CONTENT

1. INTRODUCTION

PILOO MODY COLLEGE OF ARCHITECTURE ESTD : 1993
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Introduction

The Biju Patnaik University of Technology (BPUT) is following the syllabus of Five Year Full Time Bachelor of Architecture(B.Arch) degree programme, which was last revised during the year 2012. Piloo Mody College of Architecture (PMCA), Cuttack, is entrusted by BPUT with the task of coordinating the revision of the present B.Arch syllabus. PMCA undertook the task of restructuring and revising the content of the syllabus, after which a meeting was organised at PMCA with the core committee faculties of Architecture of other colleges under BPUT to get feedback on the syllabus. The expert committee meeting was held at PMCA on the 6th and 7th of May' 2016 to seek recommendation for and approval of the revised syllabus of B. Arch programme.

The new syllabus aims to encourage independent thinking, promote analytical approach to understand concepts in general and to minimize rote-learning in architectural education. The syllabus is framed so as to educate the students not only about the latest developments and innovations in the field, but also to make them sensitive to heritage, culture and tradition. The objective is to imbibe consciousness about sustainable and inclusionary development practice in the profession of architecture. These two principles guided the structuring of theory subjectsand the design studios.

Some of the salient aspect of the syllabus

- All the subjects to fit into four thematic streams: design, humanities, technology and practice.
- Restructuring of the syllabus with more vertical (in the same semester) and horizontal (across the semesters) correlation between the theory and non-theory courses
- Rationalization of the number of courses and credits. Total number of credit is 232.
- The theory courses offered in the curriculum are organized systematically so as to serve as a strong input of conceptual knowledge and understanding for the subsequent studio and lab courses.
- To introduce new subjects and incorporate flexibility in the syllabus by introducing more electives
- Scope to acquire additional credits by undertaking Honors courses in relevant emerging areas.
- Subjects offered for minor specialization to other disciplines are identified in the syllabus. These subjects are selected on the basis of their multidisciplinary relevance.
- Emphasis to be laid on organizing seminars in both compulsory and elective courses so that students get opportunities in public speaking and become more articulate in direct presentation of their ideas.
- Rationalization in the marks awarded for progressive internal and final evaluation for studio based subjects. The final evaluation to be conducted through external viva-voce.
- Technical skill oriented courses isemphasized.
- Content of some of the existing courses offered is revised so as to provide the students with up-to-date knowledge.

- Structural analysis subjects is revised in terms of the content and teaching methods
- Along with basic theoretical understanding it is felt that practical and case studies exercises is needed to be included to better comprehend the technical concepts.
- There is scope for introducing creative and alternative teaching pedagogy methods, as Module-5 is left as a flexible slot in the content of the syllabus in each subject.
- Focused Architectural Design Studio in each semester
    - In the new syllabus the Design Studios focus specifically into different thematic areas and is carefully sequenced keeping in view the core theoretical learning and technical skills acquired prior to handling the respective design exercises. The studio sequence proceeds from a broad understanding of design as intentional activity to progressively complex exercises involving bigger spatial scales
    - The Architectural Design course, as was earlier envisaged to be the central discipline of the programme with highest credit, not only retains its importance in the curriculum, but has also been further fine tuned into a more pragmatic, systematic and explicit form.

Guidelines

For all sessional subjects, progressive submissions at each stage will be evaluated to complete internal evaluation of 60% of the total marks. Evaluation of rest 40% of the total marks will be done through external viva voce and presentations.
Along with progressive evaluation of class works, tests to be conducted for Architectural Graphics -I & II, as part of the internal and external evaluation process.

Architectural Design Studio to have one major problem as per the thematic outline, one small scale pace setter problem and one time problem till Semester- I. Architectural Field Study to be made mandatory as part of Architectural Design curriculum in each semester.

For the subject Building Materials and Construction,theoretical understanding about different aspects of the respective building materials used for different construction technologies taught in each module to be imparted in the beginning of the module before doing the technical drawings. First 1/2 hour of the 3 hour studio class to be dedicated to lectures where the theoretical aspects are discussed.

Syllabus of History of Architecture is framed according to time line which will be covered in three semesters. Architecture principles, styles and settlement pattern of different geographical regions spanning a particular period will be taught in each semester. Different styles of different regions belonging to the same period can be studied in correlation, so that regional and periodic significance and relevance can be better understood and interpreted.

2. COURSE STRUCTURE OF 5 YEAR B.ARCH

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COURSE STRUCTURE OF 5 YEAR B.ARCH

COURSE STRUCTURE: FIRST YEAR B.ARCH. PROGRAMME

Ist SEMESTER

Sl. No.	Sub.Code	Theory	ContactHrs. (L-T-P)	Credit	Internal Evaluation	University Marks
1	15AH113	Applied Mathematics	3-0-0	3	50	100
2	15AR123	Environmental Studies	3-0-0	3	50	100
3	15AR133	Introduction to Architecture	3-0-0	3	50	100
TOTAL			***9***	***9***	***450***	
Sl. no	**Sub. Code**	**Sessionals**	**ContactHrs. (L-T-P)**	**Credit**	**Internal Evaluation** (Progressive Evaluation- 60 + Final Viva Voce - 40)	
4	15AR144	Architectural Graphics-I	0-0-6	4	100	
5	15AR153	Architectural workshop	0-0-3	3	100	
6	15AR164	Basic Design-I	0-0-6	4	100	
7	15AR174	Building Materials and Construction-I	0-0-6	4	100	
8	15AH182	Communicative English	1-0-2	2	100	
TOTAL			***24***	***17***	***500***	
Total Contact Hours in the Semester			***33***			
Total Credits in the semester				**26**		
Total Marks in the semester					**950**	

IInd SEMESTER

Sl. No.	Sub.Code	Theory	ContactHrs. (L-T-P)	Credit	Internal Evaluation	University Marks
1	15AS213	Structural Mechanics	3-0-0	3	50	100
2	15AR223	Climatology	2-0-1	3	50	100
3	15AR233	History of Architecture-I	3-0-0	3	50	100
TOTAL			***9***	***9***	***450***	
Sl. no	**Sub. Code**	**Sessionals**	**ContactHrs. (L-T-P)**	**Credit**	**Internal Evaluation** (Progressive Evaluation- 60 + Final Viva Voce - 40)	
4	15AR244	Architectural Graphics-II	0-0-6	4	100	
5	15AR252	Visual Documentation and Measured Drawing	0-0-3	2	100	
6	15AR264	Basic Design-II	0-0-6	4	100	
7	15AR274	Building Materials and Construction-II	0-0-6	4	100	
8	15AS283	Surveying techniques	1-0-2	3	100	
TOTAL			***24***	***17***	***500***	
Total Contact Hours in the Semester			***33***			
Total Credits in the semester				**26**		
Total Marks in the semester					**950**	

COURSE STRUCTURE: SECOND YEAR B.ARCH. PROGRAMME

IIIrd SEMESTER

Sl. no	Sub.Code	Theory	ContactHrs. (L-T-P)	Credit	Internal Evaluation	University Marks
1	15AS313	Structural Analysis	3-0-0	3	50	100
2	15AR324	Advanced Building Materials and Finishes	4-0-0	4	50	100
3	15AR3330	History of Architecture-II	3-0-0	3	50	100
4	15AS343	Water Supply and Sanitation	3-0-0	3	50	100
TOTAL			***13***	***13***	***600***	
Sl. no	**Sub. Code**	**Sessionals**	**ContactHrs. (L-T-P)**	**Credit**	**Internal Evaluation** (Progressive Evaluation- 60 + Final Viva Voce - 40)	
5	15AR356	Architectural Design -I	0-0-9	6	100	
6	15AR364	Building Materials and Construction-III	0-0-6	4	100	
7	15AR372	Computer Applications in Architecture	0-0-3	2	100	
TOTAL			***18***	***12***	***300***	
Total Contact Hours in the Semester			***31***			
Total Credits in the semester				**25**		
Total Marks in the semester					**900**	
Minor specialization to be offered - Advanced Building Materials and Finishes						

IVth SEMESTER

Sl. No.	Sub.Code	Theory	ContactHrs. (L-T-P)	Credit	Internal Evaluation	University Marks
1	15AS413	Design of RCC Structures	3-0-0	3	50	100
2	15AR424	Landscape Design	3-0-1	4	50	100
3	15AR433	History of Architecture-III	3-0-0	3	50	100
4	15AR443	Vernacular Architecture	3-0-0	3	50	100
TOTAL			***13***	***13***	***600***	
Sl. no	**Sub. Code**	**Sessionals**	**ContactHrs. (L-T-P)**	**Credit**	**Internal Evaluation** (Progressive Evaluation- 60 + Final Viva Voce - 40)	
5	15AR456	Architectural Design -II	0-0-9	6	100	
6	15AR464	Building Materials and Construction-IV	0-0-6	4	100	
7	15AR472	3D Modelling Techniques	0-0-3	2	100	
TOTAL			***18***	***12***	***300***	
Total Contact Hours in the Semester			***31***			
Total Credits in the semester				**25**		
Total Marks in the semester					**900**	
Minor specialization to be offered - Landscape Design						

COURSE STRUCTURE: THIRD YEAR B.ARCH. PROGRAMME

Vth SEMESTER

Sl. No.	Sub.Code	Theory	ContactHrs. (L-T-P)	Credit	Internal Evaluation	University Marks
1	15AS513	Design of Steel Structures	3-0-0	3	50	100
2	15AE524	Lighting and Electrical Services	3-0-1	4	50	100
3	15AR533	Contemporary Architecture	3-0-0	3	50	100
4	15AR543	HVAC Systems	3-0-0	3	50	100
TOTAL			***13***	***13***	***600***	
Sl. no	**Sub. Code**	**Sessionals**	**ContactHrs. (L-T-P)**	**Credit**	**Internal Evaluation** (Progressive Evaluation- 60 + Final Viva Voce - 40)	
5	15AR556	Architectural Design -III	0-0-9	6	100	
6	15AR564	Working Drawing-I	0-0-6	4	100	
7	15AR572	Design Communication	0-0-3	2	100	
TOTAL			***18***	***12***	***300***	
Total Contact Hours in the Semester			***31***			
Total Credits in the semester				**25**		
Total Marks in the semester					**900**	
Minor specialization to be offered - Lighting and Electrical Services						

VIth SEMESTER

Sl. No.	Sub.Code	Theory	ContactHrs. (L-T-P)	Credit	Internal Evaluation	University Marks
1	15AR613	Specifications	3-0-0	3	50	100
2	15AR624	Advanced Building Systems and Services	3-0-1	4	50	100
3	15AR633	Theory of Design	3-0-0	3	50	100
4	15AR643	Architectural Acoustics	3-0-0	3	50	100
TOTAL			***13***	***13***	***600***	
Sl. no	**Sub.Code**	**Sessionals**	**ContactHrs. (L-T-P)**	**Credit**	**Internal Evaluation** (Progressive Evaluation- 60 + Final Viva Voce - 40)	
5	15AR656	Architectural Design -IV	0-0-9	6	100	
6	15AR664	Working Drawing-II	0-0-6	4	100	
7	15AR673	Interior Design	0-0-3	3	100	
TOTAL			***18***	***13***	***300***	
Total Contact Hours in the Semester			***31***			
Total Credits in the semester				**26**		
Total Marks in the semester					**900**	
Minor specialization to be offered - Advanced Building Systems and Services						

COURSE STRUCTURE: FOURTH YEAR B.ARCH. PROGRAMME

VIIth SEMESTER

Sl. No.	Sub.Code	Theory	ContactHrs. (L-T-P)	Credit	Internal Evaluation	University Marks
1	15AR713	Estimation and Valuation	3-0-0	3	50	100
2	15AR724	Introduction to Urban Planning and Design	3-0-1	4	50	100
3	15AR733	Behavioural Architecture	3-0-0	3	50	100
4	15EAR743	**Elective-I** (i) Ergonomics and Product Design (ii) Set Design for Events and Performing Arts (iii)Space Syntax and Geometry of Forms	3-0-0	3	50	100
TOTAL			***13***	***13***	***600***	
Sl. no	**Sub.Code**	**Sessionals**	**Contact Hrs. (L-T-P)**	**Credit**	**Internal Evaluation** (Progressive Evaluation- 60 + Final Viva Voce - 40)	
5	15AR756	Architectural Design -V	0-0-9	6	100	
6	15AR764	Architectural Details	0-0-6	4	100	
7	15AR772	Research Methods and Seminar	1-0-3	2	100	
TOTAL			***19***	***12***	***300***	
Total Contact Hours in the Semester			***32***			
Total Credits in the semester				**25**		
Total Marks in the semester					**900**	
Minor specialization to be offered - Introduction to Urban Planning and Design						

VIIIth SEMESTER

Sl. No.	Sub. Code	Theory	ContactHrs. (L-T-P)	Credit	Internal Evaluation	University Marks
1	15AR813	Construction Project Management	3-0-0	3	50	100
2	15AR824	Disaster Resilient Architecture	3-0-1	4	50	100
3	15EAR833	Elective-II (i) Energy efficient Design and Green Architecture (ii) Modular Coordination and Prefabrication (iii) Industrial Architecture	3-0-0	3	50	100
TOTAL			***10***	***10***	***450***	
Sl. no	**Sub. Code**	**Sessionals**	**Contact Hrs. (L-T-P)**	**Credit**	**Internal Evaluation** (Progressive Evaluation- 60 + Final Viva Voce - 40)	
4	15AR846	Architectural Design -VI	0-0-9	6	100	
5	15AR854	Research and Design	1-0-5	4	100	
6	15AR862	Pre-thesis Seminar	0-0-3	2	100	
TOTAL			***18***	***12***	***300***	
Total Contact Hours in the Semester			***28***			
Total Credits in the semester				**22**		
Total Marks in the semester					**750**	

COURSE STRUCTURE: FIFTH YEAR B.ARCH. PROGRAMME

IX th SEMESTER

Sl. no	Sub. Code	Sessionals / Practical	Credit	Internal Evaluation
1	15AR914	Office Training	4	100
2	15AR922	Site Supervision Work	2	100
3	15AR933	Critical Appraisal of Buildings	2	100
4	15AR943	Documentation of ArchitecturalDetails	2	100
Total Credits in the semester			**10**	
Total Marks in the semester				**400**

Xth SEMESTER

Sl. No.	Sub.Code	Theory	ContactHrs. (L-T-P)	Credit	Internal Evaluation	University Marks
1	15AR013	Professional Practice	3-0-0	3	50	100
2	15EAR023	Elective -III (i) Building Repair and Restoration (ii)Real Estate Management (iii) Urban Transportation Planning	3-0-0	3	50	100
TOTAL			***06***	***06***	***300***	
Sl. no	**Sub. Code**	**Sessionals**	**ContactHrs. (L-T-P)**	**Credit**	**Internal Evaluation** (Progressive Evaluation- 50 + Final Viva Voce - 50)	
3	15AR0416	Architectural Thesis	0-0-24	16	100	
TOTAL			***24***	***16***	***100***	
Total Contact Hours in the Semester			***30***			
Total Credits in the semester				**22**		
Total Marks in the semester					**400**	

Total Credits in all the ten semesters -232

Total Marks in all the ten semesters - 7950

3. DETAILED SYLLABUS OF 5 YEAR B.ARCH PROGRAMME - 1st year

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DETAILED SYLLABUS OF 5 YEAR B.ARCH PROGRAMME

SEMESTER I

THEORY

15AH113	**Applied Mathematics**	**HR 3-0-0**	**CR-3**

Objective

The course is aimed to develop basic mathematical techniques required to support architectural and engineering concepts, and is also oriented to understand and analyse practical engineering problems. The course modules cover statistics and linear programming, which will enable the students to analyse field study data and formulate mathematical models.

Module I

GEOMETRY AND MEASUREMENTS

Proportion, Golden ratio, Euclidean geometry, Methods to calculate areas, surface areas of solids and volumes for various geometrical shapes (types of curves) and volumes (cube, sphere, cone, cylinder)

Module 2

CALCULUS & APPLICATIONS

Methods of differentiation. Calculus of one variable

Fundamentals of Integral calculus, Maxima and Minima for a function of one variable, Reduction Formulae, Calculation of areas using integrals: Area bounded by curve – Arc length of curve.

Module 3

MATRICES&BASICS OF LINEAR PROGRAMMING

Elementary rows & column transformation, Gauss elimination & solution of System of equations, Inverse matrix.

Formulation of LinearProgramming, Graphical solution, Simplex method.

Module 4

STATISTICS

Measures of central tendency, Mean/ Median mode, measures of dispersion (Mean derivation/ Standard Derivation, Variance), Co-relation and Regression.

Module 5

Relevant mathematical topics as decided by the subject faculty

References

1. Kreyszig, E., Advanced Engineering Mathematics. Hoboken: John Wiley & Sons, 2007.
2. Grewal B.S., Higher Engineering Mathematics, 35th edition, Khanna Publishers, 2000.
3. Kapoor,V. K. and Gupta, S. C., Fundamentals of Mathematical Statistics, Sultan & Sons
4. Kalavathy, S., Operation Research, Vikas Publishing House Pvt. Ltd., 2009
5. Boucher, J. S., 1857, Mensuration, Plane and Solid, Longman, Brown, Green, Longmans and Robert, London.

15AR123	Environmental Studies	HR 3-0-0	CR-3

Objective

To enable the student to understand the ecosystem, effect of pollution, environmental degradation and eco sustainable development.

Module 1

INTRODUCTION TO ECOSYSTEMS AND ENVIRONMENT, ENVIRONMENTAL RESOURCES

Fundamentals of Ecosystem, our earth" s Environment. Types of ecosystems, characteristics features, structure and functions of Ecosystems – Forest, Grassland, Desert, Aquatic (lakes, rivers and estuaries).

Module 2

RESOURCES AND ENVIRONMENT: LAND, FOREST, WATER AND ENERGY AS ENVIRONMENTAL RESOURCES. HUMAN IMPACT ON ENVIRONMENT AND POLLUTION:

Local and Global Issues, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Urban and Industrial wastes, Recycling and Re-use, Global warming, Acid rain and Ozone layer depletion.

Loss of wet lands, mangroves, increasing desert areas, Social issues and the environment

Module 3

INSTITUTION AND GOVERNANCE

Institutional arrangement, Environmental legislation, Introduction to Government regulations, Introduction to Environmental Acts, (eg, Water Conservation and Control of Pollution Act, Air pollution control act, Environmental Protection Act,Wild life protection Act, ForestConservation Act, etc.)

Module 4

ENVIRONMENTAL MANAGEMENT

Introduction to principles of sustainable development, Environmental quality and indicators, Management of environment, Introduction to Solid waste management.

Module 5

Conduct case studies and prepare report on relevant areas.

References

1. Ecology/ Principles and application ; J.L Chapman & M.J Press; Cambridge
2. Environmental Economics; Charles. D Kolstad: Oxford University Press
3. The hidden connection; F.Capra , Harper and Collins
4. Agarwal, K. C. (2001). Environmental Biology. Bikaner : Nidhi Publications Ltd.
5. Benny, J. (2005). Environmental Studies. New Delhi : Tata McGraw Hill.
6. Bharucha, E. (2005). Text book of environmental studies for undergraduates courses. New Delhi : Universities Press, UGC. .
7. Brunner, R.C. (1989). Hazardous Waste Incineration. New Delhi : McGraw Hill.
8. Kaushik, A. and Kaushik, C. P. (2010). Basics of Environment and Ecology. New Delhi : New Age International Publishers.

15AR133	Introduction to Architecture	HRS 3-0-0	CR-3

Objective

This course is introduced in the beginning of the B.Arch programme to impart an overall orientation towards Architectural course. To acquaint the students with fundamental knowledge of space and spatial organisation, basic aesthetic principles involved in architectural design, and approach to conceptualise and develop architectural design.
The course can be taught through interactive discussions , audio-visual presentations and creative assignments.

Module 1

ARCHITECTURE , SPACE AND MASS

Introducing Architecture as a profession and role of an Architect,
Definition of architecture- elements of architecture - Concept of space, Articulation of form and space (Primary forms, properties of form, transformation of forms - dimensional transformation, subtractive, additive forms, organization of additive forms), Organisation of spaces, sense of enclosure, openings in space defining elements.

Module 2

AESTHETIC COMPONENTS OF DESIGN

Exploration of the basic principles of design such as Proportion, scale, balance, rhythm, contrast, harmony axis, symmetry, hierarchy, datum; Golden proportion, Theories of scale and proportion, Vitruvian theory, Modular man, Relationship between Art and Design with man, space and environment.
To be explained with building examples both historical as well as contemporary.

Module 3

SPATIAL ORGANISATION AND CIRCULATION

Different types of spatial organizations of masses linear, centralised, radial, clustered, grid organization illustrations of buildings both historical & contemporary.
Building approach, building entrance, Configuration of path, Path space relationship.

Module 4

DESIGN PROCESS

Integration of aesthetics, function and form - Understanding of formative ideas, organization concepts, spatial characteristics.
Massing and circulation in design analysis of the following buildings: Falling water house & Guggenheim museum by F. L. Wright -Villa Savoye & Chapel of Notredame Du Haut byLe Corbusier.

Module 5

Case studies of historical and contemporary site and buildings (Study of spatial organisation, form, element and art).

References

1. *Francis D. K. Ching, Architecture - Form, Space and Order, Van Nostrand Reinhold Company, 1979*
2. *Roger H. Clark, Michael Pause, Precedents In Architecture, Van Nostrand Reinhold Company , 1996*
3. *K.W.Smithies, Principles of Design in Architecture, Van Nostrand Reinhold Company, 1981 4.*

Sam F. Miller, Design Process - A Primer For Architectural & Interior Design, Van Nostrand Reinhold Company , 1995
5. *Ernest Burden, Elements of Architectural Design – A Visual Resource, Van Nostrand Reinhold Company , 1994*
6. *V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications, New Delhi, 1973.*
7. *Vitruvius, Translation: Morris, H. M. (1960). The*

SESSIONALS/ PRACTICALS

15AR144	ARCHITECTURAL GRAPHICS-I	HRS 0-0-6	CR-4

Objective
To train the students in the fundamentals of architectural drawing techniques and skills. Graphical presentation of objects through geometrical projection and visualization is taught in this course.

Module 1
INTRODUCTION TO PLANE GEOMETRY
Introduction to the basic principles of drawing: Scale conversion etc. , Practices in lettering, drafting, and dimensioning
Introduction to Plane geometry: Exercise in construction of Straight lines, Circles, Tangents and Regular polygons.
Description of Plane Curves: Ellipse, Parabola, Hyperbola, Helix and other special curves.

Module 2
CONCEPT OF ORTHOGRAPHIC PROJECTION
First-Angle Projection, Projections of Points, Projections of Straight Lines, Projections of Planes, Projections of Solids.

Module 3
SECTION OF SOLID
Section of solids, True shapes of section, Interpenetration of solids

Module 4
DEVELOPMENT OF SURFACES
Surface development of simple solid forms leading to complex forms including interpenetration.

Note
Along with progressive evaluation of class works, tests to be conducted for Descriptive Geometry as part of the internal and final evaluation process.

References
1. Bhatt, N.D. and Panchal, V. M., Engineering Drawing, Charotar Publishing House, Anand, India.
2. Agarwal, B. andAgarwal, C.M., Engineering Drawing, Tata McGraw-Hill.
3. Kumar, M. S. , Engineering Drawing, D. D. Publications, Chennai.
4. Francis D. K. Ching & Steven P. Juroszek, Design drawing, John Wiley & Sons, USA, 1998.
5. I. H. Morris, Geometrical Drawing for Art Students, Orient Longman, Chennai.

15AR153	ARCHITECTURAL WORKSHOP	HRS 0-0-3	CR-3

Objective

To equip students with the basic skills necessary to represent their ideas through models using different materials. To make students practice with various tools essential for making architectural models.

Module1

INTRODUCTION TO MODEL MAKING

Need for architectural models, Role of scale-models in design; General practices in model making; Types of models: block, detailed, construction & interior models. Introduction to concepts of model making and various materials used for model making.

Module2

BASE AND BLOCK MODELLING

Preparation of base for models using wood or boards, Introduction to block models of objects (3D Compositions) and buildings involving the usage of various materials like Thermocole, Soap/Wax, Boards, Clay etc.

Module 3

DETAIL MODELLING

Making detailed models which includes the representation of various building elements like Walls, Columns, Steps, Windows/glazing, Sunshades, Handrails using materials like Mount-board, Snow-white board, acrylic sheets;

Representing various surface finishes like brick/stone representation, stucco finish etc;

Various site elements – Contour representation, Roads/Pavements, Trees/Shrubs, Lawn, Water bodies, Street furniture, Fencing etc

Module 4

JOINERY

Simple exercises in cutting, finishing and joinery with simple blocks;

Use of carpentry tools and making joints such as Dovetail joint, Mortise and Tenon joint, Lap joint, Butt joint, etc. to be used for making furniture.

MODELS OF STRUCTURAL SYSTEMS

Making models of the various structural systems used in buildings like; Space frames – using Match sticks, wires; Different forms of shell roofs using POP, Clay, Soap; Tensile structures using fabric.

Module 5

Flexible for the teacher to decide assignments for representing innovative ideas, and by using new materials and techniques.

References

1. *BENN, the book of the house , Errnest Benn limited London*
2. *Jannsen, Constructional Drawings & Architectural models, Kari Kramer Verlag Stuttgart, 1973.*
3. *Harry W.Smith, The art of making furniture in miniature, E.P.Duttor Inc., New York, 1982.*
4. *Thames and Hudson Manual of Rendering with Pen and Ink-Robert W Gill.*
5. *Ching, F. D. K. (2009). Architectural Graphics. 5th Ed. New Jersey : John Wiley & Sons.*
6. *Criss. B. M. (2011). Designing with models: A Studio guide to ArchitecturalProcess Models.3rd Ed. Hoboken :John Wiley & Sons.*
7. *Kieran, S. and Timberlake, J. (2008). Lobolly House : Elements of a New Architecture. New York : Princeton Architectural Press.*
8. *Morgan, C. L. and Nouvel, J. (2002). The Elements of Architecture. London : Thames & Hudson.*
9. *Werner, M. (2011). Model Making. New York : Princeton Architectural Press.*

15AR164	BASIC DESIGN-I	HRS 0-0-6	CR-4

Objective

The course aims at building up the vocabulary in visual and basic design principles.Introducing students to fundamental techniques of Visual representation and to equip with thebasic principles of representation. To enhance skills in developing a graphical language of architecture.

Module 1

LEARNING SKETCHING, DRAWING, AND VISUAL THINKING

Free-hand drawing appropriate to visual & architectural representation, indoor & outdoor sketching, drawing from observation, terminology, abbreviations and signage used in visual representation, Sheet layouts, art lettering, shading, symbols & scale;

Introduction to fundamentals of visual representation: Points, line & shape, tone & texture, figure & ground, Colour & value.

Module 2

COMPOSITION

Making two dimensional and three dimensional compositions involving various elements of design such as Line, Shape, Colour, Texture, Transparency, Mass, space etc., aimed at understanding the principles of design such as Repetition, Harmony, Contrast, Dominance, Balance, Dynamism, etc.

Module 3

SCULPTURAL FORMS & SPACES

Making three dimensional sculptures involving the basic platonic solids and abstract sculptures: explore play of light & shade and application of colour.

Introduction to external & internal forms, Concept of space, interrelationship between space, volume and order

Variations in forms with planar juxtapositions, Understanding the Elementary structural forms

Module 4

FORMS IN NATURE

Study of forms in nature and analysis with respect to their colour, form, texture and structure. Exercises involving these natural forms and various approaches to art such as – Representation, Abstraction and Non-Representational/ Non-Objective compositions.

Module 5

Faculty to decide on explorative Basic Design assignments for students.

References

1. Charles Wallschlaeger & Synthia Busic Snyder, Basic Visual Concepts & Principles for artists, architects& designers, McGraw hill, USA, 1992.

2. Paul Zelanski & Mary Pat Fisher, Design principles & Problems , 2nd Ed, Thomson & Wadsworth, USA,1996

3. Owen Cappleman & Michael Jack Kordan, Foundations in Architecture: An Annotated Anthology ofbeginning design projects, Van Nostrand Reinhold, New York.

4. Trewin Copplestone, Arts in Society, Prentice Hall Inc, Englewoods Cliffs, N. J. 1983. 4. H. Gardner, Art through ages.

5. Paul Laseau. (2001). Graphic Thinking For Architects and Designers, John Wiley & Sons, New York

6. Ching, F. D. K. (1997). Design Drawing. Hoboken : John Wiley & Sons.

7. Ching, F. D. K. (2012). Architecture: Form, Space and Order. 3rd Ed. Hoboken: John Wiley & Sons.

8.Broadbent, G. (1973). Design in Architecture - Architecture and Human Science. John Wiley and Sons, New York

9. Chauhan, P. (2005). Learning Basic Design. Mumbai : Rizvi College of Architecture.

15AR174	BUILDING MATERIALS AND CONSTRUCTION-I	HRS 0-0-6	CR-4

Objective

To understand fundamental building material in the context of variousconstruction methods. Focus on various building materials would be emphasised based on theperformingstandards and codes, wherein application of each material would be discussed in detail, both in the context of traditional and modern construction methods and practices. Based on the lecture delivered, the students are required to produce report on materials, construction and detail drawings. With time, each topic can also focuson latest trends in practice and usage of new technology/materials.

Module1

LECTURE

General introduction to building materials, Natural building materials; stone, mud, sand, timber. Building construction materials; bricks, terracotta, Lime mortar, cement mortar, concrete etc. Bricks: Types, qualities and application method

SHEET WORK

Brick masonry-Masonry tools & equipment. Different types of bricks. Bonding of bricks & its principles, Stop end,T, L & cross Junctions of English bond & Rat trap bond andNon structural bond. Attached & detached piers. Brick jallis, Corbelling, Cornices, Types of coping, pointing & Threshold

Module 2

LECTURE

Stones: Types, qualities and application method

SHEET WORK

Stone Masonry-Random rubble masonry, Ashlars masonry, coursed and un coursed rubble masonry etc. Walls with stone facing and brick backing (composite wall)

Module 3

SHEET WORK

Different types of walls using alternative cost effective techniques (Different types of mud walls, Cob walls, Adobe blocks, wattle Daub).

Construction detail of brick and stone arches, Lintels, brick domes.

Module 4

LECTURE

Soils: Formation –Types, 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.

SHEET WORK

Simple foundations with trenches for load bearing walls; Sections of compound walls, retaining wall, foundation for steps.

Module 5

Any other topic as per present day need as decided by the teacher.

NOTE:

- Frequent site visits to be arranged as a part of the curriculum. Site visits should be in line with the present studio work. It is mandatory for students to submit a site observation report, either periodically or at the end of the semester.
- Pedagogy should establish the linkage of the relevant material and construction techniques from past to present.
- Performing standards and Codes used for various Building Materials and Construction Techniques needs to focused.
- Alternative construction techniques for respective topics needs to be discussed in detail.

References

1. Barry, R. (1999). The Construction of Buildings Vol. 2. 5th Ed. New Delhi : East-West Press.
2. Foster, J. and Mitchell, S. (1963). Building Construction: Elementary and Advanced, 17th Ed. London : B.T. Batsford Ltd.
3. McKay, W. B. (2005). Building Construction Metric Vol. I–V. 4th Ed.Mumbai : Orient Longman.
4. Hailey and Hancork, D. W. (1979). Brick Work and Associated Studies Vol. II. London : MacMillan.
5. Merritt, F.S. and Ricketts, J.T., Building Design and Construction Handbook, McGraw Hill.
6. Rangwala, S. C. (1963). Building Construction: Materials and types of Construction. 3rd Ed. New York : John Wiley and Sons.
7. Chudley, R. (2008). Building Construction Handbook. 7th Ed. London : Butterworth-Heinemann.
8. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi : Standard Publishers.
9. Ching, F. D.K – Building Construction illustrated. VNR, 1975
10. A.Agarwal –Mud: The potentials of earth based material for third world housing – IIED, London, 1981.
11. HUDCO – All you wanted to know about soil stabilized mud blocks, New Delhi, 1989.

15AH182	COMMUNICATIVE ENGLISH	HRS 1-0-2	CR-2

Objective

This is a practice-oriented, need-based, functional-communicative course. It seeks to develop the student's skills of communication in listening, speaking and writing. Reading, though formally not included, is still a recommended activity. The student is advised to cultivate the habit of reading newspapers, magazines and books in a free, extensive manner to consolidate the skills already achieved. A more interactive process of teaching/learning is called for in order to achieve the skills of effective communication.

The course attempts to familiarize the student with the sounds of English in a nutshell, particularly long and short vowels, some consonants, stress and intonation. Provide adequate listening and speaking practice so that the learner can speak with ease, fluency and reasonable clarity in common everyday situations and on formal occasions.Use of grammar in meaningful contexts and doing things with words, i.e. performing functions like ordering, requesting, inviting and so on are to be extensively practised.

Module 1

COMMUNICATION

Verbal and non-verbal spoken and written; Language functions-descriptive, expressive and

social; To inform, enquire, attract, influence, regulate and entertain; Bias-free and plain EnglishFormal and informal style.

Module 2

WRITING I

Paragraph writing - topic sentence, cohesion and coherence - sentence linkers (so, but, however, etc.); Preparation of a business report - writing a business proposal - format, length, structure

Module 3

WRITING II

Preparing notes - writing business letters and E-Mail messages;
Documentation: *References*, notes and bibliographies.

Module 4

WRITING III

Writing curriculum vitae (both chronological and functional) along with an application for a job; Public relations - concept and relevance; PR in a business organization - handling the media.

Module 5

MEETING AND PRESENTATION

Organizing a meeting, preparing an agenda, chairing a meeting, drafting resolutions, writing minutes; Making an oral Presentation; Facing an interview

References

1. Geoffrey Leech and Jan Swartvik " A communicative Grammar of English, Longman
2. O'connor, J.D., Better English Pronunciation, ELBS.
3. Chand, J.K. and Das, B.C., A Millennium Guide to writing and Speaking English, Friends' Publishers
4. John, S., Oxford Guide to Writing and Speaking English, OUP.
5. Bovee Etal, Business Communication Today, Pearson Education.

SEMESTER II

THEORY

15AS213	Structural Mechanics	HRS 3-0-0	CR-3

Objective

To introduce the concepts of behavior of structural components and simple analytical techniques. The course aims atcovering basic theorems andmechanical properties of engineering materials, elastic constants, different types of stresses andstrains, thedeformation of elastic bodies under simple stresses, the use and principles of compositesections, geometrical properties such as centroid, moment of inertia etc of sections for different shapes,analysis of perfect frames for vertical loads by analytical as well as graphical methods.

Module 1

BRIEF INTRODUCTION OF HISTORY OF STRUCTURAL DESIGN

Trabeated construction, vaults, flying buttresses, tents, masted structures & bridges through ancient & medieval history, Post Industrial modular construction of large span & suspension structures in steel and concrete- examples of iconic projects.

Principle of statics, forces, resolution of forces, co-planar, non-coplanar, concurrent, non concurrent, Equilibrium of concurrent forces in a plane, Triangle of forces, parallelogram of forces.

Module 2

TRUSSES AND FRAMES

Plane trusses. Method of joints, Virtual works, Equilibrium of Ideal system, stable and unstable equilibrium. Examples related to building and other structure.

Module 3

FORCES AND GEOMETRICAL PROPERTIES OF SECTIONS

Center of gravity, Center of parallel forces in a plane, Center of gravity, Centroids of curves, Distribution of forces in a plane.

Moment of inertia of plane figure with respect to an axis in its plane, with respect to perpendicular to the plane, parallel axis theorem, product of Inertia.

Module 4

PROPERTIES OF MATERIAL

Concept of stress strain normal stress, shear stress, normal strain, shear strain, Hooks law, Poissions ratio, principal stresses, Principal strain, Mohar's circle for stress and strain. Breaking stress, factor of safety, safe stress values for materials.

Module 5

Application of concepts with practical examples.

References

1. Timoshenko, S., Young, D. H. and Rao, J. V., Engineering Mechanics. 4th Ed. New Delhi:Tata McGraw-Hill Education, 2007.

2. Khurmi R.S., A text book of Engineering Mechanics, S. Chand and Co, New Delhi,1999.
3. Laudner T.J. and Archer R.R., Mechanics of Solids in Introduction, McGraw - Hill International Editions, 1994.
4. Junarkar S. B., Mechanics of Structures Vol 1, Charotar Publishing House, India, 1995.
5. Rajashekharan, S. and Sankara Subhramanian, G.,Fundamentals of Engineering Mechanics, 2nd Edition, Vikas Publishing House Pvt. Ltd.
6. Timoshenko, C.P., and Gere., Mechanics of materials, McGraw - Hill Book Company, New York, 1984.
7. Ferdinand, L. S., Engineering Mechanics: Statics and Dynamics. 3rd Ed. New York:Harper Collins Publishers, 1975.
8. Kumar, K. L., Engineering Mechanics. Delhi : Tata McGraw-Hill Education, 2003.
9. Ramamrutham, S., Engineering Mechanics: A Textbook of Applied Mechanics. New DelhiDhanpat Rai Publishing Company, 2008.

15AR223	Climatology	HRS 2-0-1	CR-3

Objective

To impart scientific understanding of processes by which building and entire habitats can be designed to respond to nature, with climate as the basic parameter of design. To study fundamental parameters for thermal comfort. Equip the students with fundamental scientific concepts required to design climateresponsive buildings, by offering a clear understanding of the various climatic zones and its climateresponsive considerations in architectural design of building and built up areas.

Module 1

CLIMATE & THERMAL COMFORT

Effect of climate on habitat, shelter and environment. study of world climatic zones, characteristics of tropical climate.
Human comfort conditions – Thermal balance of the human body, comfort chart, comfort zone, Thermal comfort indices- Effective temperature, CET, humidity, radiation, wind, precipitation and its considerations at Macroclimate and Microclimate, Psychometric chart.

Module 2

SOLAR GEOMETRY &DESIGN OF SUNSHADING DEVICES

Apparent movement of the sun, sun path diagrams **(**solar chart) - Solar angles, Shadow angles, solar shading elements. etc -
Exercises on plotting isopleths, transfer of isopleths to solar chart, fitting a shading mask over the overheated period & design of sun shading devices for different orientations.

Module 3

PRINCIPLES OF THERMAL DESIGN AND VENTILATION IN BUILDINGS

Thermal quantities – heat flow rate, surface conductance, transmittance – calculation of U-value, convection, radiation, concept of sol-air temperature & solar gain factor, conductivity (k–value), resistivity, thermal capacity and emissivity, conductance through a multi-layered body. Exercises in heat loss & heat gain under steady state conditions & its application in selection of appropriate materials for walls & roof.
Ventilation- The wind, The effects of topography on wind patterns, principles of natural ventilation, wind flow around buildings and air flow patterns inside buildings, air change, quality of air, use of fans, thermally induced air currents, Pressure losses: Stack effect, Venturi effect, Use of courtyard. Wind velocity – wind rose diagram.

Exercises on anemometer and its use. Wind tunnel experiment for wind movement around the buildings.

Module 4

DESIGN FOR CLIMATIC TYPES

Building design & lay out planning consideration for warm humid, hot dry & composite climates, Tropical climate. Evaluating various built form and orientation of single building, Building material and construction for comfort conditions in the tropics. Effect of landscape elements on Climate and Architecture.

Exercises on climatic data sets, analysis, climate graph, the Mahoney tables & its recommended specification.

Module 5

Exercises on design of small buildings for various climates.

References

1. *O.H. Koenigsberger, Manual of Tropical housing and building – Climatic Design, OrientLongman, Chennai, 1975.*
2. *M .Evans – Housing, Climate & Comfort , Architectural Press, London ,1980.*
3. *E.Schild & M.Finbow – Environmental Physics in construction & its application inArchitectural Design, granadar , London, 1981.*
4. *Olgyay, A. and Olgyay, V., Solar Control and Shading Devices. New Jersey : Princeton University Press, 1976.*
5. *Krishan, A. and Nick Baker, Climate Responsive Architecture:A Design Handbook for Energy Efficient Buildings, McGraw Hill Education Private Limited, India, 1999.*
6. *B.Givoni, Man, Climate & Architecture, Applied Science, Essex 1982.*
7. *Donald Watson & Kenneth labs – Climatic Design – Mcgraw hill NewYork 1983.*
8. *A.Konya- Design Primer for Hot Climates, Architectural Press, London, 1980.*
9. *Chand, I. and Bhargava, P. K.,The Climatic Hand Book. New Delhi : Tata McGraw-Hill, 1999.*

15AR233	History of Architecture-I	HRS 3-0-0	CR-3

Pre Historic and Late Ancient (5000BC – 1st Century AD)

Objective

To provide an insight into the architecture of prehistoric period and late ancient civilizations, and the architecture of Classical antiquityof late ancient period. Social, religious and political character, construction methods, building materials and how they influenced their built form and settlement pattern shall be explained with suitable examples.Combined influence of geology, geography, climate, beliefs, religion and culture on the architecturemust be highlighted so as to appreciate how architecture is embedded in place specific context. Thestudy must enable students to do a comparative evaluation of various civilizations, appreciatechronological developments along the timeline and across geographies.

Module1

PRE-HISTORIC ARCHITECTURE & SETTLEMENT:

Introduction to human settlement: People, their shelter, settlement (growth, factors influencing the development of a settlement), burial systems, megaliths, memorials. *(Structures: Different types of graves, Stonehenge; & Settlements – World: Catal Hoyuk, Jericho; India: Mehrgarh etc.)*

INDUS VALLEY CIVILIZATION (IVC)
Indus - People, their shelter & civic buildings (typology, planning, construction & aesthetics), settlement pattern & citadel *(Structures: Great Bath/Great Granary, simple Harappan house; & Settlements – Mohen-jo-daro/ Harappa)*

VEDIC:
People, their shelter & buildings (typology, planning, construction & aesthetics), settlement (typical village, planning, shelter types, materials) *(Structures – Vedic houses, Torana, railing around villages; & Settlements – Patliputra)*

Module 2

NILE VALLEY CIVILIZATION
People, their shelter & buildings, settlement (growth, factors influencing the development of architecture & character, settlements of NVC) and religious (cult temples) & burial structures (typology, planning, construction & aesthetics) *(Structures: Mastabas, Pyramids: stepped, bent & Great Pyramids of Cheops; Temple of Abu-Simble/Amun-Ra)*

MESOPOTAMIAN (EUPHRATES & TIGRIS) CIVILIZATION:
Sumerian, Babylonian & Persian people, their shelter & buildings, settlement (growth, factors influencing the development of architecture & character, settlements) and religious structures. *(Structures – Ziggurats, Persepolis; & Settlements – Planning of Ur & Babylon)*

Module 3

CLASSICAL ARCHITECTURE OF ANCIENT GREECE (AEGEAN CULTURE):
Evolution of city states, Hellenic & Hellenistic period, factors influencing Greek Architecture, orders in Greek Architecture, proportion, optical correction. *(Structures – Parthenon, Theatre, Agora, Stoas, & Settlements – Athens & Acropolis of Athens and Delphi)*

Module 4

ROMAN ARCHITECTURE (ETRUSCAN CULTURE)
Evolution of Republican States, Roman construction techniques (masonry, vaults, domes, orders, use of concrete), building typology *(Structures – Forum, Pantheon, Thermae, Basilica, Circus, Colosseum, etc.)*

Module 5

Assignments on innovative interpretation of the periodic architectural styles. (To be decided by the subject teacher.)

References

1. Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London : B.T.Batsford Ltd.
2. Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London : Verona Printed.
3. Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai : D.B. Taraporevala Sons and Co.

4. Lloyd, S. and Muller, H.W., (1986), History of World Architecture Series, Faber and Faber Ltd., London.
5. Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London:McGraw-Hill.
6. Dutt, B. B. (2009). Town Planning in Ancient India. Delhi : Isha Books.
7. Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi :CBS Publishers.
8. Roth, M. L. (2006). Understanding Architecture: Its Elements, History, and Meaning. Columbia:West-view Press.
9. Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York : M. Courier Dover Publications .
10. Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford : OxfordUniversity Press.
11. Singh, U. (2009). A history of ancient and early medieval India: from the Stone age to the 12thcentury. Delhi : Pearson India.
12. Hiraskar, G.K., Great Ages of World Architecture, Dhanpat Rai & Sons, Delhi.

SESSIONALS/PRACTICALS

15AR244	ARCHITECTURAL GRAPHICS-II	HRS 0-0-6	CR-4

Objective

This course is aimed at developing the skills in presenting the graphical language of architecture. To introduce students to techniques of architectural representation in 3-dimension and to equip them with the basic methods of presentation techniques.Perspective Drawing and Sciography representation techniques are covered in the course. To introduce the students to fundamentals of visual arts and the use of graphics, colour and rendering for presentation of architectural drawings and visual communication.

Module 1

ISOMETRIC AND AXONOMETRIC VIEWS

Introduction to views, types and advantages. Isometric, Axonometric and Oblique view of objects, building components and Interior of the room.

Module 2

PERSPECTIVE VIEWS

Introduction to perspectives, difference between views & perspectives, Types of perspectives: one point, two point & three point,- Perspective Drawing of Three Dimensional Objects, Interiors and Exteriors of Building, Sectional perspectives.

Module 3

SCIOGRAPHY

Principles of Shade and Shadows- Sciography - Use, Definition, Direction of Light, Location of object, Method of finding shadows of a sphere, Right circular cone, shade of double curve surface of revolution, Shadows of architectural elements, Shadows of circular solids, Shadows on buildings.

Module 4

RENDERING TECHNIQUES

Representation technique of plan, elevation & section in architectural drawing; Monochromatic & different themes of rendering, architectural rendering techniques using pen & ink, color, values, tones, and general approach to rendering. Architectural representation of trees, hedges, foliage, human figures, cars, symbols etc., exposure to various mediums of presentation, Rendering of buildings.

Note

Along with progressive evaluation of class works, tests to be conducted for Descriptive Geometry as part of the internal and final evaluation process.

References

1. Bhatt, N.D. and Panchal, V. M., Engineering Drawing, Charotar Publishing House, Anand, India.
2. Albert O" Halse, Architectural Rendering:The Techniques of Contemporary Presentation, McGraw Hill Book Company. New York, 1972.
3. Ching, F. D. K. *Architectural Graphics*. 5th Ed. Hoboken : John Wiley & Sons, 2009.
4. Shankar Mulik, Perspective & Sciography, Allied Publishers
5. Shah, M.G.. & Kale, K.M., *Perspective Principles,* Asia publication, Mumbai.
6. Agarwal, B. and Agarwal, C.M., Engineering Drawing, Tata McGraw-Hill.
7. Kumar, M. S. , Engineering Drawing, D. D. Publications, Chennai.
8. Atkins, B., Architectural Rendering. California : Walter Foster Art Books, 1986.
9. Francis D. K. Ching & Steven P. Juroszek, Design drawing, John Wiley & Sons, USA, 1998.
10. H. Morris, Geometrical Drawing for Art Students, Orient Longman, Chennai.
11. Narayana, K. L. and Kannaiah, P., Engineering Graphics. New Delhi : Tata McGraw-Hill, 1988.
12. Holmes, J. M., Applied Perspective. London : Sir Isaac, Piotman and Sons Ltd., 1954.

15AR252	VISUAL DOCUMENTATION AND MEASURED DRAWING	HRS 0-0-3	CR-2

Objective

Visual documentation enables to enhance effective use of graphics and artistic skill for visual communication. Measured drawing helps to develop understanding of real built spaces and represent them graphically. To expose the students to real world situation and to represent the observation and understanding through graphics, sketches and architectural technical drawings.

SKETCHING

Sketching Human Form: Anatomy and Expressions - Graphical Representations;
Indoor objects - Still & Life – Understanding depth, light, shade & shadow etc.,
Outdoor sketching: Natural Forms & Built Forms, Natural Landscape, Rural, Heritage and Urban built environment, e.g. streetscape, chowks, squares, skyline, facade, views and vistas. etc.
Understanding variety in Forms

MEASURED DRAWING

Understanding of different scales, measurement device and their uses in practice - Drawings to scale, geometrical representation techniques and drafting skill;
Examples of Measured drawings- Furniture, Class room /Studio plan, Doors, Windows, Entrance Gate, buildings in different context (Rural, Heritage and Urban).

Drawings include plan, elevations and sections with all measurements and geometrical views (whole or sectional) of the structure.

References

1. Ching, F. D. K. (2011). A Visual Dictionary of Architecture. 2nd Ed. Hoboken:John Wiley & Sons.
2. Lockard, W. K. (1992). Drawing as a Means to Architecture. 6th Ed. New York :Van NostrandReinhold Company.

15AR264	BASIC DESIGN-II	HRS 0-0-6	CR-4

Objective

To introduce architectural design as a process and as a final product; to understand fundamentals of space, form and order as basic architectural skills. To involve students in a design project that will involve simple space planning and the understanding of the functional aspects of good design; to enable the students apply theoretical knowledge learnt in the previous semester in architectural design exercise.

Module 1

ANTHROPOMETRICS

Application of form, space, proportion, scale, order, including golden sections and modular concepts through examples from architectural theory and history taught in the previous semester.

Anthropometric study and ergonomics of human figure (including physically handicapped persons), dimensions of furniture - relationship with human anthropometrics (like in kitchens, toilets, bedrooms, staircases etc.)

Critical analysis of simple man-made objects to understand the underlying concepts in their design. Studies to understand function - Aesthetic Relationship and Anthropometrics.

Module 2

BUILDING ELEMENTS AS GENERATORS OF DESIGN (Reference to residences or small structures)

Walls, partitions, doors, windows, floors, roof, ceiling, stairs, wardrobes, storage cabinets and furniture could combine in multi-various ways to generate distinctive design solutionsthat are representative of a concept or theme.

Module 3

ARCHITECTURE AS A DESIGN RESPONSE TO THE PHYSICAL ATTRIBUTES

Indoor space, outdoor space, the concept of space in buildings; The relationship between manand space. Defining spaces and the degree of enclosure; Organization of spaces, fenestrationand character of facade, enclosure and internal spaces, Perception of space in terms of mundane, vibrant, soothing, irritating, free flowing etc.

- Quantitative & qualitative analysis of 3-dimensional spaces taking into consideration above concepts.
- 3 -Dimensional composition resulting into spaces to demonstrate the above concepts.

Basics of site planning and landscaping; Interpretation of site information as a decision making aid (Location, access, topography, surroundings and site elements such as trees, rock, views etc).

- Case studies of characteristics of built form – Urban and Rural context.

Module 4

DESIGN OF A SMALL STRUCTURE

Milk parlour / Snack kiosk / Garden pavilion / Entrance gate with a security booth / Bus stop with toilet, small shop, memorial and traffic island etc

References

1. *Mike w.Lin, Drawing & Designing with confidence – Astep by step guide, John Wiley &sons, USA,1998.*
2. *Criss B.Mills, Designing with model: A Studio guide to making & using architectural models, Thomson & Wadsworth, USA,2000.*
3. *DeChiara and Callender, Time saver standards for building types, Mc Graw Hill Company*
4. *Bousmaha Baiche & Nicholas Walliman, Neufert Architect's data, Blackwell science ltd.*
5. *Ramsey / Sleeper,National Architectural graphic standards, The American Institute of Architects Building Code – ISI*
6. *Sam F Miller, Design process– Van Nostrand Reinhold*
7. *Ching, F. D. K. (2012). Architecture: Form, Space and Order, 3rd Ed. Hoboken : John Wiley & Sons.*
8. *Pandya, Y. (2007). Elements of Space making, Ahmedabad : Mapin.*
9. *Peter, V. M. (1998). Elements of architecture – from form to place, 1st Ed. New York : Routledge.*

15AR274	BUILDING MATERIALS AND CONSTRUCTION-II	HRS 0-0-6	CR-4

Objective

To understand fundamental building material in the context of variousconstruction methods. Focus on various building materials would be emphasised based on theperformingstandards and codes, wherein application of each material would be discussed in detail, both in the context of traditional and modern construction methods and practices. Based on the lecture delivered, the students are required to produce construction and detail drawings. With time, each topic can also focus on latest trends in practice and usage of new technology/materials.

Module1

LECTURE

Cement: Types, properties and composition; Setting of cement, composition of cement mortar,Cement concrete work, Reinforced cement concrete, Light weight concrete, aerated concrete, cellular concrete and other types of cement concrete products.

SHEET WORK

Lintels-R.C.C, Reinforced brick, Wooden and Stone lintel, Steel sections

RCC Beams and slabs

Filler slabs using alternative cost effective techniques

Module-2

LECTURE

Timber: Uses and characteristics of timber

Types of Timber, defects in timber and preservation of timber

Corrugated galvanized iron sheets and asbestos cement sheets with accessories and wood preservatives.

Introduction to Bamboo and Ferro concrete

Clay tiles – Mangalore, Allahabad and Country type, Cement tiles: Application and uses, Mosaic tiles.
Note: A report to be submitted as an assignment.
SHEET WORK
Panelled doors, flush doors, PVC doors, F.R.P. Doors;
Types of Wooden Windows;

Module 3
LECTURE
Different types of roofs- pitch roof, shell roof & vault roof;
SHEET WORK
Timber Trusses: King Post, Queen Post; Lean to roof
Various types of Roof coverings for pitch roofs (Sheet, Tiles, etc).
Alternative cost effective materials and techniques used for different roof forms

Module 4
SHEET WORK
Types of R.C.C. & M.S. staircase &ramps.

Module 5
Any other topic as per present day need as decided by the teacher.

NOTE:
- Frequent site visits to be arranged as a part of the curriculum. Site visits should be in line with the present studio work. It is mandatory for students to submit a site observation report, either periodically or at the end of the semester.
- Pedagogy should establish the linkage of the relevant material and construction techniques from past to present.
- Performing standards and Codes used for various Building Materials and Construction Techniques needs to focused.
- Alternative construction techniques for respective topics needs to be discussed in detail.

References
1. Barry, R. (1999). The Construction of Buildings Vol. 2. 5th Ed. New Delhi : East-West Press.
2. Foster, J. and Mitchell, S. (1963). Building Construction: Elementary and Advanced, 17th Ed. London : B.T. Batsford Ltd.
3. McKay, W. B. (2005). Building Construction Metric Vol. I–V. 4th Ed. Mumbai : Orient Longman.
4. Hailey and Hancork, D. W. (1979). Brick Work and Associated Studies Vol. II. London : MacMillan.
5. Merritt, F.S. and Ricketts, J.T., Building Design and Construction Handbook, McGraw Hill.
6. Rangwala, S. C. (1963). Building Construction: Materials and types of Construction. 3rd Ed. New York : John Wiley and Sons.
7. Chudley, R. (2008). Building Construction Handbook. 7th Ed. London : Butterworth-Heinemann.
8. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi : Standard Publishers.
9. Ching, F. D.K – Building Construction illustrated. VNR, 1975
10. A.Agarwal –Mud: The potentials of earth based material for third world housing – IIED, London, 1981.
11. HUDCO – All you wanted to know about soil stabilized mud blocks, New Delhi, 1989.

15AS283	SURVEYING TECHNIQUES	HRS 1-0-2	CR-3

Objective

To equip students with the basic principles and theories which underlie the systematic study of topographic features, through different methods of land surveying. Basic skills of landform analysis, execution of field survey for foundation lay outing, contour survey, gradient plotting, surveying physical features, etc. are covered in the course. To train the students for preparation andinterpretation of survey drawings, methods, tools and equipment necessary to carryout differentsurvey procedures and recent advancements in the field of landforms survey and measurements.

NOTE: Theoretical understanding about different surveying techniques taught in each module to be imparted in the beginning of the respective modules before doing the practical site surveys.

Module 1

INTRODUCTION AND LINEAR MEASUREMENTS

LECTURE

Reading of survey Maps, understanding of features and undulations of ground; Scales used in Plotting.

Linear measurement and chain survey: use of various types of chains and tapes, setting-out &survey stations, measurement of correct length of line, direct and indirect ranging, open & closed traverse changing along sloping ground, Obstacles in chaining, errors, and their elimination

Compass survey, bearings & angles, local attractions, errors in compass survey.

Log-books, field boundaries, field area estimation.

PRACTICALS

Chainingstation points, offsets, field-book entry, single & double line entry, Triangulation, Traversing, Plotting, Calculation of Areas. Compass Surveying Traversing, balancing, closing errors, plotting, calculating areas.

Module 2

LEVELLING

LECTURE

Profile levelling, Use of auto level and levelling staff; Temporary and Permanent adjustments of auto level; Reduction of levels by H.I and rise and fall method. Curvature and refraction error, sensitiveness of level tube, reciprocal levelling, levelling difficulties and common errors

PRACTICAL

Profile levelling using auto level and staff.

Module 3

CONTOURS IN LANDFORMS

LECTURE

Characteristics of contours, Contour interval and horizontal equivalent, methods of contouring- - direct and indirect method, contour gradient, block contour surveys, longitudinal & traverse cross sections, gradients, Contouring methods & equipment, plane-table, plotting contours & profiles, estimating areas & volumes.

PRACTICAL

Method of Plane Table Surveying, Two & Three PointProblems.

Module 4
THEODOLITE SURVEY & MEASUREMENT
LECTURE
Theodolite Surveying, temporary adjustment, measuring horizontal and vertical angles, closing errors, theodolite traversing
PRACTICAL
Theodolite, measuring vertical and horizontal angles, Theodolite Plotting, balancing

closing errors.
Module 5
PRECISION METHODS
LECTURE
Automated & digital surveying, Total station, G.P.S
PRACTICAL
Demonstration of Surveying with Total Station equipment.

References

1. Shahani, P. B. (1980). Text of Surveying Vol. I. Oxford and IBH Publishing.
2. Punmia, B. C., Jain, A. K. and Jain, A. K. (2005). Surveying Vol. I-III. New Delhi : Laxmi Publications.
3. Duggal, S. K. (2004). Surveying Vol. 1-2. New Delhi : Tata McGraw Hill.
4. Miller, V. C. and Westerback, M. E. (1989). Interpretation of Topographic Maps. Columbus: Merrill.
5. Easterbrook, D.J. (1999). Surface Processes and Landforms. 2nd Ed. New York : McMillan.
6. Carson, M. A. and Kirkby, M. J. (1972). Hill slope Form and Process. London and New York : Cambridge University Press.
7. Kanetkar, T. P. & Kulkarni, S. V., Surveying & levelling, Vol - 1.

4. DETAILED SYLLABUS OF 5 YEAR B.ARCH PROGRAMME - 2nd year

SEMESTER III

THEORY

15AS313	Structural Analysis	HRS 3-0-0	CR-3

Objective

With the acquired knowledge of statically equilibrium of forces the course aims at teaching methods to determine effect of loads on members of different determinate structures and give additional knowledge of deformation of structures to solve indeterminate structures.To familiarize the student with the effects of transverse forces such as shear force& bending moment in beams; determination of SF & BM in simple beams under different loading systems; and understanding of strength and forces in columns and arches

Module 1

Introduction to determinate and in determinate structures, Different types of loads acting on a structure

BEAMS: TYPES & PROPERTIES

Types of beams, its behaviour, types of supports and reactions, bending moment and shear forces; simply supported, cantilever and overhanging beams, relation between bending moment and shear force.

Explaining with Bending moment and Shear force diagram.

Module 2

BENDING AND SHEAR FORCES

Shear fore and bending moment for fixed and continuous beams, application of Clapperayon" s theorem of three moments. Moment distribution method.

Determination of member of forces in determinate trusses and simple frames.

Module 3

DEFLECTION

Relation between slope, deflection and curvature, double integration method, three moment theorem, deflection by conjugate beam method.

Application to simple cases including overhanging beams.

Module 4

COLUMNS

Types of columns, columns and struts, buckling and crushing failure, Euler" s theory, equivalent length and slenderness ratio, Rankine" s formula.

Module 5

ARCHES

Determination of horizontal thrust, radial shear and normal force, axial thrust, bending moment and shear force for three-hinged arch. Structural concepts in post & lintel, arch, dome, and vault construction.

References

1. Junnarkar, S. B. (1991). Mechanics of Structures. Vol. 1. 20th Ed. Delhi : Charotar.
2. Kurmi, R. S. Strength of Materials. New Delhi : S. Chand & Company.
3. Mukherjee, S. Elements of Engineering Mechanics. New Delhi : PHI Learning.

4. Ramamrutham, S. (2008). Engineering Mechanics: A Textbook of Applied Mechanics. Dhanpat Rai Publishing.
5. Vazirani and Ratwani. (2008). Analysis of Structures. Vol. I. New Delhi : Khanna Publishers.
6. Gere, J. M & Timoshenko, S. P. , Mechanics of Materials , CBS Publishers & Distributors.

15AR324	Advanced Building Materials and finishes	HRS 4-0-0	CR-4

Objective

The course intends to introduce different materials used in modern buildings, and innovative alternative materials that are being used to make the building more energy efficient and sustainable. Property, application and performance of each material is highlighted. To get hands on experience and idea about the material students are required to visit building material outlets and construction sites, and collect product information.

MODULE 1

INTRODUCTION AND ADVANCED CONCRETE

Introduction to advanced building materials in building industry.
Role of advance materials in building performance.
Contemporary materials in super structure.
Ultra high performance concrete, Ferrock, Liquid granite, Litracon etc.
High-Ductility Concrete for Resilient Infrastructures: Engineered Cementitious Composite (ECC), Engineered stone, etc.

MODULE 2

GLASS

Speciality Glass as a contemporary building material.
Types and categories of Glass and its application in building facades.
Laminated, curved and tempered glass, Kinetic glass, Smart glass and smart windows.
Introduction to Digital building facades: Building kinetics and facade engineering, sensor glasses for interiors.

MODULE 3

WOOD AND COMPOSITES

Wood as an advanced material for buildings: Reconstructed wood, cross laminated timber, Plyboards, composite boards, Acoustics boards, and panelling materials, laminates and veneers, wood foam.
Advanced fibre composite materials: Bamboo,glass-reinforced plastic (GRP),Fibre-reinforced polymers (FRP), Shape memory polymer composites.
Vacuum insulation panel (VIP), stretched fabric wall systems External Thermal Insulation Cladding System (ETICS), Insulated Vinyl Siding.
Different types of stainless steel applications, Polycarbonates.
Aluminium composite panels: application method in interior and exterior facades

MODULE 4

INTRODUCTION TO DIFFERENT BUILDING FINISHES

Paints and Varnishes: Properties and uses of ordinary paints, Varnishes and wood preservatives, method of distempering wall surfaces and painting of timber and metal work. Plastic paints, emulsion paints, cement paint and textured plaster. Enamel and epoxy paints.
Reflective indoor coatings and High reflectance and durable outdoor coatings.
Nano-materials for building construction and finishes.
Different types of flooring and wall cladding tiles, Antistatic Vinyl surfaces.

MODULE 5
Site visits for practical exposure to different advanced materials and their application in the building industry.
Case studies to be conducted for further documentation of the knowledge explored, and report to be submitted.

References

1. Al-homound, M.S., Performance Characteristics and Practical Applications of Common Building Thermal Insulation Materias, Building and Environment, Vol-40(3), 2005.
2. Duggal, S.K., Building Materials, New Age International Publishing Co., (3rd Ed.), 2008.
3. Varghese, P.C., Building Materials, PHI Learning Pvt. Ltd., 2005.
4. www.in.saint-gobain-glass.com

15AR333	History of Architecture-II	HRS 3-0-0	CR-3

Late Ancient and Early Medieval (1st Century AD – 1000AD)

Objective
To provide an overview of the architecture of early Medieval period across different geographies. Social, religious, political and architectural character, construction methods and building materials shall be explained with suitable examples. Toprovide an understanding of the evolution of Classical period and Church architecture of the west,and Indian Architecture in its various stylistic modes characterized by technology, ornamentation andplanning practices. Combined influence of geology, geography, climate, beliefs, religion and cultureon the architecture must be highlighted so as to appreciate how architecture is embedded in placespecific context. The study must enable students to do a comparative evaluation of developments in achronological manner along the timeline and across different geographies.

Module 1
EARLY CHRISTIAN ARCHITECTURE:
Evolution of church form from the Roman Basilica, architectural character & space planning, Schism of Roman Empire to Western & Eastern Provinces, Polymath architecture & Baptisteries,*(Structures – St. Peters Basilica, St. Clemente)*.

Module 2
CHURCH ARCHITECTURE OF BYZANTINE:
Factors influencing Byzantine Architecture, development of Domes & Pendentives, *(Structures – Hagia Sophia at Constantinople);* Romanesque – evolution of religious orders in Christianity – Italy *(Pisa Cathedral complex)*& England *(Tower of London)*.

Module 3
BUDDHIST AND JAIN ARCHITECTURE:
Symbolism of Buddhist Architecture, rock-cut architecture, Ashokan School (Hinayana & Mahayana Period), development of stupa, Buddhist schools – Mathura School & Takshashila

School (Greek influence) *(Structures – Chaitya & Vihara, Monolithic Ashokan Pillars, Rock-edicts, Stupa of Sanchi / Amravati)*
Symbolism of Jain Architecture, rock-cut architecture, general planning, sitting and decorative treatments of Jain temples. *(Structures – Jain temples of Mt. Abu*

Module 4
EARLY TEMPLE ARCHITECTURE:
Evolution of Hindu temples, early shrines of Gupta *(Tigwa, Sirpur, Deogarh)*& Chalukya *(Ladh Khan, Durga Temple)*, Development of Indo-Aryan style *(Papanatha, Virupaksha at Pattadakal)*, Dravidan Style: Rock-cut of Pallavas *(Rathas & Mandapa)*& Structural *(Shore temple of Mahabalipuram)*.
Temples and Pagodas of South East Asia: Cambodia- Angkor Wat, Borobudur; Nepal

Module 5
Study on development of fortification, walled towns, settlement pattern, and the causative factors in India. (Places to be decided by the subject teacher)

References

13. Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai : D.B. Taraporevala Sons and Co.
14. Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London : B.T.Batsford Ltd.
15. Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London : Verona Printed.
16. Lloyd, S. and Muller, H.W., (1986), History of World Architecture Series, Faber and Faber Ltd., London.
17. Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London:McGraw-Hill.
18. Dutt, B. B. (2009). Town Planning in Ancient India. Delhi : Isha Books.
19. Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi :CBS Publishers.
20. Roth, M. L. (2006). Understanding Architecture: Its Elements, History, and Meaning. Columbia:West-view Press.
21. Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York : M. Courier Dover Publications .
22. Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford : OxfordUniversity Press.
23. Singh, U. (2009). A history of ancient and early medieval India: from the Stone age to the 12thcentury. Delhi : Pearson India.
24. Hiraskar, G.K., Great Ages of World Architecture, Dhanpat Rai & Sons, Delhi.

15AS343	Water Supply and Sanitation	HRS 3-0-0	CR-3

Objective
To provide knowledge and understanding of the fundamentals of water supply and sanitation infrastructure required for buildings and urban areas, so as to enable them to comprehend the subject thoroughly andintegrate the learning into architectural design. Students to be encouraged to explore technologies for recycling and reuse of water and solid waste.

Module1
WATER SUPPLY
General idea of sources of water supply: qualitative and quantitative aspects, Water requirements for different types of buildings, water saving practices
Water treatment and distribution systems- Domestic water supply systems, sump, overhead storage tank, pipe size, pipe fittings.
Special installation Cold water and hot water supply in multistoried buildings.
Material, types of fixtures and fitting for a contemporary bathroom– taps –quarter turn, half turn, ceramic, foam flow etc, hot water mixer, hand shower, types of valves etc. provision for fire fighting and code requirements.
Rainwater harvesting to include roof top harvesting, type of spouts, sizes of rainwater pipes and typical detail of a water harvesting pit

Site visits - Water treatment plant. Multistoried apartments for studying water supply and submission of report.

Module 2
SANITATION
Principles of drainage, surface drainage, shape and sizes of drains and sewers, storm water over flow chambers, methods of laying and construction of drains and sewers
Traps: shapes, sizes, types, materials and function, Inspection chambers - sizes and construction, intercepting chamber, cast iron manholes
Ventilation of House drainage: Anti siphon pipe, system of plumbing - single stack , one pipe system, one pipe partially ventilating system and two pipe system, grey water recycling and dual plumbing
Types of fixtures and materials:Sinks, shower tray, shower temple, bath tub, Jacuzzi, water closets, flushing cisterns, urinals, sinks , wash basins, bidet, low flow fixtures, etc.

Module 3
SANITATION
Design of Septic tank, Oxidation pond, Dispersion trench and soak pits
Treatment system- Root zone treatment system, Decentralized Wastewater Treatment Systems (DEWATS), Soil Bio technology, packaged Bio-ReactorSystem

Module 4
SOLID WASTE DISPOSAL
Approaches for solid waste management, Solid wastes collection and removal from buildings. On-site processing and disposal methods, guidelines for municipal solid waste management, e-waste management
Disposal of Wastes: Sanitary land filling, Composting, Vermi-compost, Incineration, Pyrolysis

Module -5
Application of above studies in building projects, preparation of layouts and details
Site visits - Sewage treatment plant.

References
1. Birdie, B. S. (1996). Water supply and Sanitary Engineering. Dhanpat Rai and Sons.
2. National Building Code of India. (2005).
3. Punmia, B. C., Jain, A. K. and Jain, A. K. (1995). Water Supply Engineering. New

Delhi: Laxmi Publications.
4. Punmia, B. C., Jain, A. K. and Jain, A.K. (1998). Waste Water Engineering.New Delhi: Laxmi Publications.
5. Rangwala, S. C. (2005). Water Supply and Sanitary Engineering. Charoter Publishing.
6. Handbook Water Supply and drainage with Special Emphasis on Plumbing. Bureau of Indian Standards, New Delhi.

SESSIONALS/PRACTICALS

15AR356	Architectural Design -I	HRS 0-0-9	CR-6

Objective

To explore the interrelationship between human behavior and space in a smallresidential environment, including, volume of space, shape, form, function, climate and materials

1. MAJOR DESIGN PROBLEM

- Composite Built spaces within a residential unit

Intent

To make the students know about and resolve the complexities involved in integrating living and working spaces in urban areas and understanding the relationship of internal spaces in such structures.

Focus Areas

- Impact of Living and Working environments on the psychology of users
- Relationship of varied spaces having a composite relationship of occupancy and their nature [vertical(2 to 3 *levels*)/horizontal]
- Appropriate Space-planning methods (facilitation and circulation)

Allied Knowledge Required

- Types of relevant furniture and techniques of area analysis
- Basic contemporary building materials and their applications
- Principles of framed structures

Examples of Studio Projects

Residence cum work place - Artist's residence, Architect's residence, Doctor's residence, Sculptor's residence, etc.

2. SMALL SCALE PACE SETTER DESIGN PROBLEM

- Small design problems using metaphors, signs & symbols as a design tool
- Small form oriented design problems

References

1. Chaira, J. D. and Crosbie, M. J. (2001). Time Saver Standards for Building Types. 4th Ed. NewYork : McGraw-Hill.
2. Bousmaha Baiche & Nicholas Walliman, Neufert Architect" s data, Blackwell science ltd.

3. Hareguchi, H. (1988). A Comparative analysis of 20th C. houses. London: Academy Editions.
4. Miller, S. F. (1995). Design Process: A Primer for Architectural and Interior Design. New York: Van Nostrand Reinhold.
5. Robson, D. (2002). Geoffrey Bawa: The Complete Works. New York : Thames & Hudson.
6. Schulz, N. C. (1985). The concept of dwelling. New York : Rizzoli International Publications.
7. Unwin S. (2010). Twenty Buildings every Architect should understand. New York : Routledge.
8. Meiss, V. and Pierre, Elements of Architecture: From Form to Place.

15AR364	Building Materials and Construction-III	HRS 0-0-6	CR-4

Objective

To understand fundamental building material in the context of variousconstruction methods. Focus on various building materials would be emphasised based on theperformingstandards and codes, wherein application of each material would be discussed in detail, both in the context of traditional and modern construction methods and practices. Based on the lecture delivered, the students are required to produce construction and detail drawings. With time, each topic can also focus on latest trends in practice and usage of new technology/materials.

Module-1

LECTURE

Objective of this module is to introduce the students to construction practices relating to framed RCC structures and its formwork.

SHEET WORK

Reinforced brick wall; Types of foundation – (i) stepped (ii) Isolated (iii) Eccentric (iv) Strip (v) Combined (vi) Raft (vii) Pile foundation

Module-2

LECTURE

Introduction of Glass, Fibre Glass, Aluminium and Steel as building materials

SHEET WORK

Types of Advanced Doors and Windows – Sliding door, folding door, revolving door, frameless door, fire retardant door, Rolling shutter & collapsible gate

Anodised aluminium, steel and UPVC window sections.

Module-3

SHEET WORK

Scaffolding & shoring

Module-4

SHEET WORK

Rain water harvesting & recharge pits, Site drainage.

Module-5

Any other topic as per the need of the present day as felt by the teacher

NOTE:

Frequent site visits to be arranged as a part of the curriculum. Site visits should be in line with the present studio work. It is mandatory for students to submit a site observation report, either periodically or at the end of the semester.

- Pedagogy should establish the linkage of the relevant material and construction techniques from past to present.
- Performing standards and Codes used for various Building Materials and Construction Techniques needs to focused.
- Alternative construction techniques for respective topics needs to be discussed in detail.

References

1. Barry, R. (1999). The Construction of Buildings Vol. 2. 5th Ed. New Delhi : East-West Press.
2. Foster, J. and Mitchell, S. (1963). Building Construction: Elementary and Advanced, 17th Ed. London : B.T. Batsford Ltd.
3. McKay, W. B. (2005). Building Construction Metric Vol. I–V. 4th Ed. Mumbai : Orient Longman.
4. Hailey and Hancork, D. W. (1979). Brick Work and Associated Studies Vol. II. London : MacMillan.
5. Merritt, F.S. and Ricketts, J.T., Building Design and Construction Handbook, McGraw Hill.
6. Rangwala, S. C. (1963). Building Construction: Materials and types of Construction. 3rd Ed. New York : John Wiley and Sons.
7. Chudley, R. (2008). Building Construction Handbook. 7th Ed. London : Butterworth-Heinemann.
8. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi : Standard Publishers.
9. Ching, F. D.K – Building Construction illustrated. VNR, 1975
10. A.Agarwal –Mud: The potentials of earth based material for third world housing – IIED, London, 1981.
11. HUDCO – All you wanted to know about soil stabilized mud blocks, New Delhi, 1989.

15AR372	Computer Applications in Architecture	HR 0-0-3	CR-2

Objective

To familiarize students with basic understanding of documentation and presentation software. To develop skill in using Computer aided Architectural Design software for preparing architectural drawings.

Module 1

Introduction to Applications of MS Office in presentation: Microsoft Word, Microsoft PowerPoint, Microsoft Excel, Adobe Page Maker.

Module 2

Introduction to computer aided design in architecture. Introduction to two dimensional drafting in CAD.

Understanding commands like Draw, Modify, Use of tools, layers, plotting system and its applications etc.

Module 3

Customization of Auto-CAD, Auto-CAD express tools, creation of architectural library elements and blocks, applying materials and rendering.

Google Sketch-up application in 3D architectural drawings, modeling, creation of entities, dimensioning, application of solids and surfaces

Module 4

Application of CAD in small Architectural projects done in the previous semester design class through site plan, floor plan, presentation plan, elevation and section using appropriate software.

Module-5

Seminar on another related software like ARCHICAD/INTELLICAD to understand basic differences between the two.

Reference

1. Gindis, E. (2014). Up and Running with AutoCAD 2015: 2D & 3D Drawing and Modelling.Oxford : Elsevier.
2. Seidler, D. R. (2007). Digital Drawing for Designers: A Visual Guide to AutoCAD 2012. London: Fairchild Publications.
3. Tutorials: http://www.lynda.com/

SEMESTER IV

THEORY

15AS413	**Design of RCC Structures**	**HRS 3-0-0**	**CR-3**

Objective
The course aims to impart knowledge about reinforced cement concrete and its applications in buildings. To equip students about the methods of designing various structural members using reinforced cement concrete and fundamentals of soil mechanics and foundations.

ISI CODE COMPLIANCE

Module 1
INTRODUCTION TO RCC DESIGN
characteristics of RCC, nominal mix, Design mix.
Evolution of different design theory, principle of limit state analysis, load path in a building, Creating building frames and selecting sizes of structural elements based on thumb rules with guidelines of relevant codes.

Module 2
DESIGN OF BEAM
Design of singly reinforced beams for flexure, shear, torsion & bond. Concept of doubly reinforced beams and design.

Module 3
DESIGN OF SLAB
Concepts and design of different types of slabs, behaviour and design of simply supported slabs spanning in one direction, two directions, continuous slab, cantilevered slab, flat slab and inclined roof.

Module 4
DESIGN OF FOUNDATION AND COLUMN
Soil Mechanics: Soil formation and resulting soil deposits, different types of soils and their physical properties, classification as per Indian standard system.
Foundations: Types of foundations for RCC structures, Design of isolated column footing, retaining wall.

Design of short and long axially loaded RCC Columns, Principles of staircase design

Module 5
PRACTICAL
Laboratory: Soil testing, casting of cement concrete cubes, Compressive test of cement concrete cubes, Tensile strength of steel.
Visit to construction site for study of RCC structures.

Reference

1. Varghese, P. C. (2011). Limit state Design of Reinforced Concrete. PHI Learning.
2. Ramachandra, S. (2004). Limit State Design of Concrete Structures. Scientific publishers.
3. Ramamrutham, S. (2000). Design of RCC Structures. New Delhi : Tata McGraw Hill Education.
4. Ramamrutham .S and Narayanan .R, (1997), Reinforced Concrete Structures, Dhanpat Kai Publication, New Delhi.
5. Punmia, B. C. (2005). Soil Mechanics and Foundation Engineering. Delhi : Laxmi publications.
6. Swamisaran. (2010). Analysis and Design of Substructures. 2nd Ed. (LSD).
7. Punmia, B. C. (2007). Limit State Design of Reinforced Concrete. Delhi : Laxmi Publications
8. I S 456-2000
9. I S 875-1987
10. I S 800 -2007.
11. Explanatory Hand Book SP24 Design Aid SP 16,
12. Detailing of Reinforcement, SP 34

15AR424	Landscape Design	HRS 3-0-1	CR-4

Objective

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

Module 1

PRINCIPLES

Landscape design- definition, Theories and principles, aesthetic value of landscape, site survey, analysis and appraisal, Elements of landscape design

Module 2

LANDSCAPE ELEMENTS

Contours- Representation of Land form and Landform design, interpolation of contours, slope analysis, Grading,

Design of water bodies, swimming pool, storm water drainage design, design to reduce surface runoff, paving and surface treatments.

Vegetation, planting design principles and practice, Indoor landscaping, terrace gardening, industrial landscaping.

An assignment to be given to identify native plant species, their availability

Module 3

LANDSCAPE DESIGN STYLES

History of landscape design. Landscape design style and principles: Chinese, Japanese, English, French, Moghul.

Module 4

SITE PLANNING AND LANDSCAPE DESIGN

Site Zoning. Organization of vehicular and pedestrian circulation; parking; street widths; turning radii; street intersections;steps and ramps. Site planning considerations in relation to water systems, sewage disposal, outdoor electrical systems.

Landscaping of residential areas, parks, archaeological gardens, urban avenues, Roads and Highways and Parking design

Landscaping details.

An assignment to be prepared on designing and execution of a small landscape.

Module 5
Methods for multi-criteria landscape evaluation.

References
1. Appleton. (1996). *The Experience of Landscape*. Wiley.
2. Laurie. (1986). *An Introduction to Landscape Architecture*. Elsevier.
3. Lynch, K. (1962). *Site Planning*. Cambridge : The MIT Press.
4. Simonds, J. O. (2006). *Landscape Architecture: A Manual of Land Planning and Design*.

15AR433	History of Architecture-III	HRS 3-0-0	CR-3

Medieval - Early Modern (10th Century - 19th Century AD)

Objective
To impart understanding of the evolution in architecture and urbanism from the medieval to Early Modern times; Social, religious and political character, building materials, construction methods, landscape and how they influenced their built form and settlement patterns shall be explained with examples. Knowledge of European Renaissance and Mughal architecture in India is provided; Combined influence of geology, geography, climate, beliefs, religion and culture on the architecture must be highlighted so as to appreciate how architecture is embedded in place specific context.

Module1
GOTHIC & RENAISSANCE ARCHITECTURE
Evolution of vaulting & development of structural system (flying buttress, pinnacles, spires, pointed arches); Italian Gothic *(Vatican City and St Peters Cathedral)*, French Gothic *(Notre Dame at Paris)*, English Gothic *(Westminster Abbey)*. Renaissance architecture at Italy and France, Baroque Period.

Module 2
TEMPLE ARCHITECTURE
Indo-Aryan – salient features & development of Shikharas. Odishan – Early *(Vaithal Deula / Parshurameswar)*, Middle *(Lingaraj / Konark Sun Temple)*, Late *(Mukteswar / Raja Rani);* Gujarat *(Surya Temple, Modhera);* Central India *(Khadariya Mahadev, Khajuraho)*; Dravidian – salient features & development of Vimanas & Gopuram. Chola style *(Brihadeswara, Tanjore)*; Pandya Style *(Gopuram & temple complex, Meenakshi Temple)*.

Module 3
ISLAMIC ARCHITECTURE
Evolution of Islamic architecture – features of a typical mosque, principles & influences; construction techniques – domes, arches, minarets, calligraphy, etc.
Imperial Style (Delhi Sultanate) and Provincial Islamic Styles –Development of mosques & tomb prototypes in India *(Structures – Qutab Complex at Delhi),* Bengal *(Adina Mosque)*, Gujarat *(Jami Masjid)*, Deccan *(Golgumbaz and Bijapur)*, *Hyderabad (*Charminar), *Lucknow (Bara Imambada and Chota Imambada)*

Module 4

MUGHAL ARCHITECTURE

Development of Mughal architecture under different rulers *(Fatehpur Sikri, Taj Mahal, Redfort)*

INDO SARACENIC ARCHITECTURE

Synthesis with Indian architecture and climatic factors – Mysore *(Mysore Palace)* / Lucknow *(Char Bagh Railway Station/ La Martiniere)* / Baroda *(Laxmi Vilas Palace)*.

Module 5

- Study of heritage along water front in India. (Subject teacher to decide)
- Study of Palaces and Havelis

Reference

1. Brown, P. (1983). Indian Architecture (Islamic Period). Bombay : Taraporevala and Sons.
2. Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London : B.T. Batsford Ltd.
3. Catherine, A. (2001). Architecture of Mughal India. Cambridge University Press.
4. Faulkner, H. T. (1953). Architecture through the Ages. New York : Putnam Adult.
5. Grover, S. (2002). Islamic Architecture in India. New Delhi : CBS Publications.
6. Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York : M. Courier Dover Publications.
7. Hillenbrand, R. (1994). Islamic architecture - form, function and meaning. Edinburgh : Edinburgh University Press.
8. Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford : Oxford University Press.
9. Mitchell, G. (1978). Architecture of the Islamic world - its history and social meaning. London : Thames and Hudson.
10. Nath, R. (1985). History of Mughal Architecture Vols I-III. New Delhi : Abhinav Publications.
11. Tadgell, C. (1990). The History of Architecture in India. New Delhi : Penguin Books.

15AR443	Vernacular Architecture	HRS 3-0-0	CR-3

Objective

Efforts and activities related to promotion of Sustainable Architectureare underway, and this can be reinforced with the knowledge of Vernacular Architecture. Odisha has a rich treasure of vernacular architecture.The objective is to instill sensitivity towards the less explored field that is concerned with Architectural building traditions/practices that are cost effective, ecologically sensible and culturally relevant. Students acquire a working vocabulary that can help them describe vernacular architecture in meaningful ways. The course introduces grass root principles of indigenous architecture that has evolved over time in response to environment, climate, culture, economy and basic human needs. The course covers variations in built forms and their environmental performance across different climatic and geographical regions of India with more emphasis to Odisha. Cases studies of adaptations of vernacular architecture in contemporary buildings are also covered in the syllabus.

Module 1

INTRODUCTION TO VERNACULAR ARCHITECTURE

Definitions and theories, Categories, Contextual responsiveness: Climatic, Geographical, Anthropological and Cultural influences

Module 2

ENVIRONMENT AND MATERIALS

Typical building materials, Built form and elements, Construction technique and Environmental performance

Module 3

REGIONAL VARIATIONS IN BUILT FORM: TRIBAL ARCHITECTURE

Settlement Pattern, Dwelling Typology, Symbolism, Typical features, Construction materials and techniques

Andhra Pradesh, Madhya Pradesh, Odisha (Kondha and Santals)

Module 4

REGIONAL VARIATIONS IN BUILT FORM: RURAL ARCHITECTURE

Settlement Pattern, Dwelling Typology, Symbolism, Typical features, Construction materials and techniques

Eastern Region

Odisha – Rural houses of the coastal and inland areas; Bengal –Rural house form- Aat Chala houses, Thakur Bari (Mansions in North Kolkata).

Western Region

Rajasthan- Rural Jat houses for farming caste and Bhungas(Circular Huts) and Havelis;
Gujarat- Deserts of Kutch, Pol houses of Ahmedabad, Wooden Havelis;

Southern Region

Kerala – Nalukettu, Houses of Nair & Namboothri community, Koothambalam;
TamilNadu – Toda Huts, Chettinad Houses (Chettiars);
Andhra Pradesh –Rural Kaccha house

Northern Region

Kashmir – Typical Kutcha houses, Dhoongas(Boathouses), Ladakhi houses, bridges ;
Himachal Pradesh – Kinnaur houses

Module 5

EXMPLES OF ADAPTATIONS IN CONTEMPORARY ARCHITECTURE (To be decided by subject teacher)

Examples - Works of Laurie Baker, Hasan Fathy, Anil Laul, Gerard Da Cunha, Building Centres- Auroville, Anangpur, Nizamuddin Building Centre

Basics of Architectural Heritage Conservation

References

1. Paul Oliver. Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997.
2. Amos Rapoport. House, Form & Culture, Prentice Hall Inc. 1969.
3. R W Brunskill: Illustrated Handbook on Vernacular Architecture. 1987.
4. Ilay Cooper and Barry Dawson. Traditional buildings of India, Thames and Hudson Ltd., London. 1998.
5. Frampton, Kenneth. Towards a Critical Regionalism: Six points for an architecture of resistance, In The Anti-Aesthetic: Essays on Postmodern Culture. Edited by Hal Foster. Seattle, WA: Bay Press. 1983.
6. V.S. Pramar. Haveli- Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad. 1989.
7. Kulbushanshan Jain and Minakshi Jain. Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad. 1992.
8. G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi. 1989.

9. Carmen Kagal, VISTARA – The Architecture of India, Pub: The Festival of India, 1986.
10. S. Muthiah and others: The Chettiar Heritage. 2000
11. House, Form & Culture, Amos Rappoport, Prentice Hall Inc, 1969.

SESSIONALS/PRACTICALS

15AR456	Architectural Design -II	HR 0-0-9	CR-6

Objective

To enable the students to understand the habitatand socio-cultural character of rural environment and develop sensitivity in designing in rural context, as Odisha has a significant rural character.

1. MAJOR DESIGN PROBLEM

Designing for Rural Communities

INTENT

To acquaint the students with the contextual background and locale of traditional and vernacular architecture to base their ideas on functional simplicity, physical comfort, climatic conditions, locally available material and cultural background.

FOCUS AREAS

- The aesthetics of building materials
- Passive techniques to achieve built environment, supporting physical comfort
- Relationship of built spaces with the surrounding landscape

ALLIED KNOWLEDGE REQUIRED

- Anthropometry
- Principles of Load bearing Structures
- Vernacular architecture
- Symbolism and culture
- Basic theories of design
- Basic concepts of climatology
- The science of Building materials; their structural integrity and their behaviour against climate
- Drafting and presentation techniques (Visual Graphics)

Examples of Studio Projects

Small Rural cluster, rural development centre, clinic(vet/humans) village Haat, Farm out-house, Tribal Housing, community centre, village school, etc.

NOTE: The allied knowledge required henceforth for all the semester design studios are mentioned in consideration to the fact that the previous theoretical and conceptual knowledge has already been acquired by the student.

2. SMALL SCALE PACE SETTER DESIGN PROBLEM

Reference

1. Chaira, J. D. and Crosbie, M. J. (2001). Time Saver Standards for Building Types. 4th Ed. New York : McGraw-Hill.
2. Bousmaha Baiche & Nicholas Walliman, Neufert Architect" s data, Blackwell science ltd.
3. Hareguchi, H. (1988). A Comparative analysis of 20th C. houses. London: Academy Editions.
4. Frampton, Kenneth. Towards a Critical Regionalism: Six points for an architecture of resistance, In The Anti-Aesthetic: Essays on Postmodern Culture. Edited by Hal Foster. Seattle, WA: Bay Press. 1983.
5. V.S. Pramar. Haveli- Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad. 1989.
6. Kulbushanshan Jain and Minakshi Jain. Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad. 1992.

15AR464	Building Materials and Construction-IV	HRS 0-0-6	CR-4

Objective

To acquaint the students with construction practices on framed steel structure and its formwork. To understand building material in the context of variousconstruction methods. Focus on various building materials would be emphasised based on theperformingstandards and codes, wherein application of each material would be discussed in detail,
both in the context of traditional and modern construction methods and practices. Based on the lecture delivered, the students are required to produce construction and detail drawings. With time, each topic can also focus on latest trends in practice and usage of new technology/materials.

Module1

LECTURE
Iron and Steel: cast iron, Steel and wrought iron with properties, use of iron work in buildings.
Introduction to tensile structures
SHEET WORK
Different types of steel trusses & girders, North light, Tubular, K-Type.
Domes, Shells, Folded plates
Space frame- Single layer, Tensile structures, Pneumatic structures, cable structures, Double layer
Hyperbolic & parabolic structure.
Precast & Pre stressed concrete units.

Module2

LECTURE
Glass: Types of glass like plate, decorative, tinted, heat absorbing etc. structural glass bricks and glass Crete, fibre glass, wool etc.
SHEET WORK
Expansion & Contraction joint details-Brick wall & concrete structures; Terracing, Water proofing

Module3

SHEET WORK
Curtain walls & structural glazing-
Lifts, Escalator and Ramps.

Module4
SHEET WORK
Application of Ferro cement; Non-conventional roofing techniques; Bamboo Construction techniques

Module5
Any other topic as per the need of the day as felt by the teacher

NOTE:
Frequent site visits to be arranged as a part of the curriculum and contact hours. Site visits should be in line with the present studio work. It is mandatory for students to submit a site observation report, either periodically or at the end of the semester.

References

1. Barry, R. (1999). The Construction of Buildings Vol. 2. 5th Ed. New Delhi : East-West Press.
2. Foster, J. and Mitchell, S. (1963). Building Construction: Elementary and Advanced, 17th Ed. London : B.T. Batsford Ltd.
3. McKay, W. B. (2005). Building Construction Metric Vol. I–V. 4th Ed. Mumbai : Orient Longman.
4. Merritt, F.S. and Ricketts, J.T., Building Design and Construction Handbook, McGraw Hill.
5. Rangwala, S. C. (1963). Building Construction: Materials and types of Construction. 3rd Ed. New York : John Wiley and Sons.
6. Chudley, R. (2008). Building Construction Handbook. 7th Ed. London : Butterworth-Heinemann.
7. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi : Standard Publishers.
8. Ching, F. D.K – Building Construction illustrated. VNR, 1975
9. Chudley, R. (2008). Building Construction Handbook. Noida : Elsevier.
10. Eldridge, H. J. (1976). Common Defects in Buildings. London : HMSO.
11. Emmit, S. and Gorse, C. A. (2006). Barry" s Advanced Construction of Buildings. Blackwell Publications.

15AR472	3D Modelling Techniques	HR 0-0-3	CR-2

Objectives
To enable the students to understand the fundamentals of computer aided 3DModeling (3DS-Max/ Revit etc.) -presentation techniques.

Module1
INTRODUCTION TO 3D MODELLING
Project: Create 3D sculpture using 3D primitives (cubes, spheres etc.) Tools: Slide facilities scriptattributes, V-port, editing session. Introduction to 3D-modelling technique and construction planes,drawing objects, 3D surfaces setting up elevation thickness and use of dynamic projections. Solidmodelling with primitive command and Boolean operation. Surface development and exploration

Module 2
3D RENDERING AND SETTING
Project: Visualize a building. Explore the potential of lights and camera and use the same in themodel created for the final submission. Tools: Rendering and scene setting to create a photo realisticpicture, understanding material mapping, environment setting and image filling. Exercise to identifyand visualize a building using the above said utilities.

Module3

Seminar on another related software to understand basic differences between the two.

Reference

1. Gindis, E. (2014). Up and Running with AutoCAD 2015: 2D & 3D Drawing and Modelling, Oxford : Elsevier.
2. Seidler, D. R. (2007). Digital Drawing for Designers: A Visual Guide to AutoCAD 2012, London: Fairchild Publications.
3. Smith, B. L. (2007). 3ds Max 2008 Architectural Visualization Beginner to Intermediate, Sarasota: 3DATS.
4. 3DS MAX- Advanced 3D modeling and animation – C & M, CADD Centre
5. Tutorials: http://www.lynda.com/

5. DETAILED SYLLABUS OF 5 YEAR B.ARCH PROGRAMME - 3rd year

PILOO MODY COLLEGE OF ARCHITECTURE ESTD : 1993
H.O.: Badambadi, Cuttack - 753012
College : Plot No.11/1/A, Sector-, C.D.A, Cuttack 753014
e-mail : info@pmca.ac.in website : www.pmca.ac.in
Phone : 0671-2363014
0671-2363012 / 2364081
0671-2316923 Dir (Off)
0671-2366933
Tel/Fax : 0671-2362015
0671-2312664 (Fax/Tel)

SEMESTER V

THEORY

15AS513	Design of Steel Structures	HRS 3-0-0	CR-3

Objective
To introduce the concepts of designing with steel structures and its components. To enable students to analyse and design simple steel structural components; To enable the students to select suitable steel roof truss for different spans of industrial buildings and large spanstructures.

Module 1
INTRODUCTION
Introduction to Steel structures: Steel structural shapes, Introduction to IS 800; Rivets, welded connection, Steel structural members, tension, compression and bending Members. Design of riveted and welded connections like beam end connections (Limit Stress method).

Module 2
STRUCTURAL ELEMENTS
Design of structural elements; Truss members under tension, a laterally restrained beam using rolled steel sections. Design of structural element under compression in a truss, a column using rolled steel sections, effective length bulking load. (Practical case study of a steel section)

Module 3
FOUNDATION
Concept of type of foundation; Design of slab base and gusseted base; Introduction of plastic design.

Module 4
DESIGN OF A UNIT
Visit to a construction site to study steel fabrication work. Design of shed in steel structure

Module 5
Innovative designs in steel for space and box frames. (To be decided by the subject teacher)

Reference

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 Strctures, Nem Chand and Bros, Roorkee, 1999.
4. Subramanian, N. (2008). Design of Steel Structures. Oxford University Press.
5. Duggal, Design of Steel structures, Tata McGraw Hill Company, New Delhi, 2000
6. Lin .T.R, and Scalzi .J.B, Design of Steel structures – Bressler Weley Eastern Pvt. Ltd., NewDelhi, 1960.
7. Dayaratnam .P, Design of Steel Structures, Wheelers Publishing Company Co. Ltd, 1990
8. Handbook of Typified Designs for Structures with steel roof trusses, SP 38 (S&T) – 1987, BIS, New Delhi, 1987.
9. Code of practice for Earthquake Resistant Design and Construction of Buildings IS4326-1976, BIS, New Delhi.

15AE524	Lighting and Electrical Services	HRS 3-0-1	CR-4

Objective

This course gives basic understanding about the science behind Lighting, and fundamental principles of lighting design and electrical services in buildings. By learning this course students can design for optimum lighting requirement for indoor and outdoor spaces. Power distribution network and fundamentals of electrification in buildings is covered to impart technical and practical knowledge.

Module 1

INTRODUCTION TO DAYLIGHTING

Physics of light, Transmission of light, coloured light, the munsell system, Photometry (Law of illumination, illumination from point, line and surface sources), recommended illuminances, Glare, Luminance distribution.

Module 2

DESIGN FOR DAYLIGHTING

Daylighting Design Principles, Design methods, Total flux method, Daylight factor method, Planning for daylight, day light utilization factor, Simple experiments to measure Lux levels under different skyconditions, Class room lux measurements, etc.

Module 3

ARTIFICIAL LIGHTING

Classification of lighting , Artificial light sources, Spectral energy distribution, Luminous efficiency, Colour temperature, Colour rendering.
Types of luminaries, Power factor, reflector, type of lens, cove lighting, cornice lighting, track lighting, wall washer, down light, spot light and stage lighting.
Exterior lighting –Flood, street, lighting for displays and signaling, Neon signs LED-LCD and lighting for surveillance.
General Illumination design & interior lighting: industrial, residential, office departmental store, indoor stadium, theatre, museum, hospital.

Module 4

ELECTRICAL SERVICES

General distribution of electric power in towns and cities. Substation for small schemes and industrial units, supply undertaking, meter room, electrical installation in buildings, connection with the supply company, mains and meter board installation from the meter board to individual units.
Basics of electricity, Single and Three Phase Supply, Protective devices in electrical installation, Earthing for safety – Types of earthing, ISI Specifications.

Electrical installations in buildings – Types of wires, Wiring systems and their choice – planning electrical wiring for building – Main and distribution boards, Planning transformer & generator rooms, Standby Generators & Inverter Backup Systems; Electrical Load Calculation of Buildings. Electrical layout of a simple residential, school and commercial building

Module 5

Any topic on modern, energy saving and sustainable lighting and electrification techniques as decided by the teacher.

References

1. Szokolay, S. V. (2008). Introduction to architectural science. Taylor & Francis.
2. Conceptnine, R. (2008). The Architecture of Light: Architectural Lighting Design Concepts and Techniques. Sage Publications.
3. Cox, T. J. and D'Antonio, P. (2009). Acoustic Absorbers and Diffusers.2nd Ed. Taylor & Francis
4. Cuttle, C. Lighting by Design. 2nd Ed. Architectural Press.
5. Rea, M. (2000). The Lighting Handbook. 9th Ed. Illuminating Engineering Society of NorthAmerica.
6. Reinhart, C. (2014). Day lighting Handbook. Steffy, G. (2000). Time-Saver Standards forArchitectural Lighting. McGraw-Hill.
7. Philips, D., Lighting in Architectural Design, MCGraw Hills, New York.
8. Bovay, H. E. (1981). Handbook of Mechanical & Electrical systems for Buildings. McGraw-Hill Higher Education.
9. Bureau of Indian Standards. (2005). Code of Practice for Electrical Wiring Installations IS-732.
10. Electrical Wiring & Contracting (Vol.1 to Vol.4).

15AR533	Contemporary Architecture	HRS 3-0-0	CR-3

Modern (19th Century AD – Until Present)

Objective

To impart an understanding of the evolution in architecture and urbanism from the advent of modern era to present times.Understanding about the theories, principles and styles of architecture that emerged during Industrial Revolution and its influence on the built form and settlement patterns is covered. Colonial mercantile capitalism and spread of Western influences in India, and synthesis of architectural styles as modes of political accommodation are imparted in the course. The socio-economic and political context, scientific inventions, and technological improvements, and the exchange of styles and philosophies is discussed through notable works of leading architects.

Module 1

INDUSTRIAL REVOLUTION

Its impact, new materials & techniques, Exhibitions *(Great Exhibition 1851)*, development of railways & change in settlement pattern, rapid urbanization & urban crisis. Art Nouveau, Art & Craft, Art Deco; Neo Classicism; Gothic Revival *(John Ruskin, works of Victor Horta, Antonio Gaudi)*.

SELF CONSCIOUS MODERNITY

Chicago school *(Louis Sullivan)*, Bauhaus Movement *(Peter Behrens, Walter Gropius)*, Late-Modern Styles; works of great masters *(Mies Van der Rohe, F. L. Wright, Le Corbusier, Louis Kahn, Alvar Aalto, Kenzo Tange,etc)*.

Module 2

COLONIAL ARCHITECTURE IN INDIA

Spread of European mercantile capitalism and development of early colonial architecture, British, French and Portuguese influences; Inflow of new cultural practices and construction technology, Stylistic transformations; Synthesis with Indian traditional motifs and climatic factor. ***EARLY:***Portuguese *(Basilica of Bom Jesus)*, French *(Pondicherry- Old French Colony)*& British *(St. Andrew's Kirk)*, Jewish settlement of Kerela

LATE:*Edwin Lutyens, Herbert Baker* and planning of New Delhi, Indo- Deco architecture *(Rashtrapati Bhawan / Victoria Terminus / Umaid Bhawan Palace, Jodhpur)*.

Module 3

WORLD ARCHITECTURE 1950 ONWARDS

Post modernism and classical revivalism *(James Sterling, I. M. Pei, Robert Venturi)*; Counter reaction, De-constructivism and industrial architecture *(Zaha Hadid, Renzo Piano, Norman Foster, Santiago Calatrava, Frank O. Gehry)* Alternative practices *(Hassan Fathy, Geoffrey Bawa, Tadao Andao)*

Module 4

ARCHITECTURE IN INDIA: POST INDEPENDENT ERA

Planning and Design of Post Independent Cities and Towns: Chandigarh, Bhubaneswar, Amaravati, Auroville Experiments, Nehruvian nation Building Initiatives, Planning commission & industrialization, Architecture by great Indian and International Masters: *A. Kanvinde, B. V. Doshi, Charles Correa, Raj Rewal, Joseph A. Stein*; Alternative practices *(Laurie Baker)*, Award winning works of contemporary architects.

Module 5

Presentations and critical analysis of any other significant works of architects, as decided by the subject faculty.

Reference

1. Benevolo, L. (1977). History of Modern Architecture. 2 Vols., reprint, MIT Press.
2. Curtis, W. J. (1982). Modern Architecture since 1900. Phaidon Press.
3. Giedon, S., Space, Time and Architecture: The Growth of New Tradition, Harvard University Press.
4. Frampton, K. (1994). Modern Architecture: A Critical History. London : Thames & Hudson.
5. Jenks, C. (2007). The Story of Post-Modernism. London : Wiley and Sons.
6. Lang, J., Desai, M. and Desai, M. (2000). Architecture and Independence: The search for Identity – India 1880 to 1980. New Delhi : Oxford University Press.
7. Lang, J.T (2002). A Concise History of Modern Architecture in India
8. Mehrotra, R. (2011). Architecture in India Since 1990. Pictor.
9. Tadgell, C. (1990). The History of Architecture in India. New Delhi : Penguin Books (India) Ltd.
10. Johnson, P. and Wigley, M. (1988). Deconstructivist Architecture. New York : Museum of Modern Art.
11. Schulz, C. N. (1993). Meaning in Western Architecture. New York : Rizzoli International Publishers.
12. Singh, M. and Mukherjee, R. New Delhi- Making of a Capital. New Delhi : Roli Books.
13. Tafuri, M. (1980). Modern Architecture. Harry N. Abrams Inc.
14. Verma, P. (2010). Becoming Indian – The Unfinished Revolution of Culture and Identity. New Delhi : Penguin India.

15AR543	HVAC Systems	HRS 3-0-0	CR-3

Objective

This course aims to impart fundamental understanding about heating, ventilation and air-conditioning in buildings. Basic principles of thermodynamics and air-conditioning process is covered with a specific orientation towards human comfort. the course enables the student to calculate and estimate heating or cooling load of a building and design the air-conditioning system in an effective manner. Different types of air-conditioning system and ducting system are also taught in the course.

Module 1

DEFINITIONS AND LAWS

Definition & Units of Thermodynamic quantities - Heat (Specific heat & Latent heat), Pressure (Absolute, Gauge & Atmospheric Pressure), Absolute Temperature (Scales & measurement). PH diagram of water to understand Latent heat, Sensible heat, Superheat & Enthalpy, Degree of Superheat & Dryness Fraction.

Laws of Thermodynamics with respect to refrigerators & heat pumps, COP & EER of HVAC systems. Working principle of a Vapour Compression Refrigeration system with schematics & TS diagram. Application, Properties & Dupont Nomenclature of refrigerants.

Module 2

AIRCONDITIONING PRINCIPLES

Heat Gains in Building Systems – Thermal Conductivity and U value of Building Materials. Conductive heat transfer through composite walls & pipes. Solar Heat Gain through Fenestration systems. Numerical

Sensible and Latent Gains, Humidification & Dehumidification, Thermal comfort conditions & Comfort Chart.

Classification, Principle, construction and working of Summer and Winter Air-conditioning systems. Cooling load calculations. Numerical using Psychometric chart.

Module 3

HEATING SYSTEMS

Space Heating: Conventional & Unconventional Heating systems, Radiant panel and Hydronic Heating systems. Passive heating and cooling techniques, Green heating systems.

Module 4

COOLING SYSTEMS

Air Distribution Systems – Natural & Mechanical ventilation systems, Supply, Return and Recirculation Ducts. Indoor air quality and Air Filters.

Thermostats and Humidistat. Centrifugal blowers and Exhausters.

Different types of air-conditioning systems. Window, split, ductable AC, etc.

Introduction to central air conditioning systems.

Understanding 2 pipe & 4 Pipe CV and VAV systems. Chilled Air and Water systems, Spatial requirement of HVAC plants and duct layout.

Module 5

Design of Air-conditioning system for a building as decided by the subject teacher.

References

1. Bovay, H. E. (1981). Handbook of Mechanical & Electrical systems for Buildings. McGraw-Hill Higher Education.

2. Sawhney, G. S. (2006). Fundamentals of Mechanical Engineering:Thermodynamics, Mechanics and Strength of Materials. New Delhi : Prentice Hall of India.
3. Willim, J. McG. (1971). Mechanical & Electrical Equipment for Buildings.
4. Ambrose, E.R. (1968). Heat pumps and Electric Heating, John and Wiley and Sons Inc, New York.
5. Handbook for Building Engineers in Metric systems (1968), NBC, New Delhi.
6. William H. Severns and Julian R. Fellows. Air conditioning and refrigeration. John Wiley and sons, London
7. Khurmi, Gupta & Arora. Refrigeration and Air Conditioning, S Chand & Co.

SESSIONALS/PRACTICAL

15AR556	Architectural Design -III	HRS 0-0-9	CR-6

Objective

To enable capability of designing buildings of specific categories for multiple user group and understanding the allied structural and building services requirement.

1. MAJOR DESIGN PROBLEM
Designing for multifunctional environments within specific categories (Medium scale)

INTENT

To let the students explore design possibilities of multifunctional environments with group of facilities supporting variety of user-groups;To expose thestudents to the challenges of site planning and designing buildings with varied functions, having an array ofactivities and services; To familiarize the students to the task of coordinating integration of structural design and specialized building services in the framework of architectural design.

FOCUS AREAS

- Considerations for planning of campuses/group of built-up spaces
- Zoning and orientating patterns
- Spatial integration
- Functional efficiency (utilitarian parameters, space optimisation, integration of structural systems and building services (HVAC, electrical, plumbing etc.)
- Man - Environment relationship

ALLIED KNOWLEDGE REQUIRED

- Site planning techniques
- Sustainable Design
- Barrier free environments
- Building services
- Landscaping Design

Examples of Studio Projects

School, Vocational training institute, School for special categories, Art and Craft Centre, Hospitality buildings (small resorts,motels, recreation clubs), Multi-speciality clinic, Small commercial or office complex etc.

Reference

1. Baiche, B. and Walliman, N. (2012). Neufert Architects Data, 4th Ed. Oxford : Wiley-Blackwell.
2. Chiara, J. D. and Michael, J. C. 2001. Time Savers Standards for Building Types. Singapore: McGraw Hill Professional.
3. Gauzin-Muller, D. (2002). Sustainable Architecture and Urbanism: Concepts, Technologies, Examples. 1st Ed. Basel: BirkhauserVerlag AG.

15AR564	Working Drawing-I	HRS 0-0-6	CR-4

Objective

To introduce Working drawings and their significance in the construction ofbuildings. To teach students the essential components of working drawings, notations, drawing standards, and strengthen students" knowledge about preparing working drawings for various stages of building construction and for details ofbuildingelements.

Module1

INTRODUCTION

The Course Objective is to acquaint students with preparation of drawings for construction of buildings as a part of „Contract Documents" , required for entering into an agreement with the Contractor, using proper methods of labelling and dimensioning techniques. The drawings shall be based on buildings designed in previous semesters as a part of Architectural Design assignment and generally a load bearing structure.

Module2

All drawings are to be in a readable scale and shall include grid and or centre lines of walls & columns, as per floor layout, indicated in all floor plans for ease of identifying areas of amendments when required.

Following are the drawings that are to be prepared:

- Excavated Trench Plan including plan of required foundation up to plinth level along with proper sections at required locations, all considerably labelled and dimensioned.
- Ground Floor Plan, as a horizontal section at minimum three feet six inches above floor level, showing disposition of rooms, thresholds, any projection above floor level e.g. canopies, chajjas etc., position of doors andwindows & marking their locations, indicating typical elements proposed in spaces like kitchen, toilet , wardrobes, staircases etc. all considerably labelled and dimensioned.
- Upper floor plans showing similar details as mentioned in Ground Floor Plan including all projection as that in elevations, all considerably labelled and dimensioned.
- Terrace or Roof Plan showing staircase / lifts along with extent of required parapet, proper roof drainage indicating ridges, valleys & slopes,
- Location of rain water outlet pipes with diameters of down pipes, all considerably labelled and dimensioned.
- A Site Plan / Layout Plan indicating shape and size of plot, dimensions of all sides, position of approach road, entries & exits, road layout if any, storm water drainage (surface or underground), location of septic tanks & sewage lines, underground water reservoirs & water supply lines, all considerably labelled and dimensioned.

Module3

Elevations of all sides - front, back and both the sides including stair head rooms and lift machine room, showing all features (solids and voids) and their surfaces marked with respect to a base level 0-0, floor levels as per heights starting from ground level to top of staircase / lift machine room.

Module4

As many transverse / longitudinal sections, required to explain vertical disposition of all elements proposed in the design and should preferably take critical areas like lifts, staircase, toilets, kitchen & walls with typical elevation features, all properly labelled/dimensioned.

Module 5

Any other topic as per the need of the present as felt by the teacher

NOTE:

Frequent site visits to be arranged as a part of the curriculum and contact hours. Site visits should be in line with the present studio work. It is mandatory for students to submit a site observation report, either periodically or at the end of the semester.

Reference

1. Building and Construction Authority. (2005). CONQUAS-21. Singapore : The BCA Construction Quality Assessment System.
2. Jefferis, A. and Madsen, D.A. (2005). Architectural Drafting and Design. 5th Ed. New York : Thomson Delmar Learning.
3. Joe, B. (Ed). (2002). Details in Architecture: Vol. I-V.Victoria : The Images Publishing group.
4. Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). The professional practice of architectural working drawings. 4th Ed. Hoboken : John Wiley & Sons.
5. Weston, R. (2004). Plans Sections Elevations – Key buildings of the twentieth century. London : Laurence King Publishing.

15AR572	Design Communication	HRS 0-0-3	CR-2

Objective

To enhance writing skills and awareness about architectural journalism. To equip students with digital and 3D presentation techniques, fundamentals ofphotography, basic skills about architectural photography, and documentation.

Module 1

ARCHITECTURAL JOURNALISM

Introduction to Architectural journalism, Skill improvement in reporting, writing, editing, criticism of architecture, descriptive and analytical writing, book reviews, reporting, review and analysis of historical and contemporary architectural examples and news , Page composition.

Module 2

DIGITAL PRESENTATIONS

Introduction of various software available for Architectural presentation such as Photoshop & Coral. Basic Tools for Editing and Creating Graphics. Rendering AutoCAD drawings with appropriate materials. Compiling and arranging drawings on sheet for presentation or portfolio. Image doctoring and manipulation using computer software for graphics and animation (Photoshop and Flash).

Module 3

COMMUNICATION TECHNIQUES

Advertising - Typography, artwork, Multimedia - digital graphic design techniques, surface decoration such as print, Printmaking – photo screen-printing and etching, scanning and laser printing.

Module 4

3D DIGITAL PRESENTATIONS

Movie making Flash movies, animation graphics, and walkthroughs, 3D Printing.

Module 5

PHOTOGRAPHY

Introduction to photography, types of Cameras, equipment- cameras & lenses, Principles of photo composition, properties & priorities: Exposure, Aperture, Speed, color, black & white photography.

Architectural Photography- Exterior and Interior photography.

Practical exercises to understand composition, photo documentation of buildings, highlighting quality of architectural spaces.

Reference

1. Dinsmore, G. A. (1968). Analytical Graphics. Canada : D. VanNostrand, Company Inc.
2. Freeman, S. (1978). Written Communication. New Delhi : Orient Longman.
3. Sounders, D. (1988). Professional Advertising Photography. London : Merchurst.
4. Edward, J. F. and Lee, J. (2000). Feature Writing for Newspapers and Magazines.4th Ed. Longman.
5. Harris, M. (2002). Professional Interior Photography. Focal Press.
6. Heinrich, M. (2008). Basics Architectural photography. Bikhauser Verlag AG.

SEMESTER VI

THEORY

15AR613	Specifications	HR 3-0-0	CR-3

Objective

The Course is intended to impart understanding in the mode of detailed clause by clause specification as complimentary to the detailed drawings. This subject is also intended to impart knowledge to the student regarding different materials used in the building construction and the methods of application.

Module 1

Introduction-Definition-Importance-Scope of the Subject, Specifications forming part of Building Contract, Drafting Specification, Correct form of writing , Avoiding duplication, Ambiguity and conflicting statements. Correct order of sequence. Specification of simple building materials i.e Brick, Stone, Lime, Cement and Wood etc. Traditional building materials.

Module 2

Detail specification of Excavation in foundation, Plain Cement Concrete, Masonry in Brick and stone (Rubble and ashlar. Reinforced Cement Concrete work detail specification of all the works related all civil works.

Module 3

Material Quality and Standard, various Mixes, cutting, bending and fixing of M. S .Bars. Centring and shuttering and its removal. Curing of concrete, flooring, Paving and Tiling, Indian patent Stone, Terrazzo in situ. Flag Stone flooring. Water proofing of structure, Carpentry and Joinery.
Roof work in timber, Panelled door and Glazed window. Specification for Structural steel work , Materials Quality and setting out. Cutting and welding. Specification of First class building and second class building.

Module 4

Building Boards. Ply Wood, Particle Boards, Block boards. Acoustic Boards. Flooring- Asphalt Rubber cork, Linoleum, Parquet etc. Glass – various types of glass used in buildings. Patent Glazing for Factories, Glass bricks, Partition, Pavements lights etc . Paints- Plastic Emulsion paint, metal paints, Cement paint, weather proof paint etc.

Module 5

Standard Specification for different Institutions like PWD, MES, CPWD, BIS etc. Abstract of quantities and writing Schedules, Rate and Material analysis . Bill of quantities.

Reference

1. Birdie, G. S. (2005). Text Book of Estimating and Costing. Dhanpat Rai Publishing.
2. Chakraborty, M. Estimating, Costing, Specification & Valuation
3. C.P.W.D. Standard Schedule of Rates.
4. Khanna, P. N., Indian Practical Civil Engineers' Handbook, Engineers' Publishers, N.Delhi.
5. Rosen, H.J., Construction Specifications Writing, John Wiley and Sons, N. York and London.

15AR62 Advanced Building Systems and Services | HR 3-0-1 | CR-4

Objective

To develop know-how and understanding of important advanced systems and services in buildings, their definitions andterms used, functioning and their applications in building.

Module 1

FIRE SAFETY

Classification of Fires & Extinguishers, Dry Riser, Wet Riser & Down Comer systems, Sprinkler & Drencher systems, Fire detection systems, Fire Lifts & Fire Escape Plan, Fire prevention, safety and security measures and regulations.

Fire fighting layout, Reflected ceiling plan of smoke detectors / sprinklers, etc.

Module 2

PARKING AND CIRCULATION SYSTEMS

Multilevel Parking Systems, Semi automatic and automatic parking systems, Elevator types and spatial requirements with respect to Passenger, Service & Fire lifts, Escalators and Travelators, Applications of Raised Floor systems.

Module 3

BUILDING UTILITIES

Building Automation – Objectives & advantages, Smart devices used in Illumination, Climate control, Building Security systems etc., Laundry & Garbage chutes, Understanding Bio Medical Waste and their disposal, Chemical and Biological Toilets, Hot water systems for apartments and hotels, Cooking gas distribution system for residences. Communication systems: space and connection facilities for LAN, computer server, PABX and telephone.

Module 4

STANDARDS AND REGULATIONS

Study of building services with reference to NBC (National Building Code), ECBC (Energy Conservation and Building Code) and BIS regulations (Bureau of Indian Standards).

Module 5

Case studies and assignments for students on applications of building systems and services.

References

1. Stein Reynolds Mc Guinness – Mechanical and Electrical equipment for buildings, Vols 1 &2, John Wiley & sons.
2. Francisco Asensio Cerver – The architecture of Skyscrapers, Hearst Book International, New York, 1997
3. Bennetts Ian & others – Tall building structural systems
4. William, J. McG. (1971). Mechanical & Electrical Equipment for Buildings
5. Bovay, H. E. (1981). Handbook of Mechanical & Electrical systems for Buildings. McGraw-HillHigher Education.
6. Bureau of Indian Standards. (2005). Code of Practice for Electrical Wiring Installations IS-732.
7. Kloft, E. and Johann, E. (2003). High-rise Manual: Typology and Design, Construction andTechnology, 1st Ed. Basel: Birkhauser Verlag AG.
8. National Building Code
9. Energy Conservation and Building Code

15AR633	Theory of Design	HR 3-0-0	CR-3

Objective

The course will focus on creating a deep understanding about Architecture and Design from a theoretical perspective. The course will help students to develop a strong designvocabulary, how and by what means to communicate their design and to understand the philosophyand the undercurrents of the design process. It will impart knowledge of different aesthetic movement and philosophies that has influenced architectural principles and evolution of architectural style over time in the world.

Module 1

INTRODUCTION TO DESIGN

Definition of design, Value Judgments in Design (Design and Morality/Ethics, Socially Responsive Design Process, Inclusive Design), evaluation of design, Design Skills, General discussion on Manmade and Natural elements/structures

Module 2

DESIGN PROCESS AND THINKING

Context for architectural design problems

Design process - stages in the design process, different ideas of design methodology, analysis and synthesis, simulation, action ability and implementation of intentions.

Understanding the terms - creativity, imagination, etc. Theories on thinking, convergent and divergent thinking, lateral and vertical thinking, creative techniques like checklists, brainstorming, syntactic, etc., blocks in creative thinking.

Module 3

DESIGN CONCEPTS AND PHILOSOPHIES

A chronological overview of principles and philosophy of architectural movement in art, design and architecture, worldview, theories & perceptions of time and space, mode of reasoning through discussion on works of notable architects

- Theories of perception and variability of perception, Phenomenology of perception - Merleau-Ponty
- Modernism
  Related to works of Walter Gropius, Le Corbusier, Mies van der Rohe, Frank Lloyd Wright, Louis Sullivan
- Postmodernism
  Work of Michael Graves, Robert Venturi, Philip Johnson

Module 4

DESIGN CONCEPTS AND PHILOSOPHIES

A chronological overview of principles and philosophy of architectural movement in art, design and architecture, worldview, theories & perceptions of time and space, mode of reasoning through discussion on works of notable architects

- Structuralism
  Charles Alexander Jencks, Aldo van Eyck, Herman Hertzberger, KenzōTange, Claude Lévi-Strauss
- Post-structuralism/Deconstruction
  Bernard Tschumi, Peter Eisenman, Henri LeFebvre, FrankGehry, Daniel Libeskind, ZahaHadid.
- Biomimicry/biomimetics
  Antoni Gaudi, Norman Foster

Module 5

Book review, seminars and discussions

READING:

- *Louis Sullivan (Form Follows Function)*
- *Le Corbusier (Towards a new Architecture)*
- *Bernard Tschumi (deconstructivism)*

Reference

1. Geoffrey Broadbent - Design in Architecture - Architecture and the human sciences - John Wiley & Sons, New York, 1981
2. Nigel Cross - Developments in Design Methodology, John Wiley & Sons, 1984
3. Bryan Lauson - How Designers Think, Architectural Press Ltd., London, 1980.
4. Tom Heath - Method in Architecture, John Wiley & Sons, New York, 1984
5. Johnson, P, Wigley, M, (1988). "Deconstructivist Architecture" in Deconstructivist Architecture, New York: Museum of Modern Art, pp 10-20.
6. C. Jencks, (1991). "The Language of Post Modern Architecture" Wiley Academy.
7. P. Eisenman, (1999). "Diagram Diaries". Universe, New York.
8. Merleau-Ponty, M., (1964). "The primacy of perception". In The Primary Perception and other essays on phenomenological psychology, the philosophy of art, history, andpolitics,(J. M.Edie Trans), Northwestern University Press.
10. Robert Venturi, (1966) "Complexity and Contradiction in Architecture .New York: The Museum of Modern Art.
11. Tschumi, B. (1994). "Architecture and disjunction. Cambridge", Mass: MIT.

15AR643	Architectural Acoustics	HR 3-0-0	CR-3

Objective

The course imparts fundamental understanding about architectural acoustics and environmental noise. Physics of sound and acoustical design for built spaces are covered, which enables the student to provide appropriate acoustic solutions for both indoor and outdoor spaces.

Module 1

FUNDAMENTALS OF ARCHITECTURAL ACOUSTICS

Fundamentals: Definitions, terms related to acoustics, sound waves, frequency, amplitude, intensity, wavelength, sound pressure, measurement of sound, decibels.
Characteristics of speech, music and hearing.

Module 2

ROOM ACOUSTICS CONCEPTS

Room Acoustics: resonance, reverberation, echo, reverberation time (Sabine's formula)
Material property: Absorption, reflection, scattering, diffusion, transmission, absorption co-efficient, Noise Reduction Coefficient (NRC),
Absorbing materials used and their choices for different acoustic treatment, Sound insulation
Simple exercises involving reverberation time and absorption

Module 3
ACOUSTICS IN BUILDING DESIGN AND TREATMENT

Basic room acoustics concepts and design: shape, volume, defects, treatment for interior surface, basic principles in designing, cinemas, recording studios, class rooms, conference halls, Auditorium.

Module 4
ENVIRONMENTAL NOISE

Noise and its control- Air and structure borne, sound transmission, vibration isolation, damping. Noise source within buildings and its control (Fans, chillers, boilers, HVAC noise sources).
External noise source and its control: Open air acoustics, Free field propagation of sound, absorption from air and natural elements, Site planning, Design of open air theatres, Types and design of Noise barrier, effects of landscape elements

Module 5
Acoustic design of small spaces using innovative techniques and materials by applying manual or simulation software method, as decided by the subject teacher.

References

1. Szokolay, S. V. (2008). Introduction to architectural science. Taylor & Francis.
2. Vigran, T. E. (2008). Building Acoustics. 1st Ed. Taylor & Francis.
3. Barron. M.(2009). Auditorium acoustics and architectural design. 2nd Ed. Taylor & Francis.
4. Eagan, D. Concepts in Architectural Acoustics.
5. Kang, J. (2006). Urban Sound Environment. 1st Ed. CRC Press.
6. Meyer, H. B. and Goodfriend, L. Acoustics for Architects. Reinhold.
7. Smith, B. J., Peters, R. J., and Stephanie, O. (1982). Acoustics and Noise Control. New York: Longman.

SESSIONALS/PRACTICALS

15AR656	**Architectural Design -IV**	**HR 0-0-9**	**CR-6**

Objective
The objective of this studio is to expose the students to the complexities of providing shelter for people from different socio-economic background in an urban setting. To exposethe students to the challenges of bigger scale site planning involving a group of buildings, space programming, complexities of providing building services and infrastructure facilities and economic feasibility. To enable the students to understand how to design in compliance with building regulations and space standards.

1. MAJOR DESIGN PROBLEM

Group Housing

INTENT

To generate an understanding within the students about the various past and future concepts of neighbourhood design, and deal with the complexities of mixing various user groups (economic and socio-cultural) in living environments. While designing socio-economic determinants and

technological alternatives shall be studied in detail. Special emphases to put on structural aspects of high rise buildings, utilitarian parameters, space optimisation, conformancewith regulatory requirements, integration of structural systems and building services. They are also expected to be conscious about the need for climate sensitive passive design techniques.Application of concepts of project phasing, financing andconstruction planning are to be applied. Design and standards for different physical infrastructure such as, roads/streets, pedestrian pathways, parking provision (basement parking, other covered and open parking), site drainage, solid waste management facilities, water conservation systems.

FOCUS AREAS

- The concept of neighbourhood/sense of belonging
- Housing Density
- Typologies of residential units based on their economic occupancy(unit typology, floor plate typology and building group typology)
- Economic and environmental sustainability
- Structural criteria
- Alternative construction techniques for affordable housing/ Innovative techniques for high rise and modern housing

ALLIED KNOWLEDGE REQUIRED

- Building regulations and codes
- Building and site services (technical)
- Sustainable architecture

EXAMPLES OF STUDIO PROJECTS

Housing types based on height of buildings, and occupancy densities, Gated community, housing types based on affordability, etc.

Reference

1. Baiche, B. and Walliman, N. (2012). Neufert Architects Data, 4th Ed. Oxford : Wiley-Blackwell.
2. Chiara, J. D. and Michael, J. C. 2001. Time Savers Standards for Building Types. Singapore: McGraw Hill Professional.
3. Gauzin-Muller, D. (2002). Sustainable Architecture and Urbanism: Concepts,Technologies, Examples. 1st Ed. Basel : BirkhauserVerlag AG.
4. Huxtable, A-L. (1984). Tall Buildings Artistically Reconsidered.
5. Kloft, E. and Johann, E. (2003). High-rise Manual: Typology and Design, Construction andTechnology, 1st Ed. Basel: Birkhauser Verlag AG.
6. Markus, K., Rollbacher, R., Herrmann, E., Wietzorrek, U. and Ebner, P. (2009). Typology+:
7. Innovative Residential Architecture. Basel : BirkhauserVerlag AG.
8. Parker, D. And Wood, A. (2013). The Tall Buildings Reference Book. New York : Routledge.
9. Wood, A. and Ruba, S. (2012). Guide to Natural Ventilation in High Rise Office Buildings. NewYork : Routledge.
10. Correa, C. (2010). A Place in the Shade: The New Landscape and Other Essays. New Delhi : Penguin Books.
11. Ferre, A. and Tihamer, S. H. (2010). Total Housing: Alternatives to Urban Sprawl. New York : ACTAR Publishers.
12. Brooks, R. G. (1988). Site Planning: Environment, Process and Development. Michigan.
13. Richard Untermann and Robert Small, "Site planning for cluster housing", Van Nostrand Reinhold Company, 1977.

15AR664	Working Drawing-II	HR 0-0-6	CR-4

Objective

To train the students to prepare detailed Working drawings for effective executionat construction site, preparation of integrated services drawings, and detailing of building components, and methods of transmittals and record keeping.

Module1

The Course Objective is to acquaint students with preparation of drawings for construction of buildings as a part of „Contract Documents" , required for entering into an agreement with the Contractor, using proper methods of labelling and dimensioning techniques. The drawings shall be based on buildings designed in previous semester as a part of Architectural Design assignment and generally a frame structure.

Module2

All drawing to be in a readable scale and shall include grid and or center lines of walls & columns, as per floor layout, indicated in all floor plans for ease of identifying areas of amendments when required.

Following are the drawings that are to be prepared:

- Excavated Trench Plan including plan of required foundation up to plinth / parking level showing all structural members (columns & other r.c.c. elements) along with proper sections at all places, as necessary, all considerably labelled and dimensioned.
- Drawings should indicate type of foundations adopted in a scheduled manner.
- Ground / Stilt Floor Plan, as a horizontal section at minimum three feet six inches above floor level, showing parking layouts, disposition of rooms, thresholds, any projection above floor level e.g. canopies, chajjas etc., position of doors and windows & marking their types (as per door & window schedule) & locations, indicating internal finishes (as per schedule of finishes), typical elements proposed in spaces like kitchens, toilets, wardrobes, staircases etc. all considerably labelled and dimensioned.
- Upper floor plans showing similar details as mentioned in Ground Floor Plan including all projection as that in elevations, all considerably labelled and dimensioned.
- Drawings should also include, in typical formats, Schedules of Doors & Windows with their Hardware fixtures and also a Schedule of Finishes.
- Separate floor plans, at all levels, indicating electrical fixture layouts in respective areas.
- Detailed layout plans for toilets, kitchens, staircases indicating type of fixtures

Terrace or Roof Plan showing staircase / lifts along with extent of required parapet, proper roof drainage plan considering catchment area of roof indicating ridges, valleys & slopes, location of rain water outlet pipes with diameters of down pipes, location of lightning arrestors, all considerably labelled and dimensioned.

Module3

Elevations of all sides - front, back and both the sides including stair head rooms and lift machine room, showing all features (solids and voids) and their surface levels marked with respect to a base level 0-0, floor levels as per heights starting from ground level to top of staircase / lift machine room, all considerably labelled and dimensioned.

A probable indication of color scheme, on all surfaces, is to be prepared referring to materials available in the market for external coating.

As many transverse / longitudinal sections, required to explain vertical disposition of all elements proposed in the design and should preferably take critical areas like lifts, staircase, toilets, kitchen & walls with typical elevation features, all properly labelled/dimensioned.

Module4

- A Site Plan indicating shape and size of plot dimensions of all sides, position of approach road, entries & exits. It should include, within the premises, road layout if any, storm water drainage system (surface or underground) with discharge details, location of septic tanks & underground sewage lines, underground water reservoirs both for fire and domestic use, fire fighting system and Water Supply network, all considerably labelled and dimensioned.
- Additionally the drawing shall also have reference to water harvesting system in the form of recharge pits and or zero disposal technique.

In case of large plots with multiple building units, the project might need a Sewage Treatment Plant (STP) - open or closed type where it becomes mandatory to show the system of treatment. Detailed drawings of the system may have to be included as per respective area norms.

Module 5

Any other topic as per the need of the present as felt by the teacher

NOTE:

Frequent site visits to be arranged as a part of the curriculum and contact hours. Site visits should be in line with the current studio work. It is mandatory for students to submit a site observation report, either periodically or at the end of the semester.

Reference

1. Building and Construction Authority. (2005). CONQUAS-21. Singapore : The BCA Construction Quality Assessment System.
2. Jefferis, A. and Madsen, D.A. (2005). Architectural Drafting and Design. 5th Ed. New York : Thomson Delmar Learning.
3. Joe, B. (Ed). (2002). Details in Architecture: Vol. I-V. Victoria : The Images Publishing group.
4. Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). The professional practice of architectural working drawings. 4th Ed. Hoboken : John Wiley & Sons.
5. Weston, R. (2004). Plans Sections Elevations – Key buildings of the twentieth century. London : Laurence King Publishing.

15AR673	Interior Design	HR 0-0-3	CR-3

Objective

To familiarize students about the need of interior design; its principles and theories with specific reference to colour, texture, light and their effects. To explore creativity and innovative design options with the basic knowledge of anthropometrics, building materials and finishes and construction details.

Module 1

Interior space programming, Introduction to basic physical factors/ elements of interior design i.e walls, floors, ceiling, doors, windows etc.

Historical evolution of interior styles and furniture, vernacular interior elements (design and materials used)

Usage of modern, traditional as well as cost effective materials

- An assignment to be submitted on market survey of various interior materials.

Module2

Study of the relationship between furniture and spaces, human movements & furniture designas related to human comfort. Function, materials and methods of construction, changingtrends

and lifestyles, innovations and design ideas. Study on furniture for specific types ofinteriors like office furniture, children's furniture, residential furniture, display systems, etc.

- Assignment on different furniture types and product design.

Module3

Study of interior lighting, different types of lighting their effects types of lighting fixtures. Other elements of interiors like accessories used for enhancement of interiors, paintings, objects-de-art, etc. Interior landscaping elements like rocks, plants, water, flowers, fountains, paving, artefacts, etc. their physical properties, effects on spaces and design values.

- Assignment on two interior schemes of different functional types: residential/commercial /Public buildings at different scales will form the major design assignment and include Concept development and furniture layout.

Module4

Details like false ceiling, partition, flooring, wall panelling/cladding. Use of daylight and artificial lighting for specific functions, electrical layout , colour scheme, furnishings, interior landscape to be included in each design portfolio.

Module 5

- Presentation on eminent interior designers' work
- One time problem of 3 hours (one week) to be conducted.

Reference

1. Ching, F. D. K. (1987). *Interior Design Illustrated*. New York : V.N.R. Publications.
2. Doshi, S. (Ed.) (1982). *The Impulse to adorn - Studies in traditional Indian Architecture.* Marg Publications.
3. Kathryn, B. H. and Marcus, G. H. (1993). *Landmarks of twentieth Century Design*. Abbey Ville Press.
4. Penero, J. and Zelnik, M. (1979). *Human Dimension and Interior space: A Source Book of Design Reference Standards.* New York : Whitney Library of Design.
5. Slesin, S. and Ceiff, S. (1990). *Indian Style*. New York: Clarkson N. Potter.
6. Dorothy, S-D., Kness, D. M., Logan, K. C. and Laura, S. (1983). *Introduction to Interior Design.*Michigan : Macmillan Publishing.

6. DETAILED SYLLABUS OF 5 YEAR B.ARCH PROGRAMME - 4th year

PILOO MODY COLLEGE OF ARCHITECTURE ESTD : 1993
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College : Plot No.11/1/A, Sector-, C.D.A, Cuttack 753014
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SEMESTER VII

THEORY

15AR713	Estimation and Valuation	HR 3-0-0	CR-3

Objective: The course intends to provide knowledge of methods of estimation and valuation for building industry. Students get equipped with practical and working knowledge in areas of building construction and specification, quantifying materials and rate analysis.

ESTIMATION

Module 1

Introduction to the subject, definition, aim and objective. Scope and importance of the subject, principles of and methods of estimating. Different types of estimation. Approximate and detailed estimation

Module 2

Methods of approximate estimating- Built in or Carpet area method, Cubic content method and numerous systems. Rates of materials, Rate analysis, Pricing of bill of quantities, Abstract and detailed estimate. Taking out quantities of various items. Common abbreviations. Cost estimates, standards modes of measurements, writing schedules, elements of cost accountancy and book keeping.

VALUATION

Module 3

Principles of valuation of real properties for the purpose of sale and purchase, mortgage, lease, Free hold and lease hold, interest, forms of rents, seller s values, fair value, mortgage values, distress sale values, buyer‟ s value, fancy value, annual value, year‟ s purchase, depreciation value.

Methods of valuation- Valuation of land, methods of belting, methods of front land, land building methods of valuation, shop premises properties.

Module 4

Valuation of residential offices, commercial , industrial, lease hold agricultural properties, valuation of municipal rate, and compulsory accusation valuation of industries as going concern factories, mills, easement rights and valuation thereof, development of properties. Arbitration-litigation laws

Module 5

Complete estimation of a small scale building as decided by the faculty.

Reference

1. Birdie, G. S. (2005). Text Book of Estimating and Costing. Dhanpat Rai Publishing. Chakraborty, M. Estimating, Costing, Specification & Valuation
2. C.P.W.D. Standard Schedule of Rates.
3. Dutta, B. N. (1998). Estimating and Costing in Civil Engineering. 24th Ed. UBS Publishers Distributors Ltd.

15AR724	Introduction to Urban Planning and Design	HRS 3-0-1	CR-4

Objective

The course aims to impart a comprehensive knowledge of urban design and urban planning as means of understanding architecture in the macro scale. The students are exposed to concepts of public realm, understanding of the city as a three dimensional entity and perception ofspaces at multiple scales; Planning concepts, settlement planning, housing policies, planning policies, different levels of urban planning, familiarize with the implementation processes through various statutory andnon-statutory guidelines.

Module1

INTRODUCTION

Relationship between Architecture, Urban Design and Urban Planning; Introduction basic principles and theories, Broad understanding of urban forms and spaces at various spatial scales through examples from historic cities. examples of medieval, industrial, renaissance). Philosophies and concepts of different pioneers of town planning (Patrick Geddes, Ebenzer Howard, Patrick Abercrombie, Clarence Perry, Reymond Unwin, Soria Y. Mata, etc.)

Module2

URBAN DESIGN CONCEPTS

Understanding the city as a three dimensional element; Urban form as determined by interplay of masses, voids, order, scale, harmony, symmetry, colour and texture; Organization of spaces and their articulation in the form of squares, streets, vistas and focal points; Concept of public open space; Image of the city and its components such as edges, paths, landmarks, street features;

Module 3

URBAN PLANNING

Definition of towns in Indian context, levels of planning and steps of preparation of master plan, Structure plan and Zonal development plan. Land-use Classification of a city. Landuse subdivision, regulation and zoning.

Module 4

HOUSING AND URBAN SETTLEMENT

Introduction to housing and community facilities. Role of F.S.I and densities in housing. Housing schemes in India, Urban renewal and urban sprawl; Concepts of Transit Oriented Development, Compact City and Sustainable City; Comprehensive role of urban design in planning and public participation.

Module5

Case studies, (Slums, public spaces, neighbourhoods, heritage areas in cities), Study of policies and guidelines on recent housing schemes

Reference

1. Larice, M. and Macdonald, E. Ed. (2013). The Urban Design Reader. 2nd Ed. The Routledge
2. Urban Reader Series, Abingdon, Oxon : Routledge.
3. Carmona, M., Heath, T., Oc, T. and Tiesdell, S. (2010). Public Places Urban Spaces. Oxford:Architectural Press.
4. Marshall, S. (2009). Cities design and evolution. New York : Routledge.

5. Lang, J. T. (2005). Urban Design: A Typology of Procedures and Products. Oxford:Elsevier/Architectural Press.
6. Moughtin, C., Cuesta, R., Sarris, C. and Signoretta, P. (2003). Urban Design - Methods and
7. Techniques. Oxford : Architectural Press.
8. Watson, D., Plattus, A. and Shibley, R. (2003). Time-Saver standards for urban design. New York: McGraw Hill.
9. Joseph De Chiarra and Lee Coppleman, "Planning Design Criteria", Van Nostrand Reinhold Co., NewYork, 1968
10. Town Planning, A.Bandopadhyay, Books and Allied, Calcutta 2000.
11. Babur Mumtaz and Patweikly, Urban Housing Strategies, Pitman Publishing, London, 1976.
12. Geofrey K.Payne, Low Income Housing in the Development World, John Wiley and Sons, Chichester, 1984.
13. John F.C.Turner, Housing by people, Marison Boyars, London, 1976.
14. Martin Evans, Housing, Climate and Ocmfort, Architectural Press, London, 1980.
15. Forbes Davidson and Geoff Payne, Urban Projects Manual, Liverpool University Press, Liverpool, 1983.
16. Rangwala, Town Planning, Charotar publishing house.
17. G.K.Hiraskar, Town Planning.
18. Rame Gowda, Urban and Regional planning.
19. N.V.Modak, V.N.Ambedkar, Town and country planning and Housing, Orient Longman,1971.

15AR733	Behavioural Architecture	HRS 3-0-0	CR-3

Objective

To impart knowledge about sociological and psychological implications in designing built environment. The focus is on understanding man-environment relationship, behavioural dynamics with respect to spatial pattern, and methods of conducting behavioural studies.

Module1

SPATIAL IMPLICATIONS OF SOCIOLOGY

Difference in lifestyle due to socio-economic background, and then implication in architectural design. Sociological aspects in the history of evolution of housing or shelter forms. Room use, geometry & meaning, Personal space, adjacencies, Territoriality.

Module 2

SOCIOLOGY AND PLANNING

Essential elements of society: Rural and Urban communities. Growth of socio cultural factors through ages, dynamics of urban growth and social change, Behavioral assumptions in planning.

Module 3

SOCIO-PSYCHOLOGICAL DIMENSIONS

Social aspects of physical environment, Perceptual dimension of space, Psychological aesthetics Patterns of activity in time and space across different demographies, social & psychological issues in neighbourhoods and public spaces, environmental cognition.

Module 4

METHODS FOR BEHAVIOURAL STUDIES

Social survey and social research, Cognitive mapping, activity/adjacency relationship matrices, Area use frequency program, charts, pictograms, case studies, field work.

References

1. Burnette, C. (1971). Architecture for human behaviour. Philadelphia Chapter : AIA.
2. Canter, D. and Lee, T. (1974). Psychology and the built environment. New York : Halstead Press.
3. Christopher, A. et al. (1977). A Pattern Language. New York : Oxford University Press.
4. Clovis, H. (1977). Behavioural Architecture. McGraw Hill.
5. Lynch, K. (1973). The image of a city. Cambridge : MIT.
6. Sanoff, H. (1991). Visual Research Methods in Design. New York : John Wiley & Sons.
7. Zeisel, J. (1984). Enquiry by design: Tools for Environment-Behaviour Research.Cambridge: Cambridge University Press.
8. Zeisel, J. and Eberhard, J. P. (2006). Inquiry by Design- Environment/ Behaviour/ Neuroscience in Architecture, Interiors, Landscape and Planning. New York : W. W.Norton & Company.

15EAR743	Elective -I (i) Ergonomics and Product Design	HRS 3-0-0	CR-3

Objective

To expose the students to the requirements of designing for the human comfort in accordance with anthropometry. The students will have knowledge of ergonomics and its applicationsin Product design including designing for the physically challenged and the elderly.

Module 1

INTRODUCTION

Human being in the manmade world and importance of ergonomics, Gross human anatomy,Ergonomics for children and old people, Definitions related to Ergonomics and Product design, Historical development in the concept of ergonomics and product design, Role of Product designer.

Module 2

ERGONOMICS AND DESIGN

Application of human factors data. Human activities, their nature and effects, Man-machine interaction and physical environment - Environmental Condition including, thermal,illumination and noise.

Applied anthropometry – Human response to climate, Human performance and system reliability, designer's priorities.

Module 3

ASPECTS OF PRODUCT DESIGN

Visual, Auditory, Tactual, Olfactory human mechanisms, Physical space and arrangement. product display, process of seeing, visual discrimination, quantitative and qualitative visual display, Alphanumeric and related displays, Visual codes and symbols.

Processes of product designing, manufacturing and testing

Form, Colour, Symbols, User specific criteria, Material selections, Technology and recyclability, Packaging. Multiple Utility oriented approach to Product Design.

Module 4

UNIVERSAL DESIGN

Design of special elements in buildings for physically challenged and old aged

Module 5

DESIGN EXERCISES

Design of Household elements, tools and devices.
Design of furniture.
Design of Industrial Product – Automobiles and Electrical
Element design for differently able, old and children.

Reference

1. Time Saver Standards for Interior Design
2. Andrew Alpern, Handbook of Speciality Elements in Architecture, McGrawhill Co., USA, 1982.
3. Francis D.K.Ching, Interior Design Illustrated, VNR Publications, New York, 1987.
4. Helen Marie Evans, An invitation to Design.
5. Crosbie, M. J. and Watson, D. (2005). Time Savers Standards for Architectural Design: Technical data for Professional Practice. 8th Ed. The McGraw-Hill Company.

15EAR743	Elective -I (ii) Set Design for Events and Performing Arts	HRS 3-0-0	CR-3

Objective

Students will learn how to analyze scripts for proper scenery, how to conceptualizedesigns that will translate into actual sets, and develop visual thinking within the creative process.The course imparts understanding of designing stage and event setting through language, color, andarchitectural styles.

Module 1

HISTORY OF PERFORMING ART, SOCIETY AND SET DESIGN

Insight into the representation of culture and society through performing arts and films in different period of history. Modern interpretations of different performing art forms. Investigation of production methods, dramatic theory and conventions, and scene design of various medium of performance for motion picture and different forms of other performing arts in the 20th and 21st century.

Module 2

GRAPHIC DESIGN AND TYPOGRAPHY FOR EXHIBIT DESIGN

Principles of layout for creating effective visual signage and explore the unique problems, technique, theory, andapproaches of designing signage for films, theatre, and other forms of events and exhibition.

Module 3

CONCEPTS FOR SET DESIGN

Introduction to the basic concepts, through theory and practice of scene design for theatre, film, other performing arts, events and entertainment media. Script analysis, visual arts analysis (colour and graphics, research skills, and application of principles and elements of design.

Module 4

PROCESS OF SET DESIGN

Stage design process from inception to performance, Materials and techniques used for erecting different types, Creative Lighting design, acoustic provisions, modern equipments used for stage control.

Module 5
Study visit to a film studio or any event as decided by the subject teacher.

References
1. Baiche Bousmaha & Walliman Nicholas. Neufert Architect" s data. Blackwell science ltd.
2. Chiara De Joseph & crosbie.J.Michael. 1990. Time saver standards for building types. McGraw Hill company.

15EAR743	Elective -I (iii) Space Syntax andGeometry of Forms	HRS 3-0-0	CR-3

Objectives
To make the student understand the geometry of complex forms and to generate ideas for creative structural solutions. To introduce the concept and application of space syntax.

Module1
Evolution of forms through different period of history;vaults, flying buttresses, tents, masted structures & bridges through ancient & medieval history; Post Industrial modular construction of large span & suspension structures in steel and concrete- examples of iconic projects.

Module 2
Properties and application of Platonic solids, Archimedean solids - different types of Polyhedra, pairs of related tetrahedral forms, Compounds of stellated dodecahedron;Prism and its specializations, Antiprism and Dipyramid.

Module 3
Thin shell structures - properties, construction materials and application,Geodesic dome;Tensile structures – types of pneumatic structures;Suspended cable structures – types of cable network systems, shapes of cable suspended systems; Ellipsoid, hyperboloids and parabolic intersections.

Module 4
Introduction to the concept of Space Syntax, application in analysing spatial configuration of buildings, settlements, and urban texture and geometry.

Module 5
Different Parametric form generation using simulation tools and techniques or model making as decided by the faculty.

References
1. Gasson, Peter C., Geometry of spatial forms, Ellis Horwood/John Wiley, Chichester/New York, 1983.
2. Al-Sayed, K., Turner, A., Hillier, B., Iida, S., Penn, A., Space Syntax methodology, UCL: London, 2014.

SESSIONALS/PRACTICALS

15AR756	Architectural Design -V	HR 0-0-9	CR-6

Objective

The objective of this studio is to focus on functionality, creativity in form, understanding of different structural solutions, and integration of advanced technology andservices. To expose the students to the challenges of bigger scale site planning involving a group of buildings, space programming, complexities of providing building services and infrastructure facilities and economic feasibility. The Designstudio also aims to inculcate the techniques of designing for sustainability, and to enable the students to understand how to design in compliance with building regulations, codes and space standards.

1. MAJOR DESIGN PROBLEM

Large Span Structures/Built-ups consuming large volumes

INTENT

To let the students explore the possibilities of innovation through designing and knowledge of structure, and understand how multiple users behave in large scale developments.The intent is to develop designing abilities to handle buildings with complex spatial organizations, multifunctional spaces,large spans and variable circulation patterns. Various techniques of energy-efficient design and recycling technologies for water & wastes is essential as these have to be incorporated in the design proposals. Environmental issues are to be emphasized and awareness about bestpractices in profession is expected.Students are required to do thelandscape layout in detail to develop appreciation of a holistic environmental design. Siteplanning exercise should depict understanding of vehicular and pedestrian movement patterns, land grading and conservation of ecologically sensitive features.

FOCUS AREAS

- Spatial organisation
- Structural innovations
- Sustainable design

ALLIED KNOWLEDGE REQUIRED

- Advanced concepts of structures
- Advanced building services
- Building automation and intelligent buildings

EXAMPLES OF STUDIO PROJECTS

Stadiums, convention centres, exhibition pavilions, museum complex, educational campus design, hospitals, mercantile buildings like shopping malls, office complex, hospitality buildings, etc.

Reference

1. Baiche, B. and Walliman, N. (2012). Neufert Architects Data, 4th Ed. Oxford : Wiley-Blackwell.
2. Chiara, J. D. and Michael, J. C. 2001. Time Savers Standards for Building Types. Singapore:McGraw Hill Professional.
3. Gauzin-Muller, D. (2002). Sustainable Architecture and Urbanism: Concepts,Technologies,Examples. 1st Ed. Basel : BirkhauserVerlag AG.

4. Krishan, A. and Nick Baker, Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings, McGraw Hill Education Private Limited, India, 1999.
5. Huxtable, A-L. (1984). Tall Buildings Artistically Reconsidered.
6. Kloft, E. and Johann, E. (2003). High-rise Manual: Typology and Design, Construction and Technology, 1st Ed. Basel : Birkhauser Verlag AG.
7. Wood, A. and Ruba, S. (2012). Guide to Natural Ventilation in High Rise Office Buildings. New York : Routledge.
8. Parker, D. And Wood, A. (2013). The Tall Buildings Reference Book. New York: Routledge.

15AR764	ARCHITECTURAL DETAILS	HRS 0-0-6	CR-4

Objectives

This course focuses on creative architectural detailing of building components and use of different materialsand technologies involved for implementation. It intends to equip the students with knowledge and skill for handling modern building exteriors/interiors works.

Module1

Latest trend in external finishing materials, it" s implementing technology and hardware i.e. stone, metal, glass, tiles,

- Entrance doors/special doors and windows(sliding, folding, revolving)

Module 2

Latest trend in internal finishing materials, it" s implementing technology and hardware i.e. gypsum, plywood, metal, glass, stone, tiles etc.

- Staircase and balconydetails with finishing and railing designs,
- parapet design, coping, cornices
- Kitchen and wardrobe details.

Module 3

Worked out/creative details of walls, partitions, floorings, suspended ceilings of different materials with electrical wiring lighting, ventilation and air conditioning, Acoustic design and finishing for interiors

Module 4

Structural layout, detailing and schedule of a RCC framed building.

Module 5

Innovative and sustainable Architectural detailing as decided by the faculty

NOTE

Frequent site visits to be arranged as a part of the curriculum and contact hours. Site visits should be in line with the studio work. It is mandatory for students to submit a site observation report, either periodically or at the end of the semester.

Reference

1. Barry, R. (1999). The Construction of Buildings Vol. 1 - 5. 5th Ed. New Delhi : East-West Press.
2. McKay, W. B. (2005). Building Construction Metric Vol. 1–IV, 4th Ed. Mumbai :Orient Longman.
3. Allen, E. and Rand, P., Architectural Detailing.
4. Emmitt, S., Principles of Architectural Detailing.
5. Joe, B. (Ed). (2002). Details in Architecture: Vol. I-V. Victoria : The Images Publishing group.

6. Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). The professional practice ofarchitectural working drawings. 4th Ed. Hoboken : John Wiley & Sons.
7. Rangwala, S. (2004). Building Construction. 22nd Ed. Anand.: Charotar Pub. House.

15AR772	Research Methods and Seminar	HR 1-0-3	CR-2

Objective

- The subject exposes the students to a general understanding of research and different research methodologies
- To emphasize on the development of critical and technical writing and composing skills by inculcating an attitude towards analytical reading.
- It is a seminar-type course where the focus is on library research, regular presentation of students' work and group discussions.

INTENT

- It is expected that the students will acquire, skills to do research, understanding about different research methodologies.
- Research Methodology- methods of data collections (literature review, physical and social surveys), its tools and analysis techniques, referencing & citation etc.
- This course will also help students to understand how research projects/topics can be converted to design projects/ proposals and writing research paper.

The seminar would lead to bringing out research paper of a subject of theoretical/ philosophy / current issues related to any aspect of Architecture, Urban design, Landscape Architecture, Sustainable Architecture, Architectural Conservation.

- The paper word count can range from 3000 to 5000 words.
- Individual guidance can be provided by respective subject experts within the faculty of the institution.
- Submission of report containing aim, design objectives, literature review, preliminary case studies analysis, findings, suggestions and conclusions.
- The course is to progress by delivering regular presentations and preliminary submissions of writings on the seminar topic by the students.

Reference

1. Sanoff, H. (1991). Visual Research Methods in Design. New York : John Wiley & Sons.
2. Kothari, C.R. and Garg, G., Research Methodology: Methods and Techniques, New Age International Publishers.
3. Anderson, J. and Poole, M. (1998). Thesis and assignment writing. Brisbane : John Wiley.
4. Borden, I. and Ray, K. R. (2006). The dissertation: an architecture student's handbook. 2nd Ed.Oxford : Architectural Press.
5. Fink, A. (1998). Conducting research literature reviews: from paper to the Internet. ThousandOaks : Sage.
6. Murray, R. (2005). Writing for academic journals. Berkshire:Maidenhead, Open University Press.

SEMESTER VIII

THEORY

15AR813	Construction Project Management	HR 3-0-0	CR-3

Objective

To equip students with a practical approach to implement building projects, basicknowledge about construction industry, project management techniques needed for managing andcoordinating building projects in a professional manner.

Module 1

INTODUCTION

Introduction to Construction Industry-Significance, objectives and functions, stakeholders, roles, responsibilities and functional relationships;
Construction projects – objectives and lifecycle, existing construction practices & project management systems;Project scale.
Project Team, organization, roles, responsibilities, Management Ethics (human aspects)in construction projects, Labour welfare, applicable labour legislations.

Module 2

PROJECT PLANNING

Concepts of project planning, scheduling & controlling.
Management Techniques-Planning for Construction Projects: Principles, objectives, advantages of planning, stages of planning;
Scheduling: Definition, advantages, methods of scheduling: Bar chart, Milestone chart;
Controlling, Work Break-down Structure (WBS)

Module 3

PROJECT SCHEDULING AND RESOURCES MANAGEMENT

Project Management through Networks-Introduction, objectives, advantages, terms and definitions, types of networks, rules for drawing a network;
Introduction to PERT, CPM, difference between PERT and CPM, Network analysis – forward and backward passes, finding critical path;
Methods of material/resource management- Project time reduction and optimization, resource levelling & resource allocation.

Module 4

PROJECT MONITORING AND CONTROL

Construction equipment types, characteristics & applications, Quality tests for construction material and processes, Quality control inspections.
Siteorganization, Project progress tracking.
Finance and Risk management - Financial analysis of projects, Project direct and indirect costs.Crashing Project Schedules, its impact on time, cost and quality. Safety in Construction Projects.

Reference

1. Punmia, B. C., and Khandelwal, K. K. (2006). Project planning and control with PERT and CPM.New Delhi: Laxmi Publications.
2. Wiest, J. D., and Levy, F. K. (1982). A Management Guide to PERT/CPM. New Delhi: PrenticeHall of India.
3. Chandra, P., Projects:Planning, Analysis, Selection, Financing, Implementation and Review, McGraw Hill Education (India) Private Limited.
4. Mukhopadyay,S.P.,(1974), Project Management for Architect" s and Civil Engineers, IIT, Kharagpur.
5. Callahan, M. T., Quackenbush, D. G., & Rowings, J. E. (1992). Construction Project Scheduling.McGraw-Hill.
6. Chitkara, K. K. (2004). Construction Project Management: Planning,Scheduling andControlling. Tata McGraw–Hill Education.
7. O'Brien, J. J., and Plotnick, F. L. (2009). CPM in Construction Management. McGraw-HillProfessional.
8. National building code of India, Indian standard institution, New-Delhi, 1970

15AR824	Disaster Resilient Architecture	HR 3-0-1	CR-4

Objectives

The course is framed to provide an overview of the occurrence, causes and consequences of disaster and understanding of fundamental concepts and application of disaster resilient design. It introduces formulation of management plan and disaster mitigation strategies

Module-1

INTRODUCTION

Overview of disaster, major natural disasters - flood, tropical cyclone, droughts, landslides, heat waves, earthquakes, fire hazards etc; Hazard (earthquake and cyclone) map of the world and India

Module 2

DESIGN FOR CYCLONE

Climate change and its impact on tropical cyclone; Nature of cyclonic wind; Behaviour of structures in past cyclones and wind storms, case studies.
Cyclonic retrofitting - strengthening of structures and adaptive sustainable reconstruction; Life–line structures such as temporary cyclone shelter.
General planning/design considerations, Norms and Standards for wind storms & cyclones; Coastal zoning regulation for construction & reconstruction phase in the coastal areas; innovativeconstruction materials& techniques; traditional construction techniques in coastal areas.

Module 3

DESIGN FOR EARTHQUAKE

Causes of earthquake; Past effects of earthquake on ground and building - Behaviour of various types of buildings, structures, and collapse patterns;
Seismic retrofitting - Weakness in existing buildings, concepts in repair, restoration and seismic strengthening.
General Planning and design consideration, Norms and Standards; Various types and construction details - Foundations, retaining walls, plinth fill, flooring, walls, openings, roofs and boundary walls. Innovative construction materials and techniques, traditional regional practices

Module 4

DISASTER MANAGEMENT

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

Module 5

Exercises on design and construction techniques for disaster resilient buildings

Reference

1. *Aga Khan Award for Architecture. Ed. Shelter. (1996). The Access to Hope. AKDN, Istanbul and Geneva.*
2. *Agarwal, P. and Shrikhande, M. (2009). Earthquake Resistant Design of Structures. New Delhi: PHI Learning.*
3. *Singh, P. P. and Sharma, S. (2006). Modern dictionary of natural disaster. Deep &Deep Publications.*
4. *Simiu E. and Scanlan R. H. (1996). Wind Effects on Structures-Fundamentals and Applications to Design. 3rd Edn., John Wiley.*
5. *Sinha, P. C. (2006). Disaster Mitigation, preparedness, recovery and Response. New Delhi : SBS Publishers.*
6. *Talwar, A. K. and Juneja, S. (2009). Cyclone Disaster Management. Commonwealth Publishers.*
7. *Taranath, B. S. (2004). Wind and Earthquake Resistant Buildings: Structural Analysis and Design. CRC Press.*
8. *U.N.D.P. (2004). Reducing Disaster Risk: A Challenge for Development. New York : UNDP.*
9. *World Bank. (2009). Handbook for Reconstructing after Natural Disasters.*
10. *Seismic Design hand book for Buildings*
11. *Earth quake Architecture: New construction techniques for quake disaster Prevention.*

15EAR833	Elective-II (i) Energy efficient Design and Green Architecture	HR 3-0-0	CR-3

Module 1

SUSTAINABLE PRINCIPLES AND PRACTICES

Introduction to the ideas, issues and concepts of sustainable development; principles of environmentally and ecologically sensitive architecture;Importance of water, energy, materials and community in architecture for sustainable development;Brief introduction to green rating systems and criteria for evaluation of different categories of built development **-** IGBC, GRIHA and LEED rating systems.

Module 2

GREEN BUILDING DESIGN

Sustainable site planning and landscape design; Building form and orientation for sun and Wind; Building envelope design- Fenestration design, shading devices, facade treatment, efficient use of daylighting; Integrated Use of Landscape: Vertical Landscape, Green Wall, Green Roof

Module 3

SOLAR PASSIVE TECHNIQUES

Passive Heating techniques : General principles – Direct gain systems - Glazed walls, Bay windows, Attached sun spaces etc. Indirect gain systems – Trombe wall and Solar Chimney
Passive Cooling techniques : General principles – Evaporative cooling, Nocturnal radiation cooling, Passive Desiccant cooling, induced ventilation, earth sheltering, Wind Towers, Earth-Air tunnels, Air Vents.
Case studies on buildings designed with passive heating and cooling techniques.

Module 4

GREEN PRACTICES AND TECHNOLOGIES

Energy utilization in buildings, Renewable and Non-Renewable energy sources. Integration of non-conventional energy systems from renewable source of energy-solar (photo voltaic), wind andbiomass
Water conservation practices- Rainwater Harvesting systems; Recycling of waste water: Physical, Chemical and Biological treatment methods, Rootzone treatment, Use of recycled water.
Environment friendly materials (paints, light sensitive glass, etc), Embodied energy of materials, Bio-degradable materials, Recycling andReuse of materials.

Module 5

Introduction to building performance simulation software (as decided by the faculty)
Example- Ecotect, IES (Integrated Environmental solutions), Radiance.

Reference

1. Sustainable design manual, Vols. 1& 2, The energy and resource institute, New Delhi.
2. Krishan, A. and Nick Baker, Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings, McGraw Hill Education Private Limited, India, 2001.
3. Energy Conservation Building Code (ECBC), USAID-INDIA.
4. Szokolay, S.V., Introduction to Architectural Science - The Basis of Sustainable Design, Architectural Press.
5. Ralph Lebens M., Passive Solar Architecture in Europe – 2, Architecture Press, London 1983.
6. Mendler S.& Odell W., The Guide Book Of Sustainable Design, John Wiley & Sons, 2000.
7. Lawson B., Bulding Materials, Energy And The Environment; Towards Ecologically Sustainable Development Raia, Act, 1996.

15EAR833	Elective-II (ii) Modular Coordination and Prefabrication	HR 3-0-0	CR-3

Objective

The course aims to focus on the study of basics of modular coordination andapplications of pre-fabrication systems in buildings primarily in Indian context.

Module 1

INTRODUCTION

Introduction to conventional modular principles and practices in the West in different period, Post Industrial modular construction of large span & suspension structures in steel and concrete, Introduction to system building, mechanization of production of system.

Module 2

PRINCIPLES OF MODULAR SYSTEMS

Means and methods of various structural systems(Form - active systems like cables and arches; surface active systems like folded plates, vector- active like trusses, bulk active like trabeated members and complex structures).
Modular number pattern introduction, basic modular component and concepts of modular planning,advanced and contemporary themes of modular principles- new theories of pattern, space systems and group organisation and centring processes.

Module 3

PREFABRICATION SYSTEMS

Modular systems for building components – Classification of prefabrication systems (Example-developed by CBRI Roorkee,skeletal system, Brick panel system,R.C.Planks,non-structural elements);off-site andon-site prefabrication elements and construction joints.
Manufacturing of building components – Technology requirements for industrial building system Equipments used – manufacturing processes – transportation of components – assembly and finishing – structural aspect

Module 4

APPLICATION OF MODULAR SYSTEMS

Prefabrication - Advantages, limitations and relevance in Indian context; Feasibility of using industrial building system in Residential and Non-Residential buildings, social and economic issues related to industrial building system.
Development of planning Module and structural Modules for various types of buildings in India (Application of dimensional and functional coordination of modular systems in modern buildings), use of Industrial building system as an option for disaster mitigation. (Examples - Hindustan housing factory.Tapsia system and other such contemporary systems in India).

Module 5

Case studies and construction site visits as decided by the faculty.

References

1. Industrial Building and Modular Design Henrik Missen – C & CK, UK 1972.
2. Albert G.H.Dietz, Laurence Secotter – "Industrialized Building Systems for Housing" – MIT, special summer session, 1970 USA.
3. Industrialized Building Construction – Proceedings of National Seminar, Nov-17- 18, 2000, Indian Concrete Institute, Mumbai.
4. Innovative Construction Materials – Proceedings of Seminar, Jan 20-21,2001, Veermata Jeejabai Technical Institute, Mumbai.
5. R.M.E Diamant, Industrialized buildings, 1968.
6. Building Digest notes of CBRI, Roorkee
7. R.Nagarajan, Standards in building, Pitman Publishing, 1976
8. Le Corbusier, Le Modular-1&2
9. Garry Stevens, Reasoning Architect: Mathematics and Science in Design, McGraw-Hill Education, 1990.

15EAR833	Elective-II (iii) Industrial Architecture	HR 3-0-0	CR-3

Objectives

The course aims to focus on the study of design considerations, environmental factors, structural considerations and safety controls for industrial buildings. To make the students aware of the requirement of adaptability and flexibility in design to accommodate new technology and changes necessary in industrial development.

Module1

INTRODUCTION TO INDUSTRIAL ARCHITECTURE

Historic development of industrial architecture; Role of architects in the design of modern industrial buildings; Basic knowledge of types and categories of industries;Considerations for development of master plan for industrial areas and site selection; Design criteria for site layout,loading and unloading area.

Module 2

DESIGN CONSIDERATIONS

Design consideration in development of industrial buildings - flexibility, adaptability, structural selection. Integration of structure and services, roof lighting, internal circulation and material handling; Alternative technologies and materials for industrial use.

Module 3

ENVIRONMENTAL CONSIDERATIONS

Working environment for industrial workers which will contribute to comfort and productivity by considering - work space and ergonomic, use of colour, lighting design, noise and vibration, thermal comfort conditions, ventilation, building fabric, Visual environment and landscaping. Safety, security and warning control.

Consideration of other facilities like: rest room, locker room, sanitary, changing room, cafeteria, recreational etc. Health, welfare and child care in industrial premises.

Module 4

STRUCTURE

Large Span Construction-flat slabs-shell structures, folded plates, portal frames, space frame & trusses, tensile structures.

Pre-fabricated construction & Pre-engineered building; New Material in Construction, Cold form sections.

Module 5

Case studies as decided by the faculty

References

1. Adam, J., Hausmann, K., and Juttner, F., A Design Manual- Industrial Buildings
2. Blum, M.L., and Naylor, J.C., Industrial Psychology, CBS, Delhi
3. Philips, A., The Best in Industrial Architecture
4. Sinha, R.K., and Heart, S., Cleaner Production-Greening of Industries for Sustainable Development.
5. Drury, J., Factories- Planning, Design and Modernization.

SESSIONALS/PRACTICAL

15AR846	Architectural Design -VI	HR 0-0-9	CR-6

Objective

The design studio aims to enable students to understand spaces and activities in urban spaces in the public domain, where students will be exposed to complexities of understanding architectural intervention in a larger scale. Secondly, to equip the students to developarchitectural design by contextualising and harmonizing with the built fabric and the urban environment.

1. MAJOR DESIGN PROBLEM

Designing in urban context/Designing for Public Spaces

INTENT

To facilitate understanding and conceptualising design in spaces involving group of buildings in a public realm and having multiple stakeholders. To study all aspects of external environment, understand theinterface between public and private realm and explore the multitude of activities and the spaces they define in the urban environment.These observations are expected to be applied to design interventions within the context of the given urban setting.

The students are expected to carry out field study, documentation of the built fabric and area analysis of a given area within a city. The study is required to consider its context, physical features, views, orientation, volumetric analysis and figure ground characteristics, visual imageries, streetscape and skyline analysis, pedestrian and vehicular circulation pattern, and utility networks.

To understand the relationship among, physical, socio-cultural, environmental and socioeconomicdimensions of the built environments, so as to identify opportunities and constrainsassociated with large-scale urban interventions. Students are then expected to apply thisunderstanding to create physical environments through movement networks, open spaces, suggestive builtform, infrastructure network in compliancewith planning norms.

FOCUS AREAS

- Density and Land use optimization
- Contextualisation of architectural intervention
- Vehicular and pedestrian movement
- Urban aesthetics
- Socio-economic and cultural characteristics

ALLIED KNOWLEDGE REQUIRED

- Urban planning and urban design principles
- City level services
- Social anthropology
- Sustainable development

EXAMPLES OF STUDIO PROJECTS

Transportation nodes like bus terminus and railway stations, water front developments, development in heritage zones/context of urban conservation, city centre, administrative and legislative areas, streetscape, urban markets, etc.

Reference

1. Carmona, M., Heath, T., Oc, T. and Tiesdell, S. (2010). Public Places Urban Spaces. Oxford: Architectural Press.
2. Lang, J. T. (2005). Urban Design: A Typology of Procedures and Products. Oxford: Elsevier/Architectural Press.
3. Lynch, K. (1984). Good city form. Boston : MIT Press.
4. Marshall, S. (2009). Cities design and evolution. New York : Routledge.
5. Moughtin, C., Cuesta, R., Sarris, C. And Signoretta, P. (2003). Urban Design - Methods andTechniques. Oxford : Architectural Press.
6. Watson, D., Plattus, A. and Shibley, R. (2003). Time-Saver standards for urban design. New York : McGraw Hill.
7. Whyte, W. H. (1980). The social life of small urban spaces. Washington D.C : Conservation Foundation.

15AR854	Research and Design	HR 1-0-5	CR-4

Objective

This studio aims to inculcate amongst the students the research methods for exploring into different aspects of built environment, from architectural elements to spatial environment. Their characteristics are to be studied in view of their creation being the outcome of a phenomena occurred in past or present, and their social, cultural and environmental impactwhile considering people in interface with their built habitats.

PROCESS

1. Choosing an area for investigation
2. Identifying the elements of research
3. Studying the phenomenon in live cases through personal visits
4. Drawing inferences about the cause-effect of the phenomenon
5. Different field observation techniques

ALLIED KNOWLEDGE REQUIRED

- Architectural research methodology
- Environment behaviour

EXAMPLES OF TOPICS

1. **Role of steps leading to temples***(type as decided by the student in consultation with guide)* **upon the psychology of users (it can be universal or specific to vendors or pilgrims)-***(type as decided by the student in consultation with guide)*
2. **Role of openings and voids in buildings(single or more/of any type)** *(type as decided by the student in consultation with guide)***in connecting the internal spaces with the outdoor setting***(type as decided by the student in consultation with guide*
3. **Role of landscape in reducing noises at city/building level***(type as decided by the student in consultation with guide.*
4. **Geometry of spaces:** Interpretation, development and functionality of various patterns of spaces
5. **Understanding usage and effect of Colour and Texture in different context.**

15AR862	Pre-thesis Seminar	HR 0-0-3	CR-2

The Pre-Thesis Research shall be a research paper of 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.

This course is a mandatory prerequisite to do the Design Thesis. The selected topic of each student shall be considered as the first module of the Design Thesis where the students will finalise their broad area of interest for design thesis and the subsequent research will act as the primary literature review for the design thesis.

Individual guidance can be provided by respective subject experts within the faculty of the institution, in special cases outside subject experts may be invited for guest lectures. By the end of the semester along with the research paper the students are required to prepare their preliminary proposal for the design thesis, further, more specific research and case studies can be done on their respective topics during the professional training semester.

Broad Course Structure

1. Introduction, overview of subject, Research Methodology, critical reading, writing,referencing etc.
2. Lectures/ seminars to clarify/discuss common mistakes/doubts among the students, and todiscuss the common topics students would be dealing with.
3. Research Proposal, including the Research Problem, Background, Aim, Objectives and Research questions, Panel reviewto finalise the research topics.
4. Critical Reading/ Literature Review, continuous assessment and assignments.
5. Writing, Referencing and Citations with review ofstagewise submissions.
6. Submission of a final paper.

7. DETAILED SYLLABUS OF 5 YEAR B.ARCH PROGRAMME - 5th year

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SEMESTER IX

This semester would comprise compulsory practical professional training for the entire academic session of the IX semester.

15AR914 | Office Training | CR-4

Students are required to be involved in all aspects of office works-conceptual design; presentation drawings and detail working drawings; 3 D modelling; estimation and specification of small buildings; interaction with clients, structural consultant and other building services consultants.

15AR92 | Site SupervisionWork | CR-2

The aim of this training is to give exposure to the students on different stages of construction on the site and to learn how drawings are executed at the construction site. The student is required to prepare and submit a report comprising a set of working drawings, sketches, photographs etc. to supplement his/her observation.

15AR93 | Critical Appraisal of Buildings | CR-2

OBJECTIVE: An exercise in critical observation of an existing project.

A student may select any small project and trace down its development from early conceptual design stage to procedure adopted in decision making at inception level to series of changes in the process of approval with due consideration to constraints such as financial, human and building bye-laws. Design changes during the execution and changes done by the client after occupation also need to be identified along with reasonsthereof. Users" reaction on different physical planning aspects also need to be critically evaluated with respect to theirperformance, usefulness etc.

The study is to be presented in the form of a report comprising series of sketches, photographs supported by brief analysis and observation etc.

15AR94 | Documentation of Architectural Details | CR-2

Documentation of at least 20 details of innovative construction practices from personal observation, office record or field studies. These may include historical as well as contemporary details. The selection of details should be based on their special nature due to a practical need/situation.

SEMESTER X
THEORY

15AR013	Professional Practice	HRS 3-0-0	CR-3

Objectives

To enable the students to 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 ph & 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.

Module 1

PRACTICING ARCHITECTURE

Introduction to Architects duties and liabilities, salient features of **architect's act 1972**, the council of architecture

Understanding office management and project awarding; organization structure, responsibility towards employees, consultants & associates; maintenance of accounts; filing of records; balance sheet, Income tax; Service tax; Professional tax.

Various architectural services, additional services and scale of professional fees.

Building regulations related to submission of approval drawings to concerned public bodies.

Module 2

ARCHITECTURAL COMPETITIONS & LEGISLATIONS

Regulations governing the conduct of competitions, open & closed competitions

Role of development authorities & urban arts commissions, Environmental acts & laws, special rules governing hill area development & coastal area management, heritage act of India etc.

Pre-requisite for Indians to work in other countries & vice versa, emerging trends in architectural collaborations.

Module 3

TENDER & CONTRACT

Types of tenders, invitation of tender and conditions of tender documents, submission, scrutiny, recommendations & award of contract.

Definitions and general principles of Indian Contract Act and building, contract documents, conditions of contract, Execution of contract, various certifications, defects liability.

Module 4

ARBITRATION

Need for Arbitration, Principles of Indian Arbitration Act-1974, role of arbitrators, umpire etc, excepted matters, arbitral award. Municipal Acts, Fire prevention, safety and security measures in buildings.

References

1.COA. (1989). Architects (Professional conduct) Regulations, Architectural Competition guidelines. Council of Architecture Publications.

2. COA. (2005). Handbook of Professional Documents. Council of Architecture.

3. R H..Namavati, Professional practice, 7th ed,lakshmi book depot, mumbai,1997.

4. Environmental Acts of the Ministry of Environment & forests, Govt. of India

5. Architects Practice, J.J.Scott.

6. Handbook of Professional Practice, Madhav Deobhakta.

15EAR023	Elective -III (i) Building Repair and Restoration	HR 3-0-0	CR-3

Objective

Building construction industry is energy intensive and therefore knowledge of maintenance, restoration and retrofitting of buildings are important in the context of sustainable development. Need for building repair and maintenance, cause and effect of building deterioration and defects, and material, methods and techniques of maintenance, repair and restoration are covered in the course.

Module 1

ENVIRONMENTAL IMPACT ON BUILDINGS

Life expectancy of different types of buildings – influence of environmental elements such as heat, moisture, precipitation and frost on buildings- Effect of biological agents like fungus, moss, plants, trees, algae, - termite control and prevention - chemical attack on building materials and components- - Impact of pollution on buildings.

Module 2

DEFECTS AND STRENGTHENING METHODS

Common defects in buildings; Building failures- Causes and effects; Cracks in buildings: types, classification, investigation;

Measures to prevent and control common defects in building; Maintenance philosophy, phases of maintenance: routine preventive and curative maintenance; Fundamental Strengthening measure: beam strengthening, column strengthening, shoring, under pinning and jacketing.

Module 3

MATERIALS FOR REPAIR

Materials for repair: special mortar and concrete, chemicals, special cements and high grade concrete, admixtures of latest origin; Techniques for repair; Surface repair: material selection, surface preparation, rust eliminators and polymers coating; Repair of cracks in concrete and masonry: methods of repair, epoxy injection, mortar repair for cracks: guniting and shotcreting; Waterproofing of concrete roofs.

Module 4

RESTORATION

Introduction to conservation - Materials and methods for conservation and restoration work (with specific case studies) - Adaptive reuse of buildings and its advantages - Retrofitting (case studies), Recycling of building components and materials (case studies).

References

1. Chandler, Ian (1992). ' Repair and Renovation of Modern Buildings', Mcgraw-Hill
2. Nayak, B. S. (2013). ' A Manual of Maintenance Engineering', Khanna Publishers, India
3. Guha, P.K. 'Maintenance and Repairs of Buildings' New Central Book Agency, India.
4. Danish Standards Association, (2004).'Repair of Concrete Structure to En 1504: A guide for renovation of concrete structures repair materials and systems according to the EN 1504 series', Elsevier, Boston
5. Roger, G. and Hall, F. (2013). 'Building Services Handbook', Routledge, UK.

15EAR023	Elective -III (ii)Real Estate Management	HR 3-0-0	CR-3

Objective

To acquaint the students with the issues, regulations and functioning of Real of Estate market, economic concepts, land acquisition, legal matters concerning land and property. To make the students aware about different concepts of real estate development in Indian context.

Module1

Type of land and property; Land use planning& Urban Land Management; Land as a resource of Urban Development (supply and demand of land); Basic components of Urban Land Policy; Land assembly; Land Pooling techniques; Land Holding (Free Hold and Lease Hold).

Module 2

Land and Building related regulations; Building Bye-laws, Real Estate laws; Apartments" Act, Land registration and Society Registration Act.

Module 3

Comparision of Housing policies and Real Estate development in India; Master Plan guidelines in relation to real estate growth; Real Estate management concepts.

Module 4

Concepts of mixed use development;condominium; Gated Community and serviced apartments.

Module 5

Case studies as suggested by the faculty

References

1. Gelbtuch, H.C., Mackmin, D. and Milgrim, M.R., Real Estate Valuation in Global Markets, Amazon Books
2. Rangwal, S. C., Valuation of Real Properties, Charotar Publishing House, 2003
3. Chapin, S., and Keeble, L., Urban Land Use Planning
4. Urban Development management-I.T.P.I.Journal
5. Reading Material on Land Economics-I.T.P.I. Journal

15EAR023	Elective -III (iii) Urban Transportation Planning	HR 3-0-0	CR-3

Objective

The course imparts basic concepts and theories related to transportation planning and traffic engineering. To expose students to forecasting techniques that are relevant to transportation planning. To introduce students to geometric design of roads and environmental issues and policy related to transportation.

Module 1

INTRODUCTION TO TRANSPORTATION SYSTEMS

Transportation systems and modes; Demand and supply of transportation services; Physical structure of the city and transportation system.

Module 2

TRANSPORTATION PLANNING

Inter-relationship of land use and transportation; Transportation planning process; Systems approach to transport planning; Travel demand forecasting; Planning for public transport system, goods transportation.

Module 3

TRAFFIC STUDY AND DESIGN

Traffic flow characteristics; Transportation survey: Type of surveys, origin destination survey, Traffic analyses and design considerations; Design of intersections; Traffic signals and signs; Street design: street lighting, street furniture; street plantation; Parking: Parking problems, Parking space requirement standards.

Module 4

ENVIRONMENT AND POLICY ASPECT

Environmental impact of traffic; Energy issues in transportation, Transportation policies and safety standards.

Module 5

Study of different transportation proposals as suggested by the faculty.

References

1. Khisty, C. J. and Lal, B. K., Transportation Engineering: An Introduction.
2. Papacostas, C. S., Fundamentals of Transportation Engineering.
3. Bruton, M. J., Introduction to Transportation Planning.
4. Khanna, S. K., and Justo, C. E. G., Highway Engineering.

SESSIONALS/PRACTICAL

15AR0416	Architectural Thesis	HR 0-0-24	CR-16

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 semesters.

The topic should be related to the student's Pre-thesis Seminar topic. The particular of schedule, content presentation, format etc. as decided by the department, from 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 thesis report in the specified format and a model to the department after obtaining the approval of the respective guide / advisor.

The department shall schedule the final viva voce, which is to be conducted by external jurypanel after the Thesis submission.