportunities, Inter-American Development Bank, Sustainable Development Department, 1999.
5. Cohen, Nahoum, Urban Conservation; the MIT Press, 1999.
6. Menon, A.G.K, Conservation of Immovable Property 2: Cultural Identity and Urban Development, INTACH, New Delhi, 1989.
7. Gupta Divya, Documentation and identification of built heritages in India; INTACH, New Delhi, 2007.

AR 566 ARCHITECTURAL DESIGN-III

INTENT

To focus on exploring **structural spanning systems** and their integration with form.

COURSE OUTCOMES

With the successful completion of the course student have capability to

1. Understand spatial planning of public buildings.
2. Understand of grid application and composite large span structures.
3. Understand the basics of building services integration.

CONTENT:

Design exercise related to structural design

The project would focus on exploring structural spanning systems for large covered areas (temporary or permanent) and their integration with form. Design exercises could be sports area, exhibition hall, temporary canopy etc. The design should be formulated to increase awareness and application about advanced structural systems and latest building material.

- a. Arcuated- corbelled, radiating arch, vault and dome, squinch and pendentives.
- b. Vector structures- trusses and space frames, slabs, one way and two-way coffers.
- c. Form structures- shells, hyperbola and parabola.
- d. Tensile- tents, cables.
- e. Emphasis of the problems would be on the design parameters and graphical presentation rather than detailed structural analysis.

Reference Books:

1. Time saver standards for building types, DeChiara and Callender, Mc Graw hill company
2. Neufert Architect's data, Bousmaha Baiche & Nicholas Walliman, Blackwell science ltd.
3. National Architectural graphic standards, Ramsey / Sleeper, The American Institute of Architects
4. National Building Code – ISI
5. New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press

AR 573 WORKING DRAWING-II

INTENT

To get trained in the preparation of working drawings for buildings with specific reference to the code of practice for architectural and structural drawings as per IS code no. 962 of 1969.

COURSE OUTCOME

With the successful completion of the course student have capability to

1. Prepare working drawings for framed structure buildings
2. Understand and apply the code of practice for architectural and structural drawings
3. Understand the importance of Working Drawing in Building Construction Process

CONTENT:

Preparation of working drawings for “Framed structure” to suitable scales indicating clearly:

Module I:

The method of giving dimensions: architectural and structural, on plans at various levels, elevations and sections.

Module II:

The brief specification of materials of finishes on the drawings.

Module III:

Architectural details to a large scale showing application of materials of finishes and other constructional details.

Module IV:

Location of built up areas in the site plan showing approach roads, paths and layouts of all services such as water supply, sewage disposal and electrical connections.

SEMESTER –VI

AR 613 LANDSCAPE ARCHITECTURE

INTENT

To understand the principles of site planning, analysis techniques and its application in various types of design of buildings and landscape.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the concept of landscape and landscape architecture
2. Sensitize about the natural process and their impact on landscape
3. Understand and apply the principles of site planning and site analysis in terms of landscape
4. Realise the Landscape Drawings and details
5. Understand and Analyse the construction technologies of various landscape structures
6. Create landscape proposals

CONTENT:

Module I:

Man and the landscape: landscape development in historical perspective – brief review of landscape design – brief review of evolution of concepts in landscape design after industrial revolution and increasing awareness of ecological variables in landscape design.

Module II:

Site studies and site planning: Understanding different site characteristics and evaluation of their potential for development. Philosophical and design issues related to site development –i.e. siting of buildings, spatial and contextual relationships of built and outdoor spaces, site and its relationship to its surroundings. Importance of climatic, 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. (Study should include at least two exercises in site planning)

Module III:

Elements in Landscape design: Use of landform, water, vegetation as elements of Landscape design and types of garden furniture, lighting and water feature. Pavement types, patterns, and hard landscapes Sculptures and architectural features and elements Design concept related to use of landscape elements in outdoor design - Grouping of elements, visual effects etc.

Module IV:

Plants and design: Botanical nomenclature, anatomy and physiology Plant growth and development, plant communities and their environments in Indian Context Plants and landscape - Basic principles, appearance of plants, functional and visual effects with plants in landscape. Landscape layout and planting techniques Planting design and practice.

Module V:

Landscape Construction: Elementary knowledge of grading cut and fill, shaping the site Use of materials use in landscape and their details. Laying paths with different materials like pebble paving slabs, stone etc. Construction of garden steps Construction of screen, trellis, wall fences, gates, decks Construction and detailing of drain inlets, curbs and gutter details Fountain and pool construction Elementary knowledge of irrigation systems, and water supply, lighting systems.

Reference Books:

1. Eckbo Garrett, The art of home landscaping, Mc Graw Hill Co.London, 1978.
2. Yoshida Tetsuro and Marcus Sims, G., gardens of Japan, Frederick A. Praeger; First Edition edition 1957.
3. Jellicoe. G.A., Studies in landscape design; Oxford University Press, London; First Edition, 1960. Lynch, Kelvin and Hack, Gary, Site planning; The MIT Press; 3rd edition, 1984.
4. Laurie, Michael, An introduction to Landscape Architecture; American Elsevier Pub. Co., 1975.
5. Blanc, Alan, Landscape Construction and detailing; McGraw-Hill Professional, 1 edition, 1996.
6. Harris, Charles and Dines, Nicholas, Time-Saver Standards for Landscape Architecture, McGraw-Hill Professional; 2 edition, November 22, 1997.
7. Covin, Brenda, Land and landscape: Evolution, design and control; John Murray Publishers, 1970.

AR 623: BUILDING SERVICES – IV**INTENT**

To develop the knowledge and skills required for understanding acoustics in buildings and its integration with architectural design.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the Basic Theory and Design Importance and need of System
2. Understand NBC & IS Codes & Proper Implementation
3. Design Space required for the installation of Equipment & Allocation of Space during Architectural Design / Drawing Stage.

CONTENT:**Module I: Introduction to the study of acoustics:**

Nature of sound, basic terminology –frequency, pitch, tone, sound pressure, sound intensity, decibel scale, loudness, threshold of audibility and pain, masking, sound and distance – inverse square law.

Module II: Behaviour of sound in enclosed spaces:

Reflection of sound, nature of reflection from plane, convex and concave surfaces, sound diffraction, Absorption of sound, sound absorption coefficient, reverberation, reverberation time calculation, use of Sabine's and Eyring's formulae, sound absorbents, porous materials,

panel or membrane absorbers and cavity or Holmboltz resonators, role of functional absorbers.

Module III: Absorption coefficients of indigenous acoustical materials:

Use of IS code 2526-1963, method of setting out of raked seating. Acoustical design requirement for halls used for speech, drama and music – general purpose halls used for both speech and music, cinema theatres, open air theatres. Study of auditoria designed and acoustically treated.

Module IV:

Introduction to environmental noise control, noise and its classification, outdoor and indoor noise, airborne noise and structure borne noise, impact noise, community and industrial noise. Transmission of noise and transmission loss. Maximum acceptable noise levels. Means of noise control and sound insulations. Constructional measures of noise control and sound insulation. Use of sound measuring instrument. Sources of industrial noise – impact, friction, reciprocation, air turbulence and other noise.

Module V:

Methods of reduction by enclosures and barriers, sources of outdoor noise – air traffic, rail traffic, road traffic and seashore and inland. Traffic planning and design against outdoor noise for air traffic, road traffic and rail traffic.

Reference Books:

1. Doelle, Leslie L., Environmental Acoustics; McGraw-Hill, 1972.
2. Knudson, Vern, Acoustical Designing in Architecture; John Wiley & Sons, 1950
3. Parkin, Peter Hubert, Humphreys, Henry Robert, Acoustics: Noise and Buildings; Faber & Faber; 4th edition 1979.
4. Egan David, Architectural Acoustics; J. Ross Pub., 2007.
5. Narasimhan V., An introduction to Building Physics; Kabeer printing works, Chennai -5
6. Suri, S.L. Acoustics Design and Practice, Asia Publishing House, New York, 1963
7. Peter templeton & Saunders, Detailing for architectural acoustics; Architectural press, 1994
8. Acoustical design of auditoriums – IS2526 –ISI –1963
9. Mark Blitz et al., Elements of acoustics, John Wiley & sons, 1975
10. Handbook for Building Engineers in Metric systems, NBC, New Delhi, 1968.

CE 633 ADVANCED STRUCTURES

INTENT

The awareness and introduction to advanced structure systems.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand design approach various class of structural elements.
2. Understand choice of structural system and Procedure of structural modelling.
3. Understand economics of choice structural system and elements.
4. Understand various roof shapes and their adaptability for various application.
5. Understand economic choice of material for any structural device.
6. Understand disaster management design practice.

CONTENT:

Module I:

Concept of structural forms and their stability to various types of structures, shell, vaults and other forms of rigid structure.

Module II:

Pre-stressed and hung, suspended, cable roofs, saddle roofs, cable bridges, steel rigid framed structures, current structural forms for industrial buildings, stadiums, auditoriums, aerodromes, hangers, water towers, bridges etc.

Module III:

R.C.C Space frames and steel space structures, geodesic domes, hyperbolic, paraboloid.

Module IV:

Structural aspects in restoration work, Identification of faults and its treatment, Structural conservation techniques and concepts.

Module V:

Structural concepts for multistoried buildings, interaction of structural and non-structural parts of building, use of shear walls and diaphragms in multistoried buildings, use of composite materials and cladding systems.

Module VI:

Structural considerations for disaster resistant buildings, earthquake resistant structures, Cyclone resistant buildings, Multi disaster resistant building concepts.

Text Books:

1. Ramamrutham S., Narayan, R. Reinforced concrete structures, Dhanpat rai Publications, New Delhi, 1997.

Reference books:

1. Sinha, N.C, and Roy S.K, Fundamentals of reinforced concrete, S. Chand and Co. Ltd., New delhi 2001.
2. Ramamrutham S., Narayan, R. Reinforced concrete structures, Dhanpat rai Publications, New Delhi, 1997.
3. Bryan Stanford and Alex Coull, Tall Building Structures, Analysis and Design, John Wiley and Sons, New york, 1991
4. Ramaswamy G.S., Design of concrete Shell Roofs, McGraw Hill Publishing Company, New York, 1986.
5. Bandyopadhyay .J.N, Thin Shell Structures Classical and Modern Analysis; New Age International Publishers, New Delhi, 1998
6. Krishna Raju .N, Pre Stressed Concrete; Tata McGraw Hill Publishing Company Ltd., New Delhi, 1988
7. Taranath .B.S, Structural Analysis and Design of Tall Buildings; McGraw Hill, New York, 1988.

AR 643 GREEN ARCHITECTURE

INTENT

To familiarize the students with the understanding of recent concepts in building technology and environmental design pertaining to sustainability.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand the concept of sustainability and various approaches to achieve sustainable buildings by critically understanding alternative green building concepts that could be used at different scales.
2. Understanding the concept of Green buildings-Green building design, Rating system and various incentives and evaluation systems for green buildings.
3. Understand the architectural potential of climate and principles behind climate adaptive design
4. Understand Passive solar design concepts and techniques and their application in urban buildings in a given climatic zone for heating, cooling, lighting and application of Photovoltaic modules in buildings.
5. Understand the role of institution and governance in enforcing development control.

CONTENT:

Module I:

Ecological building: concept, scope and importance of green architecture.

Module II:

Land as a resource, Common property resources, Land degradation, Soil erosion and desertification. Use and over utilization of surface and ground water. Conflicts over water energy resources. Energy needs, Renewable and Non- renewable energy resources, Use of alternate energy resources, Impact of energy use on environment.

Module III:

Green architecture: concept, technologies, (site efficiency, energy efficiency, water efficiency, material efficiency, indoor environmental quality enhancement, water reduction), energy rating of building materials, rainwater harvesting. Sustainable consulting LEED & energy star for homes.

Module IV: Passive solar architecture:

- a. Passive solar heating: distribution of energy in building.
- b. Passive solar cooling: principles, standard, technologies.
- c. Site specific consideration during design.
- d. Passive solar lighting.
- e. Photovoltaic module: application in buildings.
- f. Low energy house: concept, technology- passive solar building design.

Module V: Institutions and Governance:

Regulations by government, Monitoring and enforcement of environmental regulation, Environmental acts, Water Act, Air pollution act, Environmental protection act, Institutions and policies relating to India, Environmental governance.

Module VI: Case Studies

Retrofitting: Empire state building, Taipei 101, GreenPix Zero Energy Media Wall, California Academy of Sciences, Shanghai Tower, CII Green business Centre, Hyderabad, TERI, Bangalore etc.

Reference Books:-

1. Fred S. and Chalmers G. Long, Jr. Dubin, Energy Conservation Standards for Building Design, Construction and Operation; McGraw Hill, 1978.
2. Handbook on Indian Green Building Council - Residential, Commercial, New Constructions.
3. Farr.D., Sustainable Urbanism: Urban Design With Nature; Wiley; 1 edition, 2007
4. Wines, J., Green Architecture (Architecture & Design); Taschen, 2000.
5. Kibert, Charles. J., Sustainable Construction-Green building design and delivery; John Wiley and sons Inc, USA, 2012.
6. N. D. Kaushika, Energy, Ecology and Environment, Capital Publishing Company, New Delhi.
7. Fernandez, John, Material Architecture: Emergent Materials for Innovative Buildings and Ecological Construction; Architectural Press, UK, 2006.
8. Howes, Rodney and Robinson Herbert, Infrastructure for the built environment; Butterworth Heineman, 2005.

AR 652 UNIVERSAL DESIGN

INTENT

Aims at design standards and construction techniques for barrier free environment.

COURSE OUTCOMES

With the successful completion of the course student should able to

Sensitize about accessibility.

Understand the design standards and construction methods for barrier free environment.

Understand and apply the various norms associated with Universal Design.

CONTENT:

Module I:

Anthropometrics for the disabled. Formation of design data for disabled.

Module II:

Types of disability, mobility devices and controls. Construction and maintenance standards, classification of buildings and access provisions.

Module III:

Design elements within buildings, site planning, parking, approach to plinth levels, corridors, entrance and exit, windows, stairways, lifts, toilets, signage, guiding and warning systems, floor materials.

Module IV:

Design elements outside the building - kerb at footpath, road crossing, public toilet, bus stop, toilet booth, and signage.

Provision in residential building, auditorium, parks, restaurants, railway station. Modern building bye-laws.

Reference Books:

1. Harkness Sarah P., Groom James N., Building without barriers for the disabled, Watson-Guptill Pubns November 1976.
2. Goldenson, Robert M. , Dunham, Jerome R. , Dunham, Charlis S., Disability and rehabilitation Handbook/ Goldenson, McGraw-Hill in New York,1978 .
3. Barrier Free Design Handbook, 2000 version, (integrated pocket notebook) ISBN: 4874606628.

AR 666 ARCHITECTURAL DESIGN- IV

INTENT

The Influence of Historical & Architecturally important sites. Site analysis, Space programming, generating design concepts, Structural considerations, application of building services will be part of the design process.

COURSE OUTCOMES

With the successful completion of the course student have capability to

1. Understand built form and its relationship to the site, surroundings and climatic setting.
2. Demonstrate through their design their understanding of energy efficient systems & related services.
3. Understand structural systems and construction systems in the design of a modern medium to high-rise building in the urban context.
4. Understand developmental regulations and their application in design studio work.

CONTENT:

Design projects should reflect sensitivity to Historical sites.

Projects may be tied to the context where the project site will be very near to a historical building or a building of architectural significance. The objective shall be to illustrate sensitivity to history & its Architectural style. Introduction to Design Problem of buildings like Museum, School for Fine Arts.

Reference Books:

1. Time saver standards for building types, DeChiara and Callender, Mc Graw Hill Company.
2. Neufert Architect's data, Bousmaha Baiche & Nicholas Walliman, Blackwell science ltd.
3. National Architectural graphic standards, Ramsey / Sleeper, the American Institute of Architects.
4. National Building Code – ISI.
5. New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press.

AR 673 LANDSCAPE DESIGN

INTENT

To enable the student to understand the principles of site planning, analysis techniques and its application in various types of design of buildings and landscape.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the application of Landscape Theories in Landscape Design Process
2. Respect and conserve while designing the environment and the geography of the Landscape site
3. Apply the principles of site planning, analysis techniques in various types of design of buildings and landscape
4. Prepare Landscape Drawings and details from the landscape design concept

CONTENT:

1. Theories and principles of space establishment, site survey, analysis and appraisal. Land form design and grading. Drainage design: Planting Design Principles and practice.
2. Landscape design exercises to be given on Indoor landscaping; terrace gardening; industrial landscaping; landscaping of residential areas and urban avenues; surface treatments; landscape elements of construction.
3. Computer application in landscape. Multi-criteria landscape evaluation and plant selection technique.

Reference Books:

1. Eckbo Garrett, The art of home landscaping, Mc Graw Hill Co.London, 1978.
2. Yoshida Tetsuro and Marcus Sims, G., gardens of Japan, Frederick A. Praeger; First Edition edition 1957.
3. Jellicoe. G.A., Studies in landscape design; Oxford University Press, London; First Edition, 1960. Lynch, Kelvin and Hack, Gary, Site planning; The MIT Press; 3rd edition, 1984.
4. Laurie, Michael, An introduction to Landscape Architecture; American Elsevier Pub. Co., 1975.
5. Blanc, Alan, Landscape Construction and detailing; McGraw-Hill Professional, 1 edition, 1996.
6. Harris, Charles and Dines, Nicholas, Time-Saver Standards for Landscape Architecture, McGraw-Hill Professional; 2 edition, November 22, 1997.
7. Covin, Brenda, Land and landscape: Evolution, design and control; John Murray Publishers, 1970.

SEMESTER –VII

AR 713 SPECIALITY BUILDING DESIGN

INTENT

Exposing the students to basic of planning and management of the special service oriented spaces in relation to types of spaces, services, standards and management systems.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand the concepts of spatial planning and design requirements and explore public spaces
2. Understand the infrastructure planning with focus on vertical and horizontal transportation systems
3. Learn the building services and structural considerations
4. Apply Integrate management systems for crowd control, traffic and waste disposal

CONTENT:

Module I: Introduction to Health Care

Introduction to hospital planning and types of hospitals. Aesthetic and emotional needs of patients, spaces norms and requirements of a hospital.

Module II: Introduction to spaces

1. Public entrance, lobby area, reception and information lounge, waiting space.
2. Vertical and horizontal transportation system.
3. Various departments of a hospital- OPD, IPD, Emergency, CSSD, Wards etc.
4. Hospital crowd management during extreme condition.
5. Hospital waste management.
6. Signal and signage.
7. Hospital management systems.

Module III: Introduction to Commercial Spaces

Introduction to the spaces like theatre, multiplex, mall, super market, hyper market and office spaces. Circulation and crowd management. External and internal traffic management. Vertical and horizontal transportation system.

Module IV: Introduction to Hotels

Introduction to spaces like –restaurant, dining hall, coffee shops and bars, conference spaces, meeting room, auditorium, gymnasium, healthcare, swimming pools, dance floors, discotheques, shopping, emporia, kitchens and toilet, recreation, Party lawns, gardens, terrace garden, open air dining area etc.

Hotel types, size, location criteria, administration. Integrated services planning incorporated all the above.

Reference Books:

1. The teacher shall develop his/her reference from various sources.

AR 723 ADVANCED BUILDING SERVICES

INTENT

Understand the recent developments in building services in the area of vertical transportation system, building automation, waste disposal, adoption of energy efficient techniques etc.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand the Basic Theory and Design Importance and need of System
2. Understand Proper Selection, Sizing, Capacity, and Space Requirement at Architectural Design / Drawing Stage, Type of System / Equipment, Installation and use of various Codes.
3. Utilise practical understanding

CONTENT:

Module I:

Mechanical accessibility system: Lift (working methods as per NBC and industry standards, capacity, parts of lift and location of these in the building, types of lifts, passenger, capsule, hospital goods), introduction to Escalator.

Module II:

Telephones and EPABX, Security system like burglar alarm services and CCTV's, intruder alarms.

Module III:

Cooking gas distribution for bulk cooking application and household as per NBC.

Module IV:

Firefighting, portable firefighting equipment and built in wet riser system and sprinkler system for firefighting.

Module V:

Building automation: central control systems, user interface, lighting systems and controls, Air Conditioning plants, Air Handling Units (constant volume air- handling units, variable volume Air- handling units, VAV hybrid systems), central plant (chilled water system, hot water system), stand by generator, Lightning Conductor.

Module VI:

Application in any one type of building followed by group assignments:

- a. Residential

- b. Commercial: Hotel
- c. Health Institute: Hospital (waste management)
- d. Office building
- e. High rise building: service core, service floors, water storage, service elevators, communication system.

Reference Books:

1. Oughton, D. R, Hodkinson, S., Faber and Kell's Heating and Air-conditioning of Buildings, Routledge, 2002.
2. Tiwari, Satish, Water and energy resources; Anmol Publications Pvt. Ltd., 2000.
3. Prasad, Manohar, Refrigeration and air conditioning; New Age International, 01-Jan-2007
4. Hall, Fred and Greeno, Roger, Building Services Handbook; Butterworth-Heinemann, 2009.
5. Greeno, Roger, Mitchell's Introduction to Building; Routledge, 2014.

AR 733 CONSTRUCTION PROJECT MANAGEMENT

INTENT

Enable students to understand the project management techniques.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Understand Project planning and project scheduling and project controlling.
2. Comprehension of Elements of network & critical path method and pert analysis.
3. Understanding of Project time reduction and optimization.
4. Detailed Analysis of Project updating.
5. Understanding of Resource allocation, Risk management and Finance Management.

CONTENT:

Module I: Introduction

Project planning and project scheduling and project controlling, Role of Decision in project management, Method of planning and programming, Human aspects of project management, work breakdown structure, Lifecycle of a project, disadvantages of traditional management system.

Module II: Elements of network & critical path method and pert analysis

Event, activity, dummy, network rules, graphical guidelines for network, numbering of events. CPM network analysis & PERT time estimates, time computation & network analysis

Module III: Project time reduction and optimization

Project cost, Indirect project cost, direct project cost, slope of the direct cost curve, TOTAL project cost and optimum duration, contracting the network for cost optimization, steps in cost-time optimization.

Module IV: Project updating

When to update? Data required for updating, steps in the process of updating.

Module V: Resource allocation

Resource usage profile: Histogram, Resource smoothing and Resource leveling, Computer applications in project management.

Module VI:

Computer application of project scheduling and management, operation research principles, risk management and finance management.

Text Book:

1. Punmia, B.C., Building Construction; Sambha and Co., New Delhi, 1986

Reference books:

1. Pilcher, R., Principles of construction management; McGraw-Hill, 1992
2. Punmia, B.C., Building Construction; Sambha and Co., New Delhi, 1986
3. Mitchell, Charles Frederick and Stroud Foster, J., Advance building construction, B.T. Batsford, 1966
4. National building code of India, Indian standard institution, New-Delhi, 1970
5. Clough, Richard H., Sears Glenn A., Construction and project management: John Wiley & Sons Inc, 2000.
6. Macedo, Manuel C. , Jr., Dobrow, Paul V. and O'Rourke, Joseph J. , Value management for construction;
7. A Wiley InterScience Publication, 1942.
8. Robert A. DeGoff, Howard A. Friedman; Construction Management- Basic principles for Architects, Engineers and Owners; Wiley publications, 1985.

AR 768 ARCHITECTURAL DESIGN-V

INTENT

Application of Complex services into buildings. Techniques like Site analysis, Space programming, generating design concepts, Structural considerations will be part of the design process.

COURSE OUTCOMES

With the successful completion of the course student have capability to

1. Design multifunctional, multi-stored buildings based on project brief.
2. Analyse the function, understand the architectural structures and building services in context of the design problem.
3. Coordinate through a comprehensive solution of the design of a complex building in the urban context.

CONTENT:

Design projects should accommodate complex building services.

Design proposals to address sensitivity to building services like Water supply & Sanitary, Electrical, HVAC & Fire Fighting regulations. Students can explore various guidelines prevalent to that particular type of building & services.

Introduction to Design Problem of buildings like Hospital, Hotel etc.

Reference Books:

1. Time saver standards for building types, DeChiara and Callender, Mc Graw hill company
2. Neufert Architect's data, Bousmaha Baiche & Nicholas Walliman, Blackwell science ltd.
3. National Architectural graphic standards, Ramsey / Sleeper, The American Institute of Architects
4. National Building Code – ISI
5. New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press.

AR 773 INTERIOR DESIGN

INTENT

Familiarize on interior design principles and theories with specific reference to colour, texture, light and their effect.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand interior design principles and theories with specific reference to colour, texture, light and their effect.
2. Identify, analyze, and solve interior architecture and design problems through completion of interior design studio projects.
3. Apply creative and critical thinking to solve interior environment problems from a human-centered approach and apply this knowledge to design solutions.
4. Understand the volumetric space and its divisions.
5. Understand the circulation pattern, zoning requirement, etc.
6. Understanding and applying principles of design for interior spaces.

CONTENT:

Module I:

Introduction to Interior Design. Elements of interior design i.e. floors, walls, ceilings, doors, windows etc. and their transformation. Enveloping space, contained space and residual space. Principles of lines, surfaces and colours for interior.

Module II:

Use of colour in interior. Various color schemes e.g. Analogues, complementary, triadic etc. Colour symbolism. Lighting requirements and their design for interior spaces including direct & indirect lighting, luminaries types and quality of light. Principles of interior landscaping. Plant species.

Module III:

Furniture design and ergonomics. Modular approach in system furnishings. Space saving interiors and furniture. Open office system, style of interiors. Exposure to eminent interior designer's works.

Reference Books:

1. Architectural interior systems: lighting, Acoustics, Air conditioning Flynn. J/&29.24FI V/A N.88
2. Colour in interior design and architecture/Ladau, Rf/747.94 Lad/C
3. Steport - De Van Kness, Logan and Szebely, Introduction to Interior Design Macmillan Publishing Co.,NY 1980.
4. Inca / Interior Design Register, Inca Publications, Chennai, 1989.
5. Kathryn .B. Hiesinger and George H.Marcus, Landmarks of twentieth Century Design; Abbey Ville Press, 1993.
6. Syanne Slesin and Stafford Ceiff - Indian Style, Clarkson N. Potter, Newyork, 1990.
7. The Impulse to adorn - Studies in traditional Indian Architecture - Editor Dr.Saranya Doshi, Marg Publications, 1982.

SEMESTER –VIII

AR 813 THEORY OF ARCHITECTURE

INTENT

The students will get insight to the ideas of influential theorists from antiquity to the present time.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand architectural history and elements of architectural theory-European and Western architectural history, some non-Western architectural traditions.
2. Understand the ideas of influential theorists from antiquity to the present times.
3. Distinguish significant developments in technology and design: concepts, architects and movements that shaped architecture into what it is today and how their Ideas affect current design
4. Understand the development of construction techniques, importance of culture and social context in built environment and critical thinking to theories in the history of architecture
5. Understand architectural criticism and theories of analysis.

CONTENT:

Module I: Theory in Antiquity and Renaissance

Concepts of Vitruvius, Leon Alberti, Andrea Palladio – Jacques Francois Blondel and Claude Perrault of French Academic Tradition 18th Century Theory – Ideas of Laugier, Boullee, Ledoux 19th Century Theory
– Concepts of Viollet Le Duc, John Ruskin, Quatremere de Quincy and Gottfried Semper.

Module II: Modern Movement Theory

Ideas of Adolf Loos, Eero Saarinen, Erich Mendelsohn, Richard Neutra, Otto Wagner, Kenzo Tange.

Module III: Post Modern Theory

Ideas on Post-Modern Classicism by Robert Venturi, Charles Jencks

Module IV: Deconstruction

Fundamental beliefs and philosophy. Ideas of Peter Eisenman

Module V:

Contribution to architectural thought by Kenneth Frampton, Christopher Alexander, Geoffrey Broadbent, Amos Rapoport.

Module VI: Architectural Criticism

Definition, Sources, Types of Criticism according to Wayne Attoe, Jon Lang – Positive and Normative Theories in Architecture.

Reference Books:

1. Broadbent, Geoffrey, Design in Architecture; Spon Press May 1990
2. Lang, Jon, Creating Architectural Theory; Van Nostrand Reinhold Company, 1987
3. Salingaros, Nikos A., Alexander, C., Isi Books, 2008
4. Jencks, Charles, The language of post-modern architecture; Rizzoli, 1984
5. Lin, Zhongjie, Kenzo Tange and the Metabolist Movement: Urban Utopias of Modern Japan; Routledge 2010

AR 823 PRINCIPLES OF TOWN PLANNING & URBAN DESIGN

INTENT

Understand the philosophies and basic components of town planning, and to enable them to develop concepts on preparation of town plan.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Develop an understanding of the evolution of human settlements in modern context.
2. Understand the philosophies and concepts of theories of town planning
3. Understand the Process of Urban Planning and Planning Techniques and types of Urban Development Plans
4. Understand the concept and importance of Urban Design

CONTENT:

Module I: Introduction

General decisive factors for any settlement; Definition of a town. Historical background with special emphasis on basic concepts of planning and urban spaces, Egyptian, Greek, Roman, Medieval, Early Indian town planning. Industrial era and its impact on human settlement system.

Module II:

Human Settlement Studies – historical determinants, mobility, socio-cultural beliefs, climate, technology, political situations, geographic locations, etc contributing to development of human settlements.

Module III: Planning theories

Planning concept related to Garden city, Satellite town, Radburn development and neighborhood planning. Planning philosophies of pioneers such as Geddes, Howard, Aber Crombie, Le Corbusier, and other eminent planners.

Module IV: Levels and techniques of planning

Steps for preparation of a town plan, Concepts, function, components and preparation of a development plan, master plan, structure plan and perspective plan. Introduction to analytical technique in town planning; land subdivision regulation and zoning.

Module V: Theory and elements of Urban design

Urban form, spaces and cities, Urban design principles and criteria, Urban design theories, visual survey, mental mapping, study of grains, patterns, textures, footprints.

Module VI:

Social aspect of urban design, public participation, Comprehensive role of urban design in planning.

Reference Books:

1. Cullen Gordon, The Concise townscape; Architectural Press, 1961
2. Lynch Kevin, Image of the city; MIT Press, 1960
3. Moughtin Cliff, Taner Oc Taner, Tiesdell Steven, Urban design – Ornament and decoration; Architectural Press, 1999
4. Moughtin Cliff, Urban design – street and square; Routledge; 3 edition, 2003
5. Zucker, Paul; Town and Square: From the Agora to the Village Green; The MIT Press; 1st edition (1970)
6. Gallion Arthur B, The Urban Pattern: City Planning and Design; D. Van Nostrand Company, 2nd Edition 1963
7. Doxiadis.C.A, Ekistics: An introduction to the science of human settlements; Oxford University Press, 1968
8. Alexander, C., Ishikawa,S., and Silverstein,M., Pattern Language-Towns, Buildings, Construction; Oxford University press, 1977

AR 833 HOUSING

INTENT

To understand the fundamentals of housing needs, housing finance and housing techniques in relation to social and environmental effects.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. To make students understand importance of housing and its various forms and its correlation with urban planning processes.
2. To introduce students to housing agencies, policies and their contributions to housing development.
3. To make students understand various forms of informal settlements and socio-economic aspects of housing.
4. To make student understand various standards required for physical and social infrastructure for housing development and its behavioural aspects.
5. To familiarize students with housing design and project development process and various architects' contribution to public housing.
6. To familiarize students with various housing standards and their applications in design process.

CONTENT:

Module I:

Housing situations: Impacts of industrialization and urbanization, slums and squatter settlements, case studies from India and abroad. Review of different forms of housing globally – particularly with reference to third world countries. **Housing need & Demand** – Calculation of future need. Housing resources and options available in housing

Module II:

Housing Agencies and their contributions to housing development – HUDCO, State Housing Boards, Housing Co-operatives and Banks. Housing Policies in India and other countries like UK & USA.

Module III: Socio Economic Aspects

Social factors influencing Housing Design, affordability, economic factors and housing concepts. Slum upgrading and sites and services schemes. Self-help housing, integrated slum improvement, slum networking.

Module IV:

Housing for new communities: norms and standard for dwelling, shopping, education, health and recreational facilities. Residential environment: users' satisfaction and behavioral aspects, evaluation of housing development.

Module V: Housing Design Process

Different stages in **project development** – Layout design including utilities and common facilities – Housing design as a result of environmental aspects, development of technology and community interests. Case studies of Public Sector housing, Government housing, Private and Co-operative housing – their Advantages and disadvantages.

Module VI: Different types of Housing standards

– Methodology of formulating standards – Relevance of standards in Housing Development.

Reference Books:

1. Mumtaz, Babur and Patweikly, Urban Housing Strategies; Pitman Publishing, London, 1976.
2. Payne, Geoffrey K., Low Income Housing in the Development World; John Wiley and Sons, Chichester, 1984.
3. Turner, John F.C., Housing by people; Marison Boyars, London, 1976.
4. Martin Evans, Housing, Climate and comfort; Architectural Press, London, 1980.
5. Forbes Davidson and Geoff Payne, Urban Projects Manual, Liverpool University Press, Liverpool, 1983.

AR 843 REAL ESTATE VALUATION

INTENT

To get acquainted with the issue of real estate market and master the time value of money and the valuation decision, methods and techniques.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Comprehensively understand of need of valuation w.r.t their purposes

2. Understand of the factors influencing the value
3. Understanding of the appraisal process
4. Understanding of the location specific consideration for valuation
5. Understand Valuation Method based on property type
6. Understand types of property, associated rights and supply and demand of property
7. Investment analysis, feasibility study, nature of arbitration and awards.

CONTENT:

Module I:

Principles of real estate valuation, Purpose and function of real estate appraisal, Types of value, Factors affecting the value, need for valuation.

Module II:

The formal appraisal process for valuation, conformity with USPAP requirement, steps in real estate appraisal process, Types of appraisal reports.

Module III:

The determinants of Value, Property analysis with respect to location, Property specific characteristics.

Module IV:

Orient in financial mathematics, accounting data, economic concepts, legal matters concerning land and property, and become familiar with the valuation methodology for its use in tax authority, land acquisition, advising owner or buyer of a property, arbitration in proprietary disputes.

Module V:

Principle type of land and property, Easement rights and natural rights, factors affecting supply and demand for land and building.

Module VI:

Valuation of different type of property, investment analysis, feasibility study, nature of arbitration and awards.

Text books:

1. Datta, S., Valuation of real property; Easter Law House, New Delhi, 2004.

Reference books:

2. Datta, S., Valuation of real property; Easter Law House, New Delhi, 2004.
3. Gelbtuch, H.C., Mackmin, D. and Milgrim, M.R, Real Estate Valuation in Global Markets; Amazon Books.
4. Kahr, J. and Thomsett, M.C, Real Estate Valuation and Analysis; Wiley Publishers, New Delhi, 2005.
5. Kenneth, M.L., Real Estate Valuation- Principles and Applications; KML Publishing, Irwin, 1977.
6. Rangawal, S.C., Valuation of Real Properties; Charotar Publishing House, 2003.

INTENT

- The Application of green building techniques, sensitivity to Vernacular Architecture & Cost effective Techniques.
- Site analysis, Space programing, generating design concepts, Structural considerations, application of building services will be part of the design process.

COURSE OUTCOMES

With the successful completion of the course student have capability to

1. Understand complexities of handling large scale projects that involves multiple activities and users.
2. Look beyond the concerns of individual buildings and creatively handle the design by massing of building blocks, landscaping and circulation.

CONTENT:

Design projects should highlight Green building features

Design proposals to address sensitivity to energy conscious buildings. Students can explore areas of vernacular architecture & Cost effective techniques which are sustainable.

Introduction to Design Problem of buildings like Engineering Colleges, Business School or Commercial buildings.

Application of advanced building services techniques in buildings and overall site. Site analysis, Space programing, generating design concepts, Structural considerations, application of building services will be part of the design process.

References:

1. Time saver standards for building types, DeChiara and Callender, Mc Graw Hill Company.
2. Neufert Architect's data, Bousmaha Baiche & Nicholas Walliman, Blackwell science ltd.
3. National Architectural graphic standards, Ramsey / Sleeper, the American Institute of Architects.
4. National Building Code – ISI
5. New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press

SEMESTER –IX

Note: Compulsory practical professional training of 16week duration

AR 916 PROFESSIONAL TRAINING

INTENT:

To involve the students in Architectural Profession by joining and working with practicing Architects/Architectural firms for one complete semester.

COURSE OUTCOME:

1. The student gets a real-time exposure of how architectural projects are carried out.
2. Office management and team-work to enhance the employability of the student.
3. Office experience in respect of preparation of working drawing, detailing drawings of perspective, preparation of architectural models, study of filing systems of documents, drawings, prints outs and preparation of tender document.

CONTENT:

Students are required to be involved in all aspects of office works-Sketch, design, presentation drawings, and detail working drawing, model of the project, estimation and specification of a small building.

AR 923 SITE SUPERVISION TRAINING

INTENT:

To give exposure to the students on different stages of work going on the site and to learn how the drawings are executed at site and by preparing a report to facilitate set of working drawings, sketches, photographs etc. to supplement their observation.

COURSE OUTCOME:

1. Site experience, in respect of supervision of the construction activity, Observation, layout on site, study of the staking methods of various building, materials, taking the measurement and recording.
2. Exposure of new material, technologies, building practices, etc.
3. Understand the structural systems, control systems and aesthetics of building envelope systems

CONTENT

The aim of this training is to give exposure to the students on different stages of on the site and to learn how the drawings of design is executed at the site construction by preparing a report to facilitate set of working drawings, sketches, photographs etc. to supplement their observation.

AR 932 FIELD OBSERVATION STUDIES

INTENT:

Aim of field observation is to systematically study any particular architectural phenomena or an element to see how it behaves and to observe, record and analyze the observation and draw inferences from the study.

COURSE OUTCOME:

1. Experience the first-hand observation, analysis, and documentation of existing buildings and their contexts
2. Understand people's needs and discover opportunities for addressing them in the building.
3. Explore wide range of field study methods to map the research topic
4. Articulate their analyses with respect to the specific urban, temporal, and cultural contexts.

CONTENT:

Aim of field observation is to systematically study any particular architectural phenomena or an element to see how it behaves. Idea is to systematically observe record and analyze the observation and to draw lessons from the study of any particular aspect. Aspects can be space types, system, materials, and visual aspects. Some examples are: spaces – outdoor recreation area in a housing community., square in a village, plaza in a city, types- slopping roof in a particular place, system- movement in a shopping area, circulation system in a situation, material-paving material in public squares, flooring in a workshop, visual aspects-way-finding in a market, signage in a hospital. Study should emphasize on relationship between physical layout, details and efficiency, highlighting performance under different conditions, maintenance and fixing problems.

AR 942 CRITICAL APPRAISAL OF BUILDING PROJECTS

INTENT:

To study and understand a building project and evaluate its performance.

COURSE OUTCOME:

1. Understand the use and efficiency of the building with respect to its user's satisfaction.
2. Explore the design abilities and challenges to the prevailing byelaws and urban context.
3. Develop an understanding of building environmental, technology, aesthetics of building envelope systems and control systems.

CONTENT

An exercise in critical observation on an existing project. A student may select any small project and trace down its development on early concept design. procedure adopted in decision making at inception level, series of changes in the process of approval, constraints such as financial, human and building bye-laws. Changes during the execution and changes done by the client after occupation-reason thereof. Users' reaction on different aspects, students' personal remark based on the flagellation of balanced critical appraisal. The study is to be presented in the form of series of sketches, photographs supported by brief analysis and observation etc.

AR 953 FIELD DOCUMENTATION AND ARCHITECTURAL DETAILS

INTENT:

To study the architectural features and details which play special roles in defining the character of structure by adding visual interest, define certain building styles and types, and often showcase superior craftsmanship and architectural design.

COURSE OUTCOMES:

1. Gather knowledge on the architectural features of different styles of building
2. Comparative analysis of the features in different time period.
3. Identifying and interpreting the same in the modern context.

CONTENT:

Documentation of at least 20 details of innovative details from personal observation, office record or field studies. This may include historical as well as contemporary details. Critical observation of performance, usefulness etc. the selection of details should be based on their special nature due to practical field situation and must be presented in a folder.

SEMESTER –X

AR 1013 BUILDING BYE LAWS & PROFESSIONAL PRACTICE

INTENT

And understand the logistics of state & central govt. in enhancing better living conditions to all without losing the interest of self. It lays down the criteria for constructing built up spaces in cities & sub-urban; good sanitation; safety & security, etc. and familiarize the students about current professional practice guidelines, codes, ethics as well as norms of professional fees & charges. It will expose them to skills and techniques for organizing a particular project, its preparation and execution etc. The same course will also contribute in getting acquainted with project management, contractual implication as well as legal formalities.

COURSE OUTCOMES

With the successful completion of the course student should able to

1. Acquaint with the profession of Architecture with the role of professional and statutory bodies, regulations for practicing Architecture.
2. Familiarize about current professional practice guidelines, codes, ethics as well as norms of professional fees & charges
3. Understand the role of Architect's in tender and contract works.
4. Be competent with project management, contractual implication as well as legal formalities.

CONTENT:

Study and development control regulations, municipal acts, building bye-laws, Indian Standard Codes of Practice related to Design, Drawing and procedure for submission to concerned bodies. Fire prevention, safety and security measures and regulations.

Module I:

Introduction to Architects duties and liabilities, understanding office management and project awarding, various architectural services, additional services and scale of professional fees.

Module II:

Definitions and general principles of Indian Contract Act and building contract documents, Types of tenders, invitation of tender and conditions of tender documents, Condition of contract, Execution of contract, various certifications.

Module III:

Principles of Indian Arbitration Act-1974, Municipal Acts, Building Bye-laws, National Building Codes, Fire prevention, safety and security measures in buildings.

Module IV:

Study of building regulations relative to submission drawings for concern bodies.

Reference Books: -

1. Nanavati, Roshan H., Professional Practice; Lakhani Book Dept, 2013
2. Scott.J.J., Architectural Practice, Butterworth-Heinemann Ltd , 1985
3. Handbook of Professional Practice; by Council of Architecture.
4. Demkin, Joseph A., The American Institute of Architects, The Architect's Handbook of Professional Practice; John Wiley & Sons, 2001
5. Hand book on Professional Practice by I. I. A, Image systems, Mumbai, 1998.

AR 10610: THESIS/ DISSERTATION**INTENT**

To reflect the knowledge gained from the entire course taken by the student in all the previous semester.

Each student is expected to prepare a design thesis under a department approved guide/ advisor. The thesis should be a design-oriented project approved by the department. The thesis should reflect the knowledge gained from the entire course taken by the student in all the previous semester. The topic should be preferably related to the students' elective stream. The particular of schedule, content presentation, format etc. as decided by the department time to time shall be strictly followed. At the end of the semester each

Student is expected to submit all original drawings prepared as per the department specification, 3 copies of the report in the specified format and a model should be submitted to the department after obtaining the approval of the respective guide / advisor. The department shall schedule the final viva voice at its convenience only after the Thesis submission by a student.

COURSE OUTCOMES

With thesis project the student is able to

1. To use all the skills acquired in the duration of preceding academic courses.
2. Methodically self-direct effort by choosing the project of choice, builds capacity to work independently and methodically in a variety of intellectually and professionally demanding contexts.
3. Learn to make an original and individual, creative contribution to the academic discipline and/or the professional field in some cases.

CONTENT

Each student is expected to prepare a design thesis under a department approved guide/ advisor. The thesis should be a design-oriented project approved by the department. The topic should be preferably related to the students' elective stream. The particular of schedule, content

presentation, format etc. as decided by the department time to time shall be strictly followed. At the end of the semester each student is expected to submit all original drawings prepared as per the department specification, 3 copies of the report in the specified format and a model should be submitted to the department after obtaining the approval of the respective guide / advisor. The department shall schedule the final viva voce at its convenience only after the Thesis submission by a student.

Followings are the submission requirements -

1. Preparation of Synopsis of the Design Project
2. Data Collection and Analysis
3. Data Interpretation and Inference-Preliminary Outcomes of the Proposal
4. Design Development
5. Design Finalization
6. Pre-Final Presentation
7. Final Presentation to an External Jury

AR 1072 VIVA VOCE

INTENT

Viva will be conducted in 10th semester which will be covering the complete syllabus.

COURSE OUTCOMES

This will test the student's learning and understanding during the course of their B. Arch programme. In doing so, the main objective of this course is to prepare the students to face interview both in the academic and the industrial sector.

CONTENT

A viva voce test would be conducted by a panel of teachers of the department. The test would cover the topics related to the various subjects taught to the students throughout their all previous year of academic session and would also contain topics of general nature related Architecture.

AR 1082 SEMINAR (Paper Presentation)

INTENT

To research a subject of theoretical / philosophy / current issues related to any aspect of Architecture, Urban design, Landscape Architecture, Sustainable Architecture, Architectural Conservation, which the student shall subsequently take up as Thesis topic and write the Thesis Report.

COURSE OUTCOMES:

With the successful completion of the course student should be able to

1. Systematically abstract, analyse, synthesize and interpret existing literature.

2. Develops a specialized knowledge in a subject area which maybe an extension to the prescribed coursework.
3. Build his his/her capacity to work independently and methodically in a variety of intellectually demanding contexts.

CONTENT

The objective of the course is to enable students to write book reviews and learn the technicalities of paper publication.

Introduction, overview of subject, Research Methodology, critical reading, writing, referencing etc.

Lectures/ seminars to clarify/discuss common mistakes/doubts among the students, and to discuss the common topics students would be dealing with.

Research Proposal, including the Research Problem, Background, Aim, Objectives and research questions, Panel review to finalise the research topics.

Critical Reading/ Literature Review, continuous assessment and assignments by the respective subject expert/supervisors.

Writing, Referencing and Citations under the guidance of supervisors with the review of stage wise submissions.

A final Thesis Report should be submitted to the supervisor.

DEPARTMENT ELECTIVE

Elective -I

AR 742 ERGONOMICS & PRODUCT DESIGNING

INTENT

Anthropometry and design principles for product design.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand anthropometry, ergonomics and design principles for product design.
2. Familiarise with product designing methodologies through activities.
3. Understand the issues of each product and its functionalities to derive a resolved product
4. Be aware about various factors such as environmental, psychological, behavioral, and cognitive that affect a usage of a particular product.
5. Learn the overall aspects, personalities, famous creations, designers etc.

CONTENT:

Module I:

Definition of human factors: application of human factor data, human activities, their nature and influence on product designing. Journey, Fitting task to man their contractual structure, Domain, Philosophy and Objective, Mutual task comfort: two way dialogue, communication model , Physiology (work physiology) and stress.

Module II:

Human body- structure and function, anthropometrics, Static and dynamic anthropometry, Stand Posture- erect, Anthropometry landmark: Sitting postures, Anthropometry: squatting and cross-legged postures, Anthropometric measuring techniques, Statistical treatment of data and percentile calculations. Human body- structure and function, Posture and job relation, Posture and body supportive devices, Chair characteristics, Vertical work surface, Horizontal work surface, Movement, Work Counter.

Module III:

Visual display process of seeing, visual discrimination, quantitative and qualitative visual display, Alpha numeric and related display, visual codes and symbols; auditory: tactual and olfactory human mechanism; applied anthropometry, physical space and arrangements, human response to climate.

Module IV: Behaviour and Perception

Communication and cognitive issues, Psycho-social behaviour aspects, behaviour and stereotype,

Information processing and perception, Cognitive aspects and mental workload, Human error and risk perception.

Module V: Ergonomic Design Process:

Ergonomics design methodology, Ergonomics criteria/check while designing, Design process involving ergonomics check, some checklists for task easiness.

Module VI: Environmental factors:

Environmental factors influencing human performance.

Reference Books:

1. Garatt, James, Design and technology; Cambridge university Press, UK, Cambridge University Press; 2Rev Ed edition, 1996.
2. Cushman, William H. Rosenberg Daniel J., Human Factors in Product Design (Advances in Human Factors/Ergonomics), Elsevier Science Ltd , 1991.
3. Sanders, Mark and McCormick, Ernest, Human Factors in engineering and design; McGraw Hill Inc, New York, 1987.

AR 752 PRE-FABRICATION & MODULAR CO-ORDINATION

INTENT

The use of Pre-fabrication systems, systems developed by CBRI, basic modular planning and the proportioning system in India Context.

CONTENT:

Module I:

Introduction to System building, mechanization of production system, building size units with special reference to India condition.

Module II:

Need for prefabrication - Principles - Materials - Modular coordination - Standardization - Systems - Production - Transportation – Erection. Advantages, disadvantages and relevance in Indian context, classification of prefabrication systems developed by CBRI, Roorkee, skeletal system, Brick panel system, R.C Panels, non-structural elements, deviations in prefabrication.

Module III:

Introduction to modular practice, basic modular planning and component module, modular number pattern introduction, system of proportion, introduction of various systems of publication in REM diamante and comprehensive industrialized building introduction and application.

Module IV:

Behaviour of structural components - Large panel constructions - Construction of roof and floor slabs - Wall panels - Columns - Shear walls.

Module V:

Disuniting of structures- Design of cross section based on efficiency of material used - Problems in design because of joint flexibility - Allowance for joint deformation.

Module VI:

Hindustan housing factory, Tapsia system and other such contemporary systems in India, development of planning Module and structural Modules for various types of buildings in India.

Reference Books:

1. Industrialised building 3; 70 international methods by R.M.E. Diamant in collaboration with the Architect & building news
2. Building digest notes of CBRI, Roorkee
3. Nagarajan.R., Standard building; Pitman Publishing,1976.
4. Le Corbusier, Le Modulor & Modulor 2; Birkhäuser Architecture; 1 edition, 2000.
5. Stevens, Garry, The Reasoning Architect: Mathematics and Science in Design,; Mcgraw-Hill College, 1990.

Elective -II

AR 852 DISASTER RESISTANT ARCHITECTURE

INTENT

To focus on the complexities involved in developing disaster resistant buildings, formulating the management plan and understanding the design guidelines in disaster resistant construction.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand natural and man-made disasters and their impacts.
2. Understand mitigation strategies to combat disasters and design guidelines for disaster proofing construction.

CONTENT:

Module I:

Introduction to over view of disaster, major natural disasters- flood, tropical cyclone, droughts, landslides, heat waves, earthquakes, fire hazards etc. Factors for disasters.

Module II:

Basic understanding on fragile eco system, physiographic and geo chemical data mapping, soil and topography, Hydrological factors, inclement climatic conditions.

Module III:

Strategies for disaster prevention and mitigation. Disaster management plan, National crisis management committee, state management group.

Module IV:

Design guidelines in disaster proofing construction. Engineering, Agricultural, Architectural, landscaping and planning solution for different type of calamities. Norms, standard, practice procedure for shelter and settlement. Organizational and management aspect.

Reference Books:

1. Rajagopal, S., Problems of housing in cyclone prone areas – SERC, Vol.2 , Chennai, 1980.
2. Office of the UN Disaster Relief Co-ordinator – Disaster prevention and mitigation, Vol 12, Social and Sociological aspects – UNO, NY, 1986.
3. F.C.Conly et.al , Issue and problems in the prevention of disaster and housing – A review of experiences from recent disasters; Appropriate reconstruction and training information centre, 1978.
4. S.Ramani, Disaster management – Advanced course on modern trends in housing; SERC, Vol 2, Chennai,1980.
5. Seismic Design hand book for Buildings
6. Garcia Belen, Bain William and Paul, Harry, Earthquake Architecture: New Construction Techniques for Earthquake Prevention; Paco Asensio, 2001

AR 862 COST EFFECTIVE HOUSING

INTENT

To highlight the different cost reduction techniques and to make them familiar with vernacular building materials and construction practices.

CONTENT:

Module I:

Basic shelter issues in India. National building Organization- Recommendation of Housing & Urban Development Corporation.

Module II:

Traditional materials and techniques- pressed soil blocks, soil cement blocks and other alternate building materials-fly ash brick, byproduct gypsum, bamboo, jute stalk etc.

Module III:

Building process-Different types of walling, Roofing, foundation, Pre-cast blocks.

Module IV:

Laurie Baker's experiments in low – cost housing. Modular construction. Experiments conducted by CBRI, Roorkee.

Text books:

1. Baker, Lauri, Houses- How to reduce building cost; Trichur, India : Centre for Science and Technology for Rural Development,1993

Reference books:

1. Goodman, L.J. Low Cost Housing Technology; Pergamon Press, New York 1979.
2. Skinner, R.J. People, Poverty and Shelter; Methuen, New York 1983
3. MacDonald, Donald. Democratic Architecture: Practical Solutions to Today's Housing Crisis. Watson-Guptill Publications. New York. 1996.
4. Baker, Lauri, Houses- How to reduce building cost; Trichur, India : Centre for Science and Technology for Rural Development,1993.
5. Baker, Lauri, Cost reduction for Primary school; Costford

Elective -III**AR 1023 REAL ESTATE MANAGEMENT****INTENT**

To understand the fundamentals of Real Estate Management and land-use issues and planning in an urban area.

CONTENT:**Module I:**

Land use planning & urban land management. Basic components of urban land policy. Land as a resource of urban development and management aspects.

Module II:

Land related legislation. Land assembly / land pooling techniques. Real Estate laws- Apartments' Act, Society Registration Act. etc.

Module III:

Real Estate Management concepts. Master plan guidelines in relation to real estate growth. Concept of condominium and serviced apartments.

Reference Books:

1. Chapin S. , Urban Land use planning; Urbana, University of Illinois Press, 1965
2. Urban Development management-I.T.P.I.
3. Reading Material on Land Economics-I.T.P.I.

AR 1033 INDUSTRIAL ARCHITECTURE**INTENT**

Become aware of different type of industries for proper planning i.e, design for the particular type of industry and make aware of adaptability and flexibility because the need of adaptability for accepting new technology and flexibility to accommodate changes has become necessary in the design.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Understand Historic development of industrial architecture.

2. Familiarize with Role of architects in the design of modern industrial buildings.
3. Understand Planning considerations in the development of master plan.
4. Understand of Design considerations in development of industrial buildings.
5. Understand Master Building Plan.
6. Understand Spatial Workplace Design.
7. Understand Functional Design of Workplaces.

CONTENT:

Module I:

Historic development of industrial architecture. Role of architects in the design of modern industrial buildings. A basic knowledge of industries in respect of type and category. Planning considerations in the development of master plan including site selection and site layout. Design for loading and unloading area.

Module II:

Design considerations in development of industrial buildings considering: Flexibility, adaptability, structural selection, integration of structure and services, roof lighting, internal circulation and material handling.

Module III:

Alternative technology and materials for industrial use, workspace and Ergonomics, Illumination, light and glare, Noise and Vibration, Temperature, Humidity and Ventilation.

Module IV:

Building Fabric, Visual environment and landscaping, Safety security and warning controls.

Reference Books:

1. Adam, J. Hausmann, K., Juttner, F, A Design Manual- Industrial Buildings.
2. Kamen, Ruth, Factories - Planning, Design, Nichols Pub Co, 1981.
3. Hansen, D., Indoor Air Quality Issues; CRC Press; 1 edition, 2000.
4. Philips, A., The best in Industrial Architecture; Rotovision, 1993.
5. Sinha, R.K., and Herat, S., Cleaner Production - Greening of Industries for sustainable development; Oscar publication, 2005.

Elective -IV

AR 1042 ARCHITECTURE JOURNALISM

INTENT

The students, who have inclination for writing will develop their skills to enable them to record, analyse and evaluate architecture both in its theoretical and practical forms.

COURSE OUTCOMES

With the successful completion of the course student should be able to

1. Develop skills for structuring architectural journals, writing descriptive and analytical reports, editing write ups; Photo journalism, book reviews, page compositions and printing process

2. Analyse major critical themes, thematic categories in architectural writing over the past three centuries
3. Analyse recent historical and contemporary examples of written and journalistic criticism of architecture, including selected writings by Indian and overseas critics
4. Understand ethics and codes in journalism and the role of an architect in journalism.

CONTENT:

Module I:

Paraphrasing and summarizing given reports, Editing given materials. Writing or original reports on design projects / buildings/complexes.

Module II:

Writing editorials for magazines and journals. Reporting activities like seminar, panel discussions, and conferences.

Module III:

Writing captions for pictures, programmes and events. Organizing materials for publication in newspapers, magazines etc.

Module IV: Thesis or research report writing.

References:-

The teacher shall develop his/her reference from various sources. The students should be exposed to the work of professional art and architecture. Various forms of architecture Review/record, progressive architecture, Japanese architecture etc. and journals of RIBA, American Institute of Architects, IIA, etc. Report writing should be presented to a panel to be chaired by the teachers for discussions. Criticism and consequential changes. Students other than the author should be asked to write a report/review of the discussions.

AR 1052 AESTHETICS AND ART APPRECIATION

INTENT

To appreciate and understand of various types of arts.

CONTENT:

Module I:

What is a work of Art? Role and meaning of art-various types of arts- fine arts, performing arts, commercial arts, industrial arts, folk arts, abstract art, visual arts, spatial arts, temporal arts, pop art etc., relationship of architecture with other arts like Painting and Sculpture.

Module II:

Nature and characteristics of the following types of arts.

1. Painting

2. Sculpture
3. Architecture
4. Dance
5. Drama
6. Music
7. The Film
8. Literature
9. Photography
10. Almost Art

Reference Books:

1. F. David Martin F., and Jacobus Lee. , A Humanities through the Art; McGraw-Hill Humanities/Social Sciences/Languages; 9 edition, 2014.
2. Brooks Susan W. , See the Paintings: A Handbook for Art Appreciation in the Classroom, Modern Learning Pr/Programs (June 1988)
3. Raczka Bob, No One Saw: Ordinary Things Through the Eyes of an Artist; Millbrook Press,2002.



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School of Chemical Technology
School of Public Health

School of Yoga & Spiritualism
School of Fashion Technology
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