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**THE COURSE STRUCTURE  
AND  
SYLLABUS FOR B. ARCH. DEGREE COURSE  
(EFFECTIVE FROM JULY 2005)**



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- Theory subject of one unit will be conducted in three classes per week.
- Sessional subject of one unit will be conducted in six classes per week.
- To register in seventh semester, students need to clear all subjects of previous semester i.e.; Stage I.

## 1<sup>st</sup> SEMESTER STRUCTURE

Subject Code	Subject	Unit
	<b>THEORY SUBJECTS</b>	
HU 1001	Technical English	1.0
MA 1005	Mathematics for Architects	1.0
Arc 1304	Principles of Architecture	1.0
Arc 1305	Building Materials and Specifications - I	1.0
	<b>SESSIONAL SUBJECTS</b>	
Arc 1306	Architectural Design – I	1.0
Arc 1207	Descriptive Geometry – I	1.0
Arc 1109	Construction Techniques & Model Making Workshop	0.5
CP 1201	Unix and C-Programming	1.0
Arc 1010	Sketching Workshop	0.5
NCC/ NSS/ CA/		0.5
<b>TOTAL UNITS</b>		<b>8.5</b>

## **T**HEORY SUBJECTS

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### **FIRST SEMESTER**

**HU.1001**

**Technical English**

**Unit: 1.0**

Module 1. Single word substitution, Idioms and phrases, Pairs of words, Common errors, Précis, Comprehension, Expansion.

Module 2. Official Correspondence-Memorandum, Notice, Agenda, Minutes, Circular letter, applying for a job, Resume, Demo-official letter.

Module 3. Business Correspondence-Types, sales letters; Social Correspondence- Invitation to speak, Congratulations; etc.

Module 4. Report writing; general and technical report, Definition, Types, structure.

Module 5. Technical proposals, Definitions, types and format.

Module 6. Research papers and articles.

Module 7. Mechanics of manuscript preparation.

Recommended Books:

1. Dictionary of Pronunciations.
2. Daniel Jones; *Phonetics (symbols and transcription)*

## **T**HEORY SUBJECTS

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### **FIRST SEMESTER**

**MA.1005**

**Mathematics for Architects**

**Unit: 1.0**

Module 1. **Matrix:** Adjoin Transpose and Inverse of Matrices, Orthogonal matrix, Rank of Matrix, Consistency and Inconsistency of a linear Equation. Eigen Value and Eigen Vector.

Module 2. **Statistics & Probability:** Measure of Central Tendency and Measure of Dispersion. Kurtosis, Curve fitting, Method of Least Squares (Straight Line and Parabola), Correlation and Regression.

Module 3. **Differential Calculus:** Successive differentiation, Leibnitz's Theorem, Tangent and Normal, Curvature (Cartesian and parametric forms only), Telor's and Mclaurin's expansion,.

Module 4. Indeterminate forms, Maxima, Minima for a function of one variable, Point of Inflexure, Concavity and Convexity.

Module 5. Partial differentiation, Euler's Theorem, Total Differential Coefficient, Change of variables.

Module 6. Telor's and Mclaurin's expansion for two variable, Maxima, Minima for a function of two variable.

Module 7. **Integral Calculus:** Reduction Formula, use of double and Triple integrals, Calculation of areas in simple cases without the use of multiple integral

#### Recommended Books

1. B. S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, Delhi, 1998.
2. P. Kandasamy, K. Thilagavathy and K. Gunavathy, *Engineering Mathematics* Vol – I & II, S.Chandan Publishers – 1998.

# THEORY SUBJECTS

## FIRST SEMESTER

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**Arc. 1305                                      Building Materials and Specifications – I                                      Unit:1.0**

- Module 1.    **BRICK:** Types of bricks according to their composition, classification of bricks, tests for bricks. Introduction of brickworks and writing their specifications.
- Module 2.    **STONES:** Classification of stones. Common building stones used in India. Characteristics and use of stones. Dressing of stone. Artificial stones. Introduction of Stoneworks and writing their specifications.
- Module 3.    **CLAY PRODUCTS AND MUD:** Tiles, their properties and use - terra-cotta, earthenware, stoneware, porcelain, vitreous. Mud – its stabilization and uses. Writing specifications for various types of tiling work.
- Module 4.    **TIMBER:** Structure, defects in timber, decay of timber, qualities of timber for construction. Seasoning, storage and preservation of timber. Industrial timber: veneers, plywood, fibreboard, etc. Writing specifications for woodwork and industrial timber for use in buildings.
- Module 5.    **LIME:** Classification of lime. Fat and hydraulic lime – properties and use. Writing specifications for lime punning and lime wash.  
**SAND:** Sources of sand, classification, tests for sand. Grades of sand and their uses in mortar and concrete.
- Module 6.    **CEMENT:** Composition of ordinary cement. Function of cement ingredients. Properties of cement – soundness, setting time, strength etc. Grades of cement and different types of cement along with use in construction. Cement packing (including their volume & weight). Writing specifications for storage of cement in site.
- Module 7.    **MORTAR:** Types of mortar – lime mortar, mud mortar, lime-surkhi mortar, cement mortar. Different grades of mortar, their compositions and properties. Writing specifications for preparation of cement mortar. Use and selection of mortar for different construction work.

### Recommended Books

1.        B. C. Punmia; *Building Materials and Construction*.
2.        Bindra & Arora; *Building Materials and Construction*.
3.        W.B. McKay, 'Building Construction', Vol. 1,2,3 Longmans, U.K. 1981.

# THEORY SUBJECTS

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## FIRST SEMESTER

**Arc.1304**

**Principles of Architecture**

**Unit:1.0**

Module 1. Design Process.

Two dimensional design: Points, lines, Plane, volume, direction, shape, size, colour, texture etc.

Module 2. Three dimensional designs: Profiles of various elementary geometric forms such as cube, pyramid, cone etc. and their arrangement in different compositions.

Module 3. Scale and proportion in architecture.

Module 4. Interplay of light and shade in building blocks, their effect on facades in terms of projections, mouldings, etc.

Style, rhythm, balance, unity, duality, monotony etc.

Harmony and contrast in design (e.g. in 2-D & 3 D).

Module 5. Form, function and order in architecture

Module 6. Judicious use of building materials, construction techniques, and mechanical services, in architecture, for different functioning.

Module 7. The module and its application to architectural design: Le Modular, golden section.

### Recommended Books

1. Francis D.K. Ching; – Architecture – *Form Space and Order* ;Van Nostrand Reinhold Co., (Canaa), 1979.
2. Gideon. S; *Space, time and Architecture*.
3. James C. Snyder, Anthony. J Catanese, *Introduction to Architecture*, Mc. Graw Hill.

## SESSIONAL SUBJECTS

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### FIRST SEMESTER

**Arc. 1306**

**Architectural Design – I**

**Unit: 1.0**

1. Process of Architectural Design and its pre-requisites.
2. By Graphical methods, comparison of designed and non-designed objects, appreciation of design criteria.
3. Exercises to understand the visual properties of two dimensional forms of both geometric and non-geometric surfaces.
4. Exercises to demonstrate graphically what is point, line, size, form, proportions, Rhythm, harmony, composition, unity, shape and texture.
5. Studies of sciography with exercises of Block Model, principles of three-dimensional composition.
6. Library studies of various design projects and preparation of portfolio of library studies.

#### Recommended Books

1. Pickering, Ernest; *Architectural Design*, John Wiley and Sons Inc., Canada, 1949.
2. Francis D.K. Ching; – *Architecture – Form Space and Order* ;Van Nostrand Reinhold Co., (Canaa), 1979.
3. V.S. Pramar, *Design fundamentals in Architecture*, Somaiya Publications Pvt. Ltd., New Delhi – 1973.

All Books, journals and magazines on Architecture.



**Arc. 1207****Descriptive Geometry-I****Unit: 1.0**

Free hand drawing and lettering for titles, line work with the use of drawing instruments. Techniques of drawing lines of various gradation and inclination. Measurements, divisions, and construction of simple geometric figures. (Ellipses, polygons, volutes etc.).

Measurement, divisions and building up of simple 3-D forms (cones, cylinders etc.). scale drawing of simple shapes describing plan, section and elevation. Reduction and enlargement of drawings on different scales, Projection of planes, Projection of solids, Analysis of forms such as cylinders, vaults etc. at different intersections. Study of interpenetrated solids to include representation of such groups in these projections.

Study of development of surfaces, drawing of unfolded surfaces of 3-D objects.

Recommended Books:

1. B. Gupta; *A Text Book of Engineering Drawing*
2. N.D. Bhatt; *Engineering Drawing*.
3. Hiram. E. Grant; *Engg Drawing*, , *Mc. Graw Hill Book Company*.
4. Sherley W, MORGAN; *Architectural Drawing*, *Mc Graw Hill*
5. Arthur L. Guptill, Watson ; *Rendering in Pen and Ink*, – *Guptill Publications, New York*.

## SESSIONAL SUBJECTS

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### FIRST SEMESTER

#### **Arc. 1109      Construction Techniques and Model Making Workshop                      Unit:0.5**

1.      Laying of Brick courses & various bonds of brick courses with & without mortar.
2.      Mortar mixing & Mortar preparations of cement mortar for masonry and for plaster.
3.      Lime burning and preparation of lime mortar for masonry & lime plaster.
4.      Architectural Model Making with different materials such as card board, ivory sheets, plastic & Acrylic sheets, glass, timber & plywood.
5.      Collection and study of various building materials.

Study of development of surfaces, drawing of unfolded surfaces of 3-D objects.

#### Recommended Books:

1.      B.C. Punmia, '*Strength of Materials and Theory of Structures, Vol. I*, Laxmi publications, New Delhi 1994.
2.      Bindra & Arora; *Building Materials and Construction*.
3.      John W. Mills ;*The Technique of Sculpture*, B.T. Batsford Limited, New York – Reinhold Publishing Corporation, London, 1966.

## **SESSIONAL SUBJECTS**

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### ***FIRST SEMESTER***

**Arc.1010**

### **Sketching Workshop**

**Unit: 0.5**

The Sketching workshop will be run by the Teachers teaching Basic Design aspects. The themes of the sketches would be given to students to make at least ten sketches of each theme:

- Human figures / Postures
- Furniture
- Street Furniture / Outdoor sculpture
- Objects: Pen, Television, Flower pot, Tea-pot, Cups etc.
- Natural Sceneries and elements of nature
- Enclosed Spaces in courtyards, Plazas, Chowks
- Vistas, skyline and avenues
- Buildings
- Public places: Market squares, Street Hawkers, Canteen & Restaurant.
- Materials of building exterior and interior

Total 100 sketches should be submitted by the students at the end of session in sketch books of minimum A4 size.

## 2<sup>ND</sup> SEMESTER STRUCTURE

<b>Subject Code</b>	<b>Subject</b>	<b>Unit</b>
	<b>THEORY SUBJECTS</b>	
Arc 2302	History of Art & Culture	1.0
Arc 2012	History of Eastern Architecture: Hindu and Buddhist	1.0
Arc 2305	Building Materials and Specifications - II	1.0
Arc 2103	Statics & Strength of Materials	1.0
Arc 2013	Environmental Science	1.0
	<b>SESSIONAL SUBJECTS</b>	
Arc 2307	Architectural Design – II	1.0
Arc 2308	Building Construction – I	1.0
Arc 2014	Descriptive Geometry – II	1.0
NCC/ NSS/ CA		0.5
<b>Total Units</b>		<b>8.5</b>

# THEORY SUBJECTS

## SECOND SEMESTER

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Arc. 2302

History of Art & Culture

Unit 1.0

▪ **Pre-Buddhist Indian Art –**

Stone-Age Cave Paintings (Madhya Pradesh, Chhattisgarh, Jharkhand); Relief Art and Sculpture of Indus Valley Civilisation; Aryan Civilisation – Art and Architecture of Mansara;

▪ **Age of Buddhism –**

Mauryan Empire under Asoka - Stone Inscriptions, *Stambhs*; Cave Art of Ajanta & Ellora; Gandhara School of Art; Relief art on Stupas;

▪ **Relief, Mural and Sculptures of Central & Western Indian Temples –**

- Central India – Khajuraho Complex, Jhansi – Orchha, etc
- Western India- Gujarat - Modhera, Somnath, Rajasthan – Mount Abu, Osian.

▪ **Relief, Mural and Sculptures of Eastern & Southern Indian Temples –**

- a. Eastern India- Orissa – Bhubaneswar, Konarak, Puri, Bihar and Jharkhand, Bengal – Bishnupur, Telkupi, Barakar.

Southern India

- Karnataka – Hampi, Hospet, Bijaynagara, etc
- Tamilnadu – Maduari, Mahabalipuram, Rameshwaram, etc
- Kerala – Trivandrum, Trichur, etc

▪ **Palace Art in Hindu Kingdoms –**

Rajasthan, Central India (Gwalior, Jhansi, Orchha, Mandu, etc), Maharashtra (Fort Palaces), Kerala (Padmanabhapuram, etc), Tamilnadu (Madurai, etc)

▪ **Islamic Period –**

Delhi Sultanates, Bahamani and Ahmednagar in Southern India, Gujarat, Bengal, Mural and Relief work in Forts, Palaces and Tombs in Mughal Period, Karnataka (during Haider Ali & Tipu Sultan – Mysore & Srirangapattanam)

▪ **Parallel Art Forms:**

- a) Miniature Paintings
- b) Kangra Valley Paintings
- c) Other painting traditions of regional character
- d) Moulded Metal Sculptures – Bengal (including present day Jharkhand, Orissa, West Bengal), Madhyapradesh, Chhattisgarh, Tamilnadu, etc
- e) Art Forms in Weaving and Ornamentation – Northern India, North-Eastern India, Eastern India (including Bangladesh), Central and Western India, Southern India

Recommended Books:

1. Basham, A. L., *A Wonder that was India*. Rupa, N. Delhi.
2. Biswas, S.S., *Terracotta Art of Bengal*, New Delhi, 1981.
3. Huntington, Susan.L. *The Art of Ancient India: Buddhist, Hindu, Jain*. New York, Weatherhill, 1985.
4. Sir Banister Fletcher, *A History of Architecture*, University of London, the Antholone Press, 1986
5. Percy Brown, *Indian Architecture (Buddhist and Hindu Period)*, Taraporevala and sons, Bombay, 1983.
6. Satish Grover, *The Architecture of India (Buddhist and Hindu Period)*, Vikas Publishing Housing Pvt. Ltd. New Delhi, 1981.
7. A. Volwahren. *Living Architecture – India (Buddhist and Hindu)*, Oxford and IBM, London, 1969
8. Khare , Ajay, *Temple Architecture of Eastern India* , Shubhi Publications, New Delhi , 2005

# THEORY SUBJECTS

## SECOND SEMESTER

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**Arc. 2012      History of Eastern Architecture: Hindu and Buddhist      Unit:1.0**

Module 1. Indus valley civilization- the various towns , town planning principles, house construction , drainage systems; Vedic village settlement.

Module 2. Buddhist architecture – Evolution & golden age; Rock cut Architecture –Stupas , Chaitya , Vihara, Pillars, Ajanta, Ellora, Kailasanath, Rathas ,etc.

Module 3. Hindu Architecture – Development of temple from example like Ladh Khan Temple at Deogarh, Bhattargaon Temple, Mundeshwari Temple etc.

Module 4. North Indian Temple Architecture- Architecture style of Orissan temple with examples.

Module 5. Khajuraho group of temples & rajputana Temples at Gwalior and Vrindavan.

Module 6. Temple Architecture of Bihar and Bengal. Brick temples of eastern India.

Module 7. South –Indian Temple Architecture

Pallava style with example

Chola style with example

Pandyas style with example

Madura style with example

Vijayanagar style with example

Emphasis should be on use of the structural techniques, stones, fine arts, special features, use of landscape, water bodies, and construction method employed.

Student to practice sketches and make an album and get it evaluated regularly

### Recommended Books:

1. Brown, P. *Indian Architecture (Buddhist Hindu )* Vol. 1 Bombay 1942 & subsequent publications
2. Fergusson , J.A. *A history of Indian and Eastern architecture* , London 1876, revised 1891
3. Grover, S. *The Architecture of India, Buddhist & Hindu* , Sahibabad, 1980.
4. Michell,G, *The Hindu Temple* , London
5. Khare , Ajay, *Temple Architecture of Eastern India* , Shubhi Publications, New Delhi , 2005
6. Sterlin Henry , *Architecture of World , India*, Germany, ISBN-38228-9658-6.

# THEORY SUBJECTS

## SECOND SEMESTER

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Arc. 2305

### Building Materials and Specifications - II

Unit: 1.0

- Module 1. FERROUS METALS: Pig iron, cast iron, wrought iron – types, properties, steel – properties, types and uses of steel in construction, properties of mild steel and hard steel, defects in steel.  
NONFERROUS METALS AND ALLOYS: Aluminium, copper, lead, nickel, important alloys like brass, bronze, etc – brief description of uses. Corrosion of both ferrous and non-ferrous metals – types and preventive measures.
- Module 2. CONCRETE: Compositions and grades of concrete. Various steps in concrete construction – batching, mixing, transporting, compacting, curing, shuttering, jointing. Light weight concrete, ready-mix concrete, and precast concrete. Tests and quality control of concrete.
- Module 3. USE OF ADDITIVE AND MIXTURES IN CONCRETE: Water repellent, Waterproofing compounds, Accelerators, Air entraining agents. Hardeners, Workability increasing agent/plasticizer, Fly ash. Their availability and uses.
- Module 4. WRITING SPECIFICATIONS FOR CONCRETE WORK: Specifications for concrete floorings, e.g., IPS flooring, coloured IPS flooring, terrazzo flooring, precast terrazzo and concrete tiles. Specifications for structural concrete.
- Module 5. PAINTS, DISTEMPERS: Compositions of paints and their uses. Writing specifications for whitewashing, distempering, cement-based paints, oil emulsion paints, enamel paints. Uses of tar paints, aluminium paints.
- Module 6. LACQUERS, POLISHES AND VARNISHES: Writing specifications for lacquers, polishes and staining varnishes.
- Module 7. GLASS: Sheet glass, plate glass, float glass, wired glass, laminated glass, obscured glass coloured glass, heat absorbing glass, etched glass, stained glass, tinted glass, glass block - their sizes and uses. Glazing putty.

#### Recommended Books:

1. B. C. Punmia; *Building Materials and Construction* .Laxmi Publications Pvt Ltd, New Delhi,1993
2. Bindra & Arora; *Building Materials and Construction*.
3. W.B. Mckay, '*Building Construction*', Vol. 1,2,3 Longmans, U.K. 1981.
4. Arthur Lyons; *Materials for Architects and Builders- An Introduction*; Arnold, London 1997.

# THEORY SUBJECTS

## SECOND SEMESTER

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Arc. 2103

Statics and Strength of Materials

Unit:1.0

Module: 1

Principles of statics, co-planar and concurrent force systems, Free Body diagram, various force systems in a plane and conditions for equilibrium.

Module: 2

Analysis of simple plane truss using method of sections and method of joints. Graphical solutions for force analysis of Trusses. Equilibrium of Parabolic Cables.

Module: 3

Determination of centroid of plane, curve areas. Centroid and center of gravity of solid objects, Moment of Inertia of Plane figures, Polar moment of inertia, parallel axes theorem. Radius of Gyration.

Module: 4

Theory of Elasticity, Concept of stress and strain, normal and shear stress, Hook's Law Poisson's Ratio, Elastic properties of Materials and their relationships, stress-strain curve for structural steel and concrete. Fundamental difference between ductile and brittle materials.

Module: 5

Bi-Axial state of stress at a point, complementary shear Principal stresses, Graphical representation of stresses (Mohr's Circle). Two-dimensional state of strains at a point, principal strains, Strain Gauge.

Module: 6&7

Different types of Supports, redundancy and degree of freedom, Statically determinacy and indeterminacy of beams, Equilibrium of a beam, Beam supports reaction, Bending Moment and Shear Force Diagram of statically Determinate Structures. Cantilever and simply supported beams with concentrated distributed and moment loads. Relation between shear force and bending moment.

### Recommended Books:

1. Johnson & Beer ; '*Engineering Mechanics*'.
2. Merium & Kraig ; '*Engineering Mechanics*'.
3. Timoshenko, S.P., and D. H. Young, *Elements of Strength of Materials*, Fifth edition, East West Press, 1993.
4. S. Timoshenko: *Strength of Material*, Tata McGraw Hill, New Delhi.

### Reference Books:

1. I.B.Prasad ; '*Engineering Mechanics*' .
2. I.H.Shames ; '*Engineering Mechanics*'.
3. Rajashekharan ; '*Engineering Mechanics*'.
4. K.L.Kumar. ; '*Engineering Mechanics*'.
5. S.Ramamurtham, *Strength of Material*, Dhanpat Rai Publication
6. Srinath ; *Strength of material*.
7. B.C. Purmia, Laxmi Publication; *Strength of Material and Theory of Structures* (Vol-I).
8. Singer; *Strength of Material*.
9. R.K.Rajput; *Strength of Material*, S.Chand Publication



**Arc. 2013**

**Environmental Science**

**Unit: 1.0**

Module 1.

Fundamentals pertaining to ecology, ecosystem structure and function: flow of energy and matter in environment; environmental factors & process in the study of geological, hydrological and atmospheric systems.

Module 2.

Environmental pollution – its types, effects, sources and abatement.

Module 3.

Introduction to environmental economics - Economic and social cost of pollution; cost of pollution abatement; cost benefit analysis; environmental policy analysis.

Module 4.

Environmental design and planning - Green Architecture: Use of eco-friendly materials and methods of construction; design of water supply system, sanitation and solid waste disposal system; recycling and reuse. Concepts of Rain water harvesting.

Module 5.

Ecological approaches to land use, site planning and environmental quality control and sustainable development.

Module 6.

Environmental impact assessment and project evaluation.

Module 7.

Environmental laws and regulations - Major environmental acts of India.

Recommended books :

1. Mackenzie, D, *Design for the Environment* , Rizzoli international Publication, New York
2. Bottkin D, Keller .E, *Environmental Science – Earth as a living planet*, John Wiley and Sons, New York.
3. Sharma , B.K. *An Introduction to Environmental Pollution*, Goel Publication House , Meerut
4. Trivedi, P.R. *Encyclopedia of Ecology and Environment* , IIEE, New Delhi
5. Crosbie, Michael J., *Green Architecture*, Rockport Publisher, Massachusetts.
6. Kevin Lynch ;*Site planning*;MIT Press, Cambridge, MA – 1967

Arc. 2307

**Architectural Design - II**

Unit: 1.0

- Design of small objects with respect to function, structure and aesthetics.
- Importance of physical factors in architectural design e.g. orientation, ventilation, adequate protection from rain, dust, insects, etc. And the human dimensions in various postures, their relation to dimensioning of everyday utilities like the table, chair, sink etc., Concepts of Anthropometrics and Ergonomics.
- Design of small structures – street furniture, kiosks, clock towers, milk booth, cycle stand, shop etc. and objects of interest with respect to form and construction.
- Study and design of part of residential buildings, with respect to indoor and outdoor spaces of buildings. Detail layout of residential components such as bathrooms, kitchen, bedroom etc.
- Minimum five projects and one time problem must be conducted and should be designed by the teacher concerned as per above syllabus. Time problem should be of 8 hours duration. The final Viva on all projects should be conducted by three teachers and should carry 20% of the total weightage.

Reference: All books and journals on architecture.

# SESSIONAL SUBJECTS

## SECOND SEMESTER

Arc.2308

Building Construction –I

Unit: 1.0

	Topic	No. of Sheets
1	<b>STONE MASONRY:</b> Rubble & Ashlars masonry and joinery work.	1
2	<b>BRICK MASONRY:</b> Different sizes of bricks including Adobe bricks, Brick bonds, Detail brick layout at corners, brick columns. Pointing details. (Advised to produce a report on different types of brick bonds in walling & Paving with sketches and some photographs, and two sheets with commonly used bonds in walling)	Sheets: 2 Report: 1
3	Different Joints in Wood	1
4	<b>WOODEN DOORS:</b> Details of door and ventilator. Battened /ledged/Braced door, Flush/Panelled door. Venetian door.	3
5	<b>WOODEN WINDOW:</b> Details of window, glazed, pivoted, louvered window, corner and bay window.	3
6.	Details of glazed door, window and ventilator with iron frame.	2
7.	Fixing Detail of Collapsible Door, Rolling Shutter	1
8	Typical Building Skin Section for a Two Storied House	1
	<b>Total Minimum No. of Sheets &amp; Report</b>	<b>14 + 1</b>

### Recommended Books:

1. B. C. Punmia; *Building Materials and Construction* .Laxmi Publications Pvt Ltd, New Delhi,1993.
2. Bindra & Arora; *Building Materials and Construction*.
3. W.B. MacKay, '*Building Construction*', Vol. 1,2,3 longmans, U.K. 1981.

### 3<sup>rd</sup> SEMESTER STRUCTURE

Subject Code	Subjects	Units
	<b>THEORY SUBJECTS</b>	
Arc. 3101	Structural Mechanics	1.0
Arc. 3203	Climatology	1.0
Arc. 3110	Building Materials & Specifications – III	1.0
Arc. 3302	History of Eastern Architecture: Islamic	1.0
	<b>SESSIONAL SUBJECTS</b>	
Arc. 3206	Architectural Drawing & Rendering Techniques	0.5
Arc. 3307	Building Construction - II	1.0
Arc. 3208	Architectural Design - III	1.5
Arc. 3209	CAD - I	0.5
Arc. 3012	Seminar-I	0.5
	NCC/ NSS/ CA/ ----	0.5
	<b>Total Units</b>	<b>8.5</b>

# THEORY SUBJECTS

## THIRD SEMESTER

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Arc. 3106

Structural Mechanics

Units: 1.0

Module: 1

Pure Bending. Theory, assumptions and equation of bending. Concept of Sectional modulus, Distribution of bending stress in beam cross-section. Bending Stress Distribution in composite beam cross section, Concept of Modular Ratio.

Module: 2

Assumptions and equation of shear in beam section, Shear stress in the Beam cross-section

Module: 3

Differential equation of the elastic curve – Deflection of beams (due to bending only) by double integration method – Area moment theorems – Applications to simply supported, cantilever and overhanging beams.

Module: 4

Strain energy for axial load, bending Castigliano's First theorem. Applications to find beam deflection and deflection of Statically Determinate Truss.

Module: 5

Theory of Torsion, Equation of Torsion, Solid & Hollow shaft under pure torsion, percentage of savings, stresses due to combination of Torsion and bending Moment.

Module: 6

Theory of Columns – Euler's theory for different support conditions – Rankin's Formula.

Module: 7

Analysis of three hinged arches of parabolic and circular shape, Eddy's theorem. Bending moment, Normal thrust and radial shear.

Recommended Books:

1. B.C. Purmia, Laxmi Publication; *Strength of Material and Theory of Structures (Vol-I)*.
2. S. Timoshenko; *Strength of Material*, Tata McGraw Hill, New Delhi.
3. S.Ramamurtham, *Strength of Material*, Dhanpat Rai Publication.
4. Singer; *Strength of Material*.
5. R.K.Rajput; *Strength of Material*, S.Chand Publication
6. Srinath ;*Strength of material*.

# THEORY SUBJECTS

## THIRD SEMESTER

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Arc. 3203

Climatology

Unit:1.0

Module 1. **GENERAL INTRODUCTION**

- Climate and weather
- Climatic Elements
- Climatic Evaluation by Region

Module 2. **THE BIO-CLIMATIC APPROACH**

- Bio-climatic Requirements
- Relation of climatic elements to comfort
- The Bio-climatic chart

Module 3. **ITS INTERPRETATION IN ARCHITECTURAL PRINCIPLES**

- Site Selection
- Solar Control
- Building Orientation
- Effect of Landscaping

Module 4. **HEAT FLOW THROUGH MATERIALS**

- Basic Principles of Heat transfer
- Performance of different material 'U' value
- Time Lag and design of Building elements.

Module 5. **DAYLIGHTING**

- Sources of Light, climate and light
- Classification of Daylight, daylight factor and Sky component.
- Daylighting in Tropics and hot dry climates and warm humid climates
- Supplementary artificial lighting.

Module 6. **VENTILATION AND AIR MOVEMENT**

- Wind Rose and wind shadows
- Air movement around the buildings, natural and induced ventilation.
- Stack Effect and Thermally induced air currents.

Module 7. **TROPICAL CLIMATE**

- Classification & Characteristics
- Technology required for comfort.

Recommended Books:

1. Narasimhan; *An Introduction to Building Physics*.
2. O.H. Koenigsberger and others, *Manual of Tropical Housing and Building – Part I – Climatic Design*, Longmans, London, 1980.
3. M.Evans – *Housing, Climate and comfort* – Architectural Press, London, 1980.
4. B.Givoni, *Man, Climate and Architecture*, Applied Science, Banking, Essex, 1992.
5. Donald Watson and Kenneth Labs., *Climatic Design* – McGraw Hill Book Company – New York – 1983.

# THEORY SUBJECTS

## THIRD SEMESTER

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Arc. 3110

Building Materials and Specifications -III

Unit:1.0

Module 1: Soil properties and Bearing Capacity of Different soil, Foundation: Types of foundation, different types of shallow and deep foundation, Raft foundation, foundation detail for RCC column, grillage foundation, Pile foundation – Different component of pile classification and use of pile foundation. Foundation strength testing techniques. Causes of foundation failure and remedies, excavation – timbering and dewatering techniques for loose soil and sub soil water condition. Differential Settlement, Soil improvement techniques.

Module 2: Temporary supporting structures: Form work and shuttering for different types of RCC elements. Different types of materials for shuttering and their specifications. Scaffolding, shoring and underpinning: Different types, uses and their specifications.

Module 3: Hollow and Panel wall: economy and advantages over solid load bearing walls, practical consideration during construction hollow concrete block construction, different types of partition wall. Reinforced brick work.

Module 4: Large Span Structures: Techniques of large span supporting structure in steel and RCC – Shell, folded plate, coffered slab, steel space frame, North light, patent glazing.

Module 5: Introduction to low cost building construction techniques: Adopted in construction of foundation, masonry, lintel, and roof.

Module 6: Miscellaneous Materials: Classification of plastic, moulding and fabrication, properties of plastic, use of plastic, PVC. Fibre glass. Cork, rubber, Gypsum, sealants, heat and sound insulative materials. Synthetic resins, Their trade name and uses.

Module 7: Building Hardware:

Tower bolts, Hinges, Door Handles, fan light latches, door springs latch, floor doorstopper. Fan light pivots, mortise lock, door closer ventilator chains, wire gauze. Their sizes materials and uses as per ISI.

Recommended Books:

1. B. C. Punmia; *Building Materials and Construction*. Laxmi Publications Pvt Ltd, New Delhi, 1993.
2. Bindra & Arora; *Building Materials and Construction*.
3. W.B. MacKay, '*Building Construction*', Vol. 1,2,3 longmans, U.K. 1981.

# THEORY SUBJECTS

## THIRD SEMESTER

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**Arc.3302**

**History of Architecture (Eastern) - Islamic**

**Unit: 1.0**

- Module 1. Introduction – Rise of Indo-Islamic Architecture
- Special features of Mosque
  - Special features of Tomb
  - Influences of Indo-Islamic Architecture in India
  - Use of arches, vaults, domes, squinches, pendentives, jaalis, minarets, etc.
  - Special features – use of landscape, water bodies and gardens.
  - Ornamentation in structures with interplay of materials – stones, mosaics, gildings.
- Module 2. Sultanate Architecture
- Slave Dynasty
  - Tughlaq Dynasty
  - Lodhi Dynasty
- Module 3. Provincial Styles of Sultanate Period
- Punjab with examples
  - Bengal with examples
  - Jaunpur with examples
- Module 4. Provincial Styles of Sultanate Period
- Gujarat with examples
  - Malwa with examples
  - Bijapur with examples
  - Golconda with examples
- Module 5. Mughal Style prevalent during the reign of  
a) Babur; b) Humayun; c) Akbar; d) Jahangir; e) Shah Jahan
- Module 6. Nawabi Architecture of the Post Mughal Period, Awadh, Hyderabad, Punjab.
- Module 7. Rajputana Architecture and revival of Indian architecture under British patronage.

### Recommended Books

1. Asher Catherine, *Architecture of Mughal India*
2. Sterlin Henry, *Architecture of World, India ( Islamic )*, Germany ISBN– 38228-9658-6
3. Tadgell Christopher, *The History of Architecture in India*, London 1990
4. George Michell ; *Architecture of the Islamic World — (its history and social meaning)*, Thames and Hudson, London, 1978.
5. Robert Hillenbrand,; *Islamic Architecture, Form, Function and Meaning*, Edinburgh University Press, 1994.
6. Brown Percy, *Indian Architecture (Islamic Period) Vol II* ;Taraporevala and Sons, Bombay, 198; and subsequent publications
7. G.H.R. Tillotson – *The tradition of Indian Architecture Continuity, Controversy – Change since 1850*, Oxford University Press, Delhi, 1989.

## SESSIONAL SUBJECTS



- 1) Techniques for rendering of various materials/textures:
  - a) Brickwork, stone, plastering, timber, tiles, flooring types, floor rugs, water, rock.
  - b) Drawing and rendering of miscellaneous objects.
  - c) Techniques of rendering the effects of lighting, shades, shadows on primary 3D objects like cubes, spheres, cones, cylinders, pyramids in different media.
  
- 2) Techniques for rendering an architectural plan:
  - a) Rendering of trees, shrubs, hedges in a plan
  - b) Rendering of different earthscapes (natural and manmade) in a plan.
  - c) Rendering of a building plan.
  
- 3) Techniques of rendering an architectural elevation:
  - a) Human figures- proportions and styles
  - b) Landscaping- Trees, plants, hedges used in elevations
  - c) Different hard landscape materials (street furniture, automobiles)
  - d) Rendering of a building elevation.
  
- 4) Techniques of rendering perspective views.
  - a) Perspective human figures
  - b) Trees and plants
  - c) Rendering of perspective views- indoor and outdoor.

**NB: All the above Rendering techniques will be done with the following media :**

- 1) Pencil sketches with proper shades and shadows
- 2) Pen & Ink drawings: Using Rapidograph variant, Line (hatch) technique, dot rendering, combination of both.
- 3) Rendering with Pencil colour, Oil Crayons, and their intermixing..
- 4) Presentation in water colour and poster colour.
- 5) Computer Aided rendering techniques.

Recommended Books:

1. Sherley W, MORGAN; *Architectural Drawing, Mc Graw Hill*
2. Arthur L. Gup till, Watson ; *Rendering in Pen and Ink, – Gup till Publications, New York*
3. Gill Robert, “*Rendering with pen and ink*”.
4. Gordon Gricce; *The Art of Architectural Illustration.*
5. John Chen ; *Architecture in Pen and Ink.*

## SESSIONAL SUBJECTS

### THIRD SEMESTER

Arc.3307

### Building Construction –II

Unit:1.0

	Topic	No. of Sheets
1	<b>FLOORING:</b> Types of flooring, methods of laying, furnishing of floors with different floor finishes like cement, coloured cement, mosaic, terrazzo, tiles etc. special consideration for rubber, linoleum and PVC flooring, flag stone Flooring, parquet flooring. Different type of resilient and vibration resistive floor	3
2	<b>FOUNDATION &amp; BASEMENT:</b> Wall foundation, isolated and combined foundation in RCC. Raft foundation. Parts of pile foundation and its type, grillage foundation, construction detail of basement wall, Retaining wall, floor and foundation with particular emphasis to their damp proofing protection against rain water and provision for natural lighting and ventilation.	3
3	<b>D.P.C. DETAILS:</b> Waterproofing details in different levels: Details of simple foundation, wall, roof, Details of sill, lintel and roof in RCC, RB and steel, Damp proof details of basement, plinth, sill, lintel, and roof level.	2
4	<b>WOOD FRAMING DETAIL:</b> Details of joist, Girder, Bridging, Floor platform, Truss joints, different connections.	2
5	<b>STAIRCASE:</b> Layout and its construction details, Different elements of staircase, Types of staircase, Details of various types of staircase in wood, RCC and steel.	2
6	<b>SITE VISIT:</b> At least one visit to be paid to the construction site covering various sequences of construction and a report to be submitted by individual students as a part of the sessional work.	Report = 1
	Total Minimum No. of Sheets & Report	12+1

#### Reference Books:

1. W.B. MacKay, 'Building Construction', Vol. 1,2,3 longmans, U.K. 1981.
2. B. C. Punmia; *Building Materials and Construction* .Laxmi Publications Pvt Ltd, New Delhi,1993.
3. Bindra & Arora; *Building Materials and Construction* .
4. Francis D. K. Ching, *Building Construction Illustrated VNR, 1975*.

## SESSIONAL SUBJECTS

### THIRD SEMESTER

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Arc. 3208

Architectural Design-III

Unit: 1.5

- Design methodology through bubble diagram, Proximity chart to establish the functional relationship of various spaces.
- Understanding the climatic data & human behaviour in space planning.
- The broad parameter for the design assignments are:

#### **Main Design Problem**

Small residential building / guest house  
Museum / health club, small resort  
Restaurant (both outdoor and indoor)

#### **Duration** (approx.)

6 weeks (9 classes/week)  
4 weeks  
3 weeks

#### **Design (Time) Problem**

1. Memorial with landscaping/ Play school /  
Crèche

#### **Duration**

8 hrs.

#### **Viva voce**

Final Viva-vice on all the design assignments done in the semester

**Arch. 3209**

**Computer Aided Design – I**

**Unit:0.5**

AUTOCAD applications in two-dimensional architectural drawing:

- Sheet layout and toolbar generation;
- Different Draw and modify operation;
- Colour and Hatch, Object Properties
- Making of blocks;
- Text and Dimensioning;
- Formatting operation: dimensions, text, line type etc.
- Creation and Use of Layer, Assigning Line types, Line thickness, Line type Scale;
- UCS generations, Use of View port;
- Creation of entities;
- Digitization of images;
- Creation of simple architectural elements, building drawings in 2-D;
- Composition of Drawing sheets,

Practice and preparation of 2D documentations based on class projects in the previous semester in Architectural Designs.

Details of task to be determined each semester by the individual instructor.

## **SESSIONAL SUBJECTS**

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### **THIRD SEMESTER**

**Arc. 3012**

**Seminar-I**

**Unit: 0.5**

The purpose of this subject is to develop the student's capability to study, analyse and to improve their presentation skills on the knowledge acquired in the architectural subjects that are taught so far. They are required to do exercises and prepare presentations on the topics pertaining to the subjects that are taken in the current semester.

#### **Section A**

- a) Bio-Climatic Chart, Sun path Diagrams
- b) Effects of Day lighting , Air Movement , Materials in modifying Climate
- c) Typical Building layouts and micro-design elements necessary for different climatic regions.

#### **Section B**

- a) Different types of foundations and formwork
- b) Large span structures
- c) Low –cost building construction techniques
- d) Miscellaneous building materials and building hardware.

#### **Section C**

- a) History of Architecture (Eastern)-Islamic
- b) Islamic architectural features- typical and Saracenic
- c) Different styles and their comparison with reference to plan, form, use of materials, structural techniques used.

The media of presentation, submittals and specific topic will be finalized by the teacher responsible for the subject.

## 4<sup>th</sup> SEMESTER STRUCTURE

Subject Code	Subjects	Units
	<b>THEORY SUBJECTS</b>	
Arc. 4101	Theory of Structure	1.0
Arc. 4010	Surveying (Theory)	1.0
Arc. 4011	Architectural Sociology	1.0
Arc. 4303	History of Architecture (Western)	1.0
	<b>SESSIONALS SUBJECTS</b>	
Arc. 4306	Architectural Design - IV	1.5
Arc. 4307	Building Construction – III	1.0
Arc. 4108	Surveying (Field Work)	0.5
Arc. 4109	CAD - II	0.5
Arc. 4012	Seminar-II	0.5
	NCC/ NSS/ CA/ ----	0.5
	<b>Total units</b>	<b>8.5</b>

# THEORY SUBJECTS

## FOURTH SEMESTER

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**Arc.4101**

**Theory of Structure**

**Unit: 1.0**

Module: 1

Statically Indeterminate structures, Redundancy, Degree of Indeterminacy of Beams, Frames and Truss. Clark Maxwell's reciprocal theorem; Betti's Theorem.

Module: 2

Introduction of Force Method, Method of Consistent Deformation, Fixed end moments of a built-in-beam with concentrated, uniformly distributed and moments. Theorem of three moments.

Module: 3

Castigliano's Second Theorem, Principle of least work: Analysis of Statically Indeterminate Truss and Frames.

Module: 4

Analysis of two hinged parabolic & circular arches

Module: 5

Introduction to Stiffness methods, Difference between Stiffness and Force Methods. Slope deflection Method – Basic formulae – Application to continuous beams and portal frames with and without sway.

Module: 6

Moment distribution Method - Introduction - Basic properties - Application to continuous beams and portal frames with and without sway.

Module: 7

Introduction to Plastic Theory. Modified Stress-Strain Diagram, Assumptions in plastic theory, Collapse load, Load Factor, Plastic bending, Plastic Moment, Shape factor of different geometrical cross-sections, Design of beams: simply supported, fixed, continuous. Design of Simple portal frames

Text Books:

1. C.K.Wang ;*Intermediate Structural Analysis, McGraw-Hill International.*
2. S. Ramamurtham; *Theory of Structures, Danpat Rai Publication.*
3. S.S.Bhavikatti ;*Structural Analysis (Vol-I), Vikash Publishing House Pvt.Ltd.*
4. S.S.Bhavikatti ;*Structural Analysis (Vol-II), Vikash Publishing House Pvt.Ltd.*
5. B.G.Neal ,*The Plastic Method of Structural Analysis, Chapman and Hall Ltd.*
6. B.C. Punmia, *Strength of Material and Theory of Structures (Vol-II), Laxmi Publication.*

**Arc.4010**

**Surveying (Theory)**

**Unit:1.0**

Module 1. **Chain Surveying** - Principles of survey, equipment required, selection of station, methods of taking off sets. Booking the field notes, obstacles in chaining, errors in chaining, chaining on sloping ground and reciprocal ranging.

Module 2. **Compass Surveying** - The prismatic compass; its construction and uses. Other types of compasses. Reduced and whole circle bearing, magnetic declination, effects local attraction. Compass traverse & balancing the closing error.

Module 3. **Levelling** - Different types of levels, their temporary and permanent adjustment levelling staff. Book of the readings and reduction of levels, errors in levelling. Curvature and refraction reciprocal levelling profile, levelling cross sections.

Module 4. **Plane table Survey and Contouring**– Equipment and methods of plane table survey. Two points & three points' problems. Characteristics of contour lines, direct and indirect methods of contouring, interpolation of contours.

Module 5. **Minor Instruments** – The hand level, abney level, tangent clinometer, sextant and pantograph.

Module 6. **Theodolite Surveying** - Theodolite its temporary and permanent adjustment measuring of magnetic bearings, horizontal & vertical angles. Theodolite traverse and balancing the closing error.

Module 7. **Introduction to modern surveying equipments**

Total Station, GPS, Use of Distomat and Theomat, Aerial Photography, Digital Levels and Auto-Levels. (Preliminary information and use).

Recommended books:

- B.C. Punmia – *Surveying Vol. I* – Standard Book House, New Delhi – 1983.
- P. B. Shahani – *Text of surveying Vol. I*, Oxford and IBH Publishing Co – 1980



# THEORY SUBJECTS

## FOURTH SEMESTER

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Arc. 4011

Architectural Sociology

Unit:1.0

Module 1. Definition, scope and use of sociology,

Module 2. Relation between sociology and architecture (i.e., to understand the meaning of architectural sociology) and its application.

Module 3. Basic concepts of sociology: society, groups, community, association, institution, culture, civilization and personality in terms of their characteristics and types.

Module 4. Social structure of India: Caste and Class, Family and marriage, their characteristics.

Module 5. Rural and Urban societies - their characteristic, features and problems, like crime, slum and poverty.

Module 6. Social change – Biological, technological and cultural factors of social change.

Module 7. Social aspects of housing and neighbourhood in the context of changing society and growing population.

### Recommended Books:

1. D. R. Sachdeva ; *An Introduction to Sociology* - Vidya Bhushan,; Kitab Mahal.
2. James C. Snyder, Anthony J. Catanese; *Introduction to Architecture-*; McGraw-Hill.
3. Shika Jain ;*Haveli* ; Shubhi Publications
4. Sarah Tillotson ; *Indian Mansions*.
5. G.H.R. Tillotson – *The tradition of Indian Architecture Continuity, Controversy – Change since 1850*, Oxford University Press, Delhi, 1989.
6. Anthony D. King, *Building and Society*. Routledge Kegan & Paul, 1980.

# THEORY SUBJECTS

## FOURTH SEMESTER

### Arch. 4203

### History of Architecture (Western)

### Unit: 1.0

All the following Modules will be studied with the following sub-heads:

1. Geography and Building Materials / Resources
2. Methods of Construction
3. Sociological Background – Degree of Dominance of Ecclesiastical / Political / Economical class

Module 1	<b>Mesopotamian Architecture and Egyptian Architecture</b>	<ol style="list-style-type: none"><li>1. Salient building types : (Mesopotamian)<ul style="list-style-type: none"><li>•Ziggurats and their development</li><li>•Palaces / palace complexes</li></ul></li><li>2. Salient building types: ( Egyptian)<ul style="list-style-type: none"><li>•Temples &amp; temple complexes</li><li>•Mastabas</li><li>•Pyramids</li><li>•Palaces</li></ul></li><li>3. Special Building Elements / Features</li></ol>
Module 2	<b>Greek Architecture</b>	<ol style="list-style-type: none"><li>1. Salient building types:<ul style="list-style-type: none"><li>• Temples &amp; temple complexes</li><li>• Classical orders</li><li>• Administrative buildings</li><li>• Theatres</li><li>• Commercial buildings</li></ul></li><li>2. Special Building Elements / Features</li></ol>
Module3	<b>Roman Architecture</b>	<ol style="list-style-type: none"><li>1. Salient building types:<ul style="list-style-type: none"><li>• Administrative buildings</li><li>• Public Baths</li><li>• Commercial buildings</li><li>• Sanitary facility</li><li>• Sports facility buildings</li><li>• Temples and palaces</li></ul></li><li>2. Special Building Elements / Features</li></ol>
Module4	<b>Early Christian &amp; Byzantine Architecture</b>	<ol style="list-style-type: none"><li>1. Salient building types: Churches</li><li>2. Special Building Elements / Features</li></ol>
Module 5	<b>Romanesque and Gothic Architecture</b>	<ol style="list-style-type: none"><li>1. Salient building types:<ul style="list-style-type: none"><li>• Churches</li><li>• Forts and associated palaces / buildings</li></ul></li><li>2. Special Building Elements / Features</li></ol>
Module6	<b>Renaissance Architecture</b>	<ol style="list-style-type: none"><li>1. Salient building types:<ul style="list-style-type: none"><li>• Churches</li><li>• Public buildings</li><li>• Squares / organised open spaces</li></ul></li><li>2. Special Building Elements / Features</li></ol>
Module7	<b>Western Architecture in India.</b>	Salient buildings from the following cities to be studied. <ul style="list-style-type: none"><li>• Delhi, Mumbai, Chennai, Kolkata, Baroda.( British influence)</li><li>• Goa. (Portuguese influence)</li><li>• Pondicherry (French influence)</li></ul>

Recommended books:

1. Sir Banister Fletcher, A History of Architecture, University of London, the Antholone Press, 1986.
2. S. Lloyd and H.W. Muller, History of World Architecture – Series, Faber and Faber Ltd. London, 1986.
3. Hiraskar ;*The Great Ages of World Architecture*
4. Kenneth Frampton, *Modern Architecture: A Critical History*; Thames and Hudson, London, 1994.
5. Sigfried Gideon, *Space Time and Architecture: The growth of a New Tradition*, Hazard University Press, 1978.

## SESSIONAL SUBJECTS

### FOURTH SEMESTER

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Arc. 4306

Architectural Design-IV

Unit: 1.5

- Design theory and application in slightly more advanced problems covering functional relationship, climatic condition and social aspects along with **structural considerations**.
- The broad parameter for the design assignments are:

#### Main Design Problem

1. Primary school / Neighbourhood Shopping

**Duration** (approx.)

5 weeks (9 classes/week)

2. Nursing Home / Artists' Exhibition Space

6weeks

3. Critical appraisal of a major building

2 weeks

#### Design (Time) Problem

Any one of the above, not covered in the class

**Duration**

8 hrs.

#### Viva voce

- Final Viva-vice on all the design assignments done in the semester

**SESSIONAL SUBJECTS**  
**FOURTH SEMESTER**

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**Arc.4307**

**Building Construction –III**

**Unit: 1.0**

	<b>Topic</b>	<b>No. of Sheets</b>
1	<b>ROOFING:</b> Types of roof, parts of roof and roof truss. Flat roof with wood and RCC, simple jack arch, various type and spans of timber and steel roof truss. Common roof covering. Waterproofing, rainwater gutter details.	3
2	<b>ARCHES &amp; DOMES:</b> Various form of arches, domes, various geometrical forms of shell and plate structure construction detailing and methods of centering.	3
3	<b>CLADDING:</b> Details of cladding of wall with stone, tiles, timber and steel framing,	3
4	<b>LARGE SPAN STRUCTURES:</b> Types and forms of roofing in steel and RCC, their applications to factories sheds, halls, Hangers, canopies, North light roofing in steel and RCC, Patent Glazing. Coffered Slab, Flat Slab.	3
5	<b>SITE VISIT:</b> At least two visit to be paid to the construction site covering various sequences of construction and a report to be submitted by individual students as a part of the sessional work.	Report = 1
	Total Minimum No. of Sheets & Report	12+1

Reference Books:

- 1) W.B. MacKay, '*Building Construction*', Vol. 1,2,3 longmans, U.K. 1981
- 2) B. C. Punmia; *Building Materials and Construction* .Laxmi Publications Pvt Ltd, New Delhi,1993.
- 3) Bindra & Arora; *Building Materials and Construction*.

**SESSIONAL SUBJECTS**  
**FOURTH SEMESTER**

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**Arc. 4108**

**Surveying (Field work)**

**Unit:0.5**

Actual field Survey by the following methods:

1. Chain Surveying
2. Compass Surveying
3. Plane table Surveying
4. Levelling
5. Theodolite Surveying

Recommended Books:

1. B.C. Punmia – *Surveying Vol. I* – Standard Book House, New Delhi – 1983.
2. P. B. Shahani – *Text of surveying Vol. I*, Oxford and IBH Publishing Co – 1980

**Arc. 4109**

**Computer Aided Design - II**

**Unit: 0.5**

Basic operations of 3-D

- Development of regions, polylines;
- Generations of surfaces and solids;
- 3-D operation: Union, Subtraction and Intersection;
- 3-D operation: Rotate, Mirror and Array;

Operations in 3-D

- Solid editing;
- UCS operation;
- Working with 3D-Viewports and 3D- pan/zoom to generate different views,
- Implications and advantage of 3D wire frame, Hide, Shade etc. in generating 3D-Views
- Making of perspective views, adjustment of camera, window orbit etc.

Exercise 1: Drawing of simple 3-D objects.

Exercise 2: Drawing 3-D of a building.

Introduction to 3DS Max, Material attachment, Light focusing, Different views, Rendering with background and foreground. [Application to the previous exercise]

## SESSIONAL SUBJECTS

### FOURTH SEMESTER

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Arc. 4012

Seminar-II

Unit: 0.5

**(Compulsory attendance in the field trip organized by the department is required in order to register in this subject)**

The purpose of this subject is to develop the student's capability to study, analyse and to improve their presentation skills on the knowledge acquired in the architectural subjects that are taught so far. They are required to do exercises and prepare presentations on the topics pertaining to the subjects that are taken in the current semester.

#### Section A

- a) Social structure of India: Caste and Class, Family and marriage, their characteristics.
- b) Rural and Urban societies - their characteristic, features and problems, like crime, slum and poverty.
- c) Social aspects of housing and neighbourhood in the context of changing society and growing population.

#### Section B

- a) Sketch presentation of important buildings of history covered in the semester.
- b) Interpretation of architectural styles from important buildings.
- c) Study on influence of western architecture in Indian context.

#### Section C

**(The prerequisite of this section is a compulsory attendance in the field trip taken in the previous semester.)**

##### Field Trip Drawing

The measured drawing conducted during the tour, will be presented as well drafted drawings by the students.

It should be **hand drafted** and rendered and all the methods for **proper documentation** of the structure measured will be considered in the presentation.

This will follow a seminar, where the students will present their work verbally.

**NB:** The media of presentation, submittals and specific topic will be finalized by the teacher responsible for the subject.

## 5<sup>th</sup> SEMESTER STRUCTURE

<b>Subject Code</b>	<b>Subjects</b>	<b>Units</b>
	<b>THEORY SUBJECTS</b>	
Arc. 5201	Concrete Structure	1.0
Arc. 5204	Contemporary Architecture	1.0
Arc. 5305	Building Services - I (Acoustics)	1.0
Arc. 5109	Building Services - II (Plumbing Design)	1.0
	<b>SESSIONAL SUBJECTS</b>	
Arc. 5206	Architectural Design - V	1.5
Arc. 5207	Working Drawing-I	1.0
Arc. 5010	Building Construction – IV	1.0
Arc. 5011	Seminar-III	0.5
	<b>Total Units.</b>	<b>8.0</b>



# THEORY SUBJECTS

## FIFTH SEMESTER

Arc. 5201

Concrete Structure

Unit:1.0

### Module: 1 **Basic Material Properties & Design Concept**

Introduction to Concrete Technology, Composition of Concrete and the properties, Strength and Durability, Modulus of Rupture, Creep and Shrinkage of Concrete, Reinforcing Bars, Types and grade, Stress-Strain Diagram of Steel and Concrete. Concrete Mix Design: Nominal Mix and Design Mix. Design Philosophies, Working Stress Method, Limit State Method, Various Limit States.

### Module: 2 **Design for Flexure**

Introduction, assumption, flexure design of singly reinforced & doubly reinforced and T-beams by Limit State Methods. IS-Coded provisions, Numerical Problems.

### Module: 3 **Design for Shear, Bond**

Shear failure of beams. Shear reinforcement, Curtailment of reinforcement. Bond, Anchorage and Development length, IS-Code provisions, Design of a beam with flexural and shear consideration. Reinforcement Detailing, Numerical Problems.

### Module: 4 **Design of Compression Members**

Short and Long Columns, IS-Code Provisions, Design of Short Columns under Axial compression, Design of Columns under bi-axial bending, use of interaction diagram for design. Lateral ties. Reinforcement Detailing, Numerical Problems.

### Module: 5 **Design of Footing**

Isolated footings for rectangular and circular columns. Reinforcement Detailing, Numerical Problems.

### Module: 6 **Design of Slabs & Stairs**

Effective span, one way and two way slabs. Design of Slabs with various boundary conditions by IS-Code methods. Reinforcement Detailing, Numerical Problems.

Types of stairs, Design of Dog Legged & Open Wall Stairs. Reinforcement Detailing, Numerical Problems.

### Module: 7 **Introduction to Pre-stressed Concrete**

Introduction to Pre-stressed Concrete, Pre and Post tensioning systems, Advantages, Basic design concept of Pre-stressed concrete beam, Analysis of prestress and bending stress, Resultant Stress, Thrust Line, Concept of Load balancing, Various losses of stresses. Simple Numerical Problems

#### IS Codes:

1. IS 465: 2000.
2. SP-16
3. SP-34

#### Note:

1. All the Design of Concrete Structural Elements must be based on "Limit State Method"
2. Students are allowed to bring IS 465: 2000 and SP-16 in the examination hall for referring the design solutions.

#### Recommended Books:

1. B. C. Punmia; *Reinforced concrete structure (Vol - I)*.
2. S. Unnikrishna Pillai & Devdas Menon; *Reinforcement Concrete Design, Tata McGraw Hill, New Delhi*.
3. N.Krishna Raju; *Structural Design and Drawing, Reinforced Concrete and Steel, University Press (India) Ltd.*
4. A.M.Nevill; *Properties of Concrete*
5. Mallick and Gupta; *Reinforced Concrete*.
6. P.C.Varghese; *Limit State Design of Reinforced Concrete Structures*.
7. M.K.Hurst, *Prestressed Concrete Design, Chapman Hall*.
8. James R. Libby, *Prestressed Concrete Design and Construction, The Ronald Press Company*.
9. N.Krishna Raju; *Prestressed Concrete, Tata McGraw Hill, New Delhi*.

# THEORY SUBJECTS

## FIFTH SEMESTER

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**Arc. 5204**

**Contemporary Architecture**

**Units: 1.0**

Module 1	Introduction, Advent of Steel, glass and Ferro-concrete	<ul style="list-style-type: none"><li>• Late Renaissance and development of open spaces</li><li>• Advent of Steel: James Bogardus, Henry Labrouste</li><li>• Great Exhibitions and their contributions</li><li>• Gustave Eiffel</li><li>• Development of Ferro concrete: Auguste Perret, Tony Garnier</li></ul>
Module 2	Development of 'New Art & Architecture'	<ul style="list-style-type: none"><li>• Le Art Nouveau movement: Victor Horta, Otto Wagner</li><li>• H.P. Berlage, H. H. Richardson and 'True Construction'</li><li>• Balloon Frame Structure and Plane Surfaces in America</li></ul>
Module 3	Chicago School & Organic Developments	<ul style="list-style-type: none"><li>• Chicago School: Louis Sullivan</li><li>• Organic Architecture: Frank Lloyd Wright</li></ul>
Module 4	Programmatic Functionalism	<ul style="list-style-type: none"><li>• Walter Gropius and Bauhaus</li><li>• Le Corbusier</li></ul>
Module 5	Development of International Style	<ul style="list-style-type: none"><li>• Mies van der Rohe</li><li>• Philip Johnson</li><li>• Louis I Kahn</li></ul>
Module 6	20 <sup>th</sup> Century World Architecture	<ul style="list-style-type: none"><li>• Works of some master architects like, Eero Saarinen,,Alvar Aalto, Oscar Niemeyer, Richard Neutra, Norman Foster, Antonio Gaudi, Frank O. Gehry, I. M. Pei, Kenzo Tange.</li></ul>
Module 7	Indian Architecture since Independence	<ul style="list-style-type: none"><li>• B. V. Doshi</li><li>• Charles Correa</li><li>• Raj Rewal</li><li>• A. P. Kanvinde</li><li>• Laurie Baker</li><li>• Various salient buildings in India and their architects</li></ul>

Recommended books:

1. Sigfried Giedion ; *Space, time and Architecture.*
2. Vincent Scully Jr; *Modern Architecture.*
3. Vikram Bhatt and Peter Sciver; *After the masters (Contemporary Architecture of India).*
4. Kenneth Frampton; *Modern Architecture.*
5. Library of Contemporary Architects.

# THEORY SUBJECTS

## FIFTH SEMESTER

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Arc. 5305

Building Services – I (Acoustics)

Units: 1.0

Module 1. **Sound Engineering:**

Introduction to architectural acoustics - Characteristic and measurement of sound, frequency, intensity, decibel scale, auditory range, effects of sound on humans, loudness.

Module 2. **Room Acoustics:**

Acoustics and acoustical environment. Behaviour of sound in an enclosed space. Principle of geometrical acoustics, Different acoustical defects in auditorium and its solution, reverberation and reverberation time calculations – Sabine's formula and its interpretation, dead and live room.

Module 3. **Design of Auditorium:**

Size, shape, sitting arrangement design criteria for speech and music, acoustical correction design and modification techniques, broadcasting studio, television studio, classroom, lecture hall, church and Cathedral.

Module 4. **Electro-acoustics:**

Introduction of Electro-acoustical systems, Unidirectional and Stereophonic sound system, Digital and Surround-sound systems, Design criteria for Theatres, Motion picture halls, Multiplexes and Multipurpose Auditoriums.

Module 5. **Open air Acoustics:**

Free field propagation of sound, absorption from air and natural elements, effect of barriers, effect of landscape element, thermal and wind gradient. Design of open-air theatre and planning of building. Reduction of noise by screening, Screening by Planting.

Module 6. **Environmental Noise Control:**

Noise sources, air borne and structure borne sound, NC curve, Propagation of noise of mechanical operation and impact noise, sound transmission through wall and partition, Vibration isolation – control of mechanical noise, floor, wall, ceiling treatment. Design Principles- reduction of noise at the source, Reduction of noise near the source. Application of sound absorption material, Reduction of noise by Structural Defence. Planning and analysis of problem. Reduction of noise by Town Planning and Regional Planning consideration.

Module 7. **Acoustical Material:**

General description of acoustical materials - acoustical tiles, fiberboard, resonator absorption unit absorber, carpets, acoustical plaster, resilient packing composite materials, etc. – Their use, selection criteria and construction.

Recommended books:

1. A. B. Wood; *A Text book of sound.*
2. T. M. Yarwood; *Acoustics.*
3. Duncan Templeton; *Acoustics in The Built Environment.*
4. J E Moore; *Design for good Acoustics and noise control.*

# THEORY SUBJECTS

## FIFTH SEMESTER

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Arc. 5109

Building Services - II (Plumbing Design)

Unit:1.0

### Module 1

Water Supply: Sources of water supply, standards of purity and treatment of water, qualities of potable water. Domestic water distribution system, various kinds of water meters, capacity of overhead tanks and pumping plants required, calculation of water consumption.

### Module 2

Domestic water piping systems. Cold and hot water distribution within the building. Specifications and sketches of various sanitary fittings for buildings. Uses of valves, taps and their different types. Model bye laws regarding sanitation of buildings. House/service connection. Layout of water supply lines in a domestic house.

### Module 3

Sanitation: Basic principles of sanitation and disposal of waste matter from building. Brief description of various systems of sewage disposal and their principles. Details of a Septic tank and capacity calculation.

### Module 4

Sewer System: Quantity of sewage and storm water, infiltration, runoff calculation, Manning's formulae, partial flow diagram. Design of Sewers, shapes of sewers, factors affecting the design of sewers. Materials and joints used in sewer systems.

### Module 5

Sewer appurtenances: Manholes, Sub drains, culverts, ditches and gutters, drop inlets and catch basins roads and pavements, storm overflow/regulators. Manholes and septic tanks in relation to buildings. Intercepting chambers, inspection chambers and their proper location and ventilation of sewers. Laying and testing of sewer. Gradient used in laying of drains and sewers, and respective sizes.

### Module 6

Characteristics of sewage, Sewage treatment-(self- Purification), Disposal of sewage from isolated building (septic tank, imhoff tank), sewage breakdown.

Plumbing definitions and related terms, plumbing systems (one pipe, two pipe; etc), House drainage system, Drainage of sub-soil water.

### Module 7

Sanitary appliances and traps used. Design considerations on drainage scheme. Preparation of plan, Planning of bathrooms, lavatory blocks and kitchen in domestic and multi-storeyed buildings. Indian standards for sanitary convenience.

N.B. The treatment of the subject will be mainly descriptive along with tutorial assignments related to the architectural designs already prepared by the students and also planning and layout of water supply and sewerage system plan.

#### Recommended books :

1. B. C. Punmia; *Water Supply and Sanitation*.
2. S.C. Rangwala, *Water Supply and Sanitary Engineering*, Charter Publishing House, Anand 388 601, 1989.
3. C.S, Shah; *Water supply and Sanitation Engineering*.

## SESSIONAL SUBJECTS

### FIFTH SEMESTER

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Arc. 5206

Architectural Design-V

Unit: 1.5

- Design theory and application in more complex problems covering functional relationship, climatic condition, social aspects along with structural considerations and **basic building services**.
- Design Programme prepared by the students should take into account relevant building bye-laws and provision of **National Building Code**:
- The broad parameter for the design assignments are:

#### Main Design Problem

1. Commercial-cum- Residential complex (high rise) / Town Hall & Civic Center

Duration (approx.)

8 weeks (9 classes/week)

2. Exhibition Pavilion / Country Club house

5 weeks

#### Design (Time) Problem

Any one of the above, not covered in the class

Duration

8 hrs.

#### Viva voce

- Final Viva-vice on all the design assignments done in the semester

## SESSIONAL SUBJECTS

### FIFTH SEMESTER

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Arc.5010

Building Construction –IV

Unit: 1.0

	Topic	No. of Sheets
1	<b>SPECIAL DOOR &amp; WINDOW:</b> One way and both way-swinging door, sliding, folding, sliding folding door, revolving door, collapsible door, sliding type casement window. Window and ventilator with Aluminium frame.	3
2	<b>SUSPENDED CEILINGS:</b> Methods of suspended framing materials like – timber, pressed steel, aluminium, different covering materials – acoustical board, gypsum board, PVC tiles etc. special consideration of fire and acoustical insulation.	3
3	<b>INSULATIONS:</b> Sound and Heat Insulation in the building, Special flooring and walling details of auditorium and recording studios, Special treatment adopted for heat insulation in cold storages, construction of cavity wall with different thermal and acoustical insulative system.	3
4	<b>SITE VISIT:</b> At least three visit to be paid to the construction site covering various sequences of construction and a report to be submitted by individual students as a part of the sessional work.	Report = 1
	Total Minimum No. of Sheets & Report	9+1

#### Reference Books:

1. W.B. MacKay, 'Building Construction', Vol. 1,2,3 longmans, U.K. 1981
2. B. C. Punmia; *Building Materials and Construction* .Laxmi Publications Pvt Ltd, New Delhi,1993.
3. Bindra & Arora; *Building Materials and Construction*.

## SESSIONAL SUBJECTS

### FIFTH SEMESTER

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Arc. 5207

Working Drawing - I

Unit: 1.0

#### Objectives

Explanation and demonstration of basics in working drawing study of process and symbols of working drawings.

Building construction drawings to be prepared as a part of contract document with proper labelling and dimensioning techniques.

Working drawing to be made of one building in a complex chosen from earlier design projects carried out in the 4<sup>th</sup> semester.

**Prerequisites:** BMC sessionals, Architectural Detailing

Topics	A1 size sheet
Layout plan of the whole complex and excavation plan of one building	2
Foundation plan	1
Ground floor plan along with schedule of internal finishes	1
Upper floor plans along with schedule of internal finishes	Minimum 1 [*as required]
Terrace/ roof plan including roof drainage	1
All 4 side elevation with labelling of one building	2
Minimum 2 sections including one through staircase and toilets	1
Door window schedule to be prepared for the undertaken building.	2

Minimum of 11 sheets to be done in the semester.

## **SESSIONAL SUBJECTS**

### ***FIFTH SEMESTER***

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**Arc. 5011**

**Seminar-III**

**Unit:0.5**

The purpose of this subject is to develop the student's capability to study, analyse and to improve their presentation skills on the knowledge acquired in the architectural subjects that are taught so far. They are required to do exercises and prepare presentations on the topics pertaining to the subjects that are taken in the current semester.

#### Section A

- a) Examples of excellent architectural work during introduction, advent of Steel and Ferro-concrete
- b) Examples of excellent architectural work during development of 'New Art & Architecture'.
- c) Chicago School & Organic Developments
- d) Programmatic Functionalism and Development of International Style
- e) 20<sup>th</sup> Century World Architecture
- f) Indian Architecture since Independence

#### Section B

- a) Sound Engineering and Room acoustics principles.
- b) Electro acoustics and Open air Acoustics.
- c) Environmental Noise Control.
- d) Design of auditorium.

#### Section C

- a) Sources of water supply, Domestic water distribution system, Domestic water piping systems. Cold and hot water distribution within the building
- b) Sewer appurtenances: Manholes, Sub drains, culverts, ditches and gutters, drop inlets and catch basins roads and pavements, storm overflow/regulators. Manholes and septic tanks in relation to buildings. Intercepting chambers, inspection chambers and their proper location and ventilation of sewers. Sanitary appliances and traps used.
- c) Design considerations on drainage scheme. Preparation of plan, Planning of bathrooms, lavatory blocks and kitchen in domestic and multistoried buildings.

NB: The media of presentation, submittals and specific topic will be finalized by the teacher responsible for the subject.



## 6<sup>th</sup> SEMESTER STRUCTURE

Subject Code	Subjects	Units
	<b>THEORY SUBJECTS</b>	
Arc. 6305	Building Services – III (Electrical & Lighting)	1.0
Arc. 6109	Building Services – IV (Mechanical and Fire Safety Services)	1.0
Arc. 6011	Steel Structures	1.0
Arc. 6012	Site Planning & Landscape Architecture	1.0
	<b>SESSIONAL SUBJECTS</b>	
Arc. 6306	Architectural Design – VI	1.5
Arc. 6307	Working Drawing – II	1.0
Arc. 6108	Structural Design (R.C.C)	0.5
Arc. 6013	Seminar-IV	0.5
Arc. 6014	Tour Report & Field Trip Drawing	0.5
	<b>Total Units.</b>	<b>8.0</b>

# THEORY SUBJECTS

## SIXTH SEMESTER

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Arc. 6305

Building Services III (Electrical & Lighting)

Unit:1.0

### A. Lighting & Illumination :

Module 1. Fundamentals of light

- Visual performance & vision
- Radiation
- Colour
- Optical properties of matter
- definition of terms
- Laws of Illumination
- Polar Curves

Module 2. Artificial sources of light; Lamps and their characteristics

Module 3. [a] Luminaries and their applications

[b] Standard level of illuminations for various tasks

Module 4. Basic lighting design – for interiors and exteriors.( includes, illumination, colour and quality, Types of luminaries, Position of luminaries)

Module 5. Lighting design of:

- Residential units
- Public buildings (Community hall, School, Hospital, Art – gallery etc.)
- Shops & Restaurants
- Office Complex (Computer centre, general office, conference hall etc.)
- Industrial sheds
- Parks & playgrounds
- Road/area lighting

### B. Electrical Services

Module 6. [a] Basic Electrical Distribution System

- Substation
  - Over head lines
  - Underground cables
- [b] Domestic wiring system
- Surface & concealed wiring
  - Wiring accessories

Module 7. [a] Symbols

[b] Lighting layout and single line-wiring diagram

[c] Safety aspects, protection of buildings against lightning

[d]Preliminary Estimation of Electrical & illumination works.

Text/Reference books/ Journals :

1. Derek Philips; *Lighting in Architectural Design*.
2. G.K.Lal, *Elements of Lighting*, 3-D Publishers.
3. R.G. Hopkinson and J.D.Kay, *The lighting of buildings*, Faber and Faber, London, 1969.
4. Philips *Lighting in Architectural Design*, McGraw Hill, New York, 1964.
5. I.E.S. Handbook.
6. International Lighting Review – Quarterly Journal.

# THEORY SUBJECTS

## SIXTH SEMESTER

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**Arc. 6109      Building Services IV (Mechanical & Fire Safety Services)      Unit: 1:0**

- Module 1      Introduction –
- Mechanical Services required in Buildings
  - Role of an Architect regarding mechanical Services.
  - The scope and impact of Mechanical system- Impact of space planning
  - Impact on Architectural Design
  - Impact on High rise Bldg
  - Impact on construction cost
  - Impact on Global environment
- Module 2      Mechanical Ventilation –
- Conditions for comfort
  - Standard requirements of ventilation for different conditions of living and works.
  - Control of quality, quantity, temperature and humidity of air.
  - Psychometric chart & its application
- Module 3      Principles of refrigeration & Air -Conditioning
- Different types of Air-Conditioning.
  - Cooling load Calculation
  - Major equipment used in Air conditioning - their characteristics & suitable place for location, consideration for reduction of heat gain and economic layout of supply and return air ducts.
  - Schematic drawings showing the Air conditioning system of an office building, hotel, auditorium etc.
- Module 4      Mechanical Equipments for vertical transportation – Building design and vertical transportation, Demand for vertical transportation
- Lift and Escalators: types, uses, functioning, automatic control system.
  - Plans & sections to explain different parts of lifts and escalators.
  - Planning for vertical transportation
- Module 5      Fire Safety
- Role and Importance, Fire safety design, planning for fire protection.
  - Fire detection & fire fighting
  - Different fire fighting methods to be adopted in buildings.

Recommended books

1. Arora & Duinkand,; “*Text book of Refrigeration & Air conditioning*”
2. Architectural Graphic Standard (HVAC System)
3. National Building code.
4. William.K.Y.Tao; “*Mechanical and electrical Systems in Buildings*”
5. V.P.Lang, ” *Principles of air conditioning*”
6. Rodney R.Alder ;”*Vertical Transportation for Building*”

# THEORY SUBJECTS

## SIXTH SEMESTER

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**Arc. 6011**

**Steel Structure**

**Unit:1:0**

**Module: 1 Basic Material Properties & Design Concept**

Material property of steel, Ductility, Behaviour of steel in cyclic loading, Different structural steel section used in India and their use. Different types of steel structural systems. Steel cable structural system, Structural configuration of tall steel structures Innovative use of structural steel, Hollow Tubular steel sections, Corrosion and fire resistance property of steel.

**Module: 2 Rivet & Weld**

Rivet and Welded connections. Property and the merits and demerits of Rivet and Weld. Different types of joints, Failure of Rivet and Weld. Rivet value. Bracket connection with eccentricity with Rivet and Weld. Numerical Problems

**Module: 3 Design of Beam**

Design Fundamental of Beam, Laterally supported and laterally unsupported beam, IS code provisions, Built-up-beams. Numerical Problems

**Module: 4 Design of Truss**

Design fundamental of compression and tension member with angles. Design of simple trusses. Numerical Problems.

**Module: 5 Design of Column**

Design Fundamental of Axially and eccentrically loaded column, IS code provisions, Built-up-Columns, Lacing and battened column. Column Splice, Numerical Problems

**Module: 6 Design of Connection**

Framed connection; unstiffened and stiffened seated connections for the connection for beam-beam and beam-column-beam, Numerical Problems

**Module: 7 Design of Foundation**

Slab base and gusseted base, column base subjected to axial load and moment; design of isolated grillage foundation, Numerical Problems

**IS Codes:**

1. IS 800
2. Steel Section Handbook

**NB:** *Students are allowed to bring IS 800 in the examination hall for referring the design solutions.*

**Recommended books:**

1. S.K.Duggal; *Design of Steel Structures*, Tata McGraw Hill, New Delhi.
2. Ramchandra; *Design of Steel Structures* (Vol. I).
3. Negi; *Design of Steel Structures*.
4. Sarwer Alam Raz; *Structural Design in Steel*, New Age International Publication
5. Thomas Burns; *Structural Steel Design*, Delmar Publication.

# THEORY SUBJECTS

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## SIXTH SEMESTER

**Arc. 6012                                      Site Planning and Landscape Architecture                                      Unit: 1.0**

Module 1: Site Planning Process: Need, Definition, scope and relationship in between site planning & landscape Arch.

Module 2: Site Analysis, Analysis of all natural and man-made factors of site, Tutorials on site analysis.

Module 3: Evolution of Garden Design: A brief study of different garden types: Mughal gardens, Indian Vedic Gardens, Japanese gardens, Chinese Gardens, English Gardens, French Gardens, Renaissance Gardens and Contemporary thoughts of landscape.

Module 4: Major and minor elements of Landscape: Land, water, plants, climate and their role in landscape design.

Module 5: Application of design fundamentals in out door space organization: Relationship of site, landscape and people, Areas, Nodes, Circulation, Passive and Active recreation spaces, Aesthetics, Landscape situations etc.

Module 6: Man made Elements of Landscape: Hard and soft landscaping, garden furniture, lighting fixtures, signage and sign boards, fences, garden hardware and surface treatment, paving materials, surface drainage, artworks, planters, garden shelters, artificial rocks, plants and water falls.

Module 7: Modern gardens: Rock garden, terrace garden, Indoor garden etc.

Recommended books:

1. Kevin Lynch ;*Site planning* ;MIT Press, Cambridge, MA – 1967
2. J. O. Simonds; *Landscape Architecture*; McGraw Hill.
3. J. E. Ingels; *Landscape – Principles and Practice*.

## SESSIONAL SUBJECTS

### SIXTH SEMESTER

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Arc. 6306

Architectural Design-VI

Unit: 1.5

- Design theory and application in the problems covering functional relationship, climatic condition and social aspects along with structural considerations. The project should also include all types of **building services** required for modern buildings and a **complete report**.
- Design Programme prepared by the students should take into account relevant building bye-laws and provision of **National Building Code**:
- The broad parameter for the design assignments are:

#### Main Design Problem

1. Sports Complex / Three star Hotel	Duration (approx.) 7 weeks (9 classes/week)
2. Auditorium(1000 Capacity) / Amusement park	5 weeks

#### Design (Time) Problem

Any one of the above, not covered in the class	Duration 8 hrs.
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#### Viva voce

- Final Viva-vice on all the design assignments done in the semester

\*Design programme prepared by the students should take into account applicable building bye-laws and provisions of building bye-laws.

## SESSIONAL SUBJECTS

### SIXTH SEMESTER

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**Arc 6307**

**Working Drawing - II**

**Unit: 1.0**

#### **Objectives**

Building construction drawings to be prepared as a part of contract document with proper labelling and dimensioning techniques.

Working drawings to be made in continuation of Working Drawing I for the building complex chosen earlier in Working Drawing I.

**Prerequisites:** Working Drawing I, Architectural Detailing.

Topics	A1 size sheet
External finishes of all types included in the complex; the drawings shall include all details required. Development of 'skin sections'.	1
Details of toilets including plan, elevation, sections of it.	2
Details of kitchen including plan, elevation, sections of it.	2
Layout of sanitary and plumbing lines on site and connection with the main sewer/ septic tank	1
Designing and detailing of septic tank and soak pit and a typical G.T., I. Chamber etc.	1
Electrical layout of a typical floor including specification of fixtures	1
Site plan of the whole complex including landscaping layout and few chosen details	2
Specific details required in the building complex.	1
Municipal submission drawings	2

Minimum of 12 sheets to be done in the semester.

## **SESSIONAL SUBJECTS**

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### **SIXTH SEMESTER**

**Arc 6108**

**Structural Design (R.C.C.)**

**Unit: 0.5**

1. Properties of Concrete, Tests on concrete and its ingredients: Fineness and soundness of cement, Slump test, compaction factor test, cube test
2. Model design of different R.C. Structural components: Beam, Slab, Column, Stair and Foundation.
3. Design Exercise: Complete Analysis and Design of a R.C Frame building, under different types of load combination.
4. Seminar presentation on various aspects of Reinforced concrete structures.

**IS Codes:**

4. IS 465: 2000.
5. SP-16
6. SP-34

*Same IS-Code and books should be referred as mentioned in the theory course*



## **SESSIONAL SUBJECTS**

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### **SIXTH SEMESTER**

**Arc 6013**

**Seminar-IV**

**Unit:0.5**

The purpose of this subject is to develop the student's capability to study, analyse and to improve their presentation skills on the knowledge acquired in the architectural subjects that are taught so far. They are required to submit reports and prepare presentations on the topics pertaining to the subjects that are taken in the current semester.

#### **Section A.**

- a) Artificial sources of light and lighting design for different areas.
- b) Basic electrical distribution systems and electrical layout in buildings.
- c) Different types and specifications of luminaries and their applications.
- d) Safety aspects, protection of buildings against lightning

#### **Section B.**

- a) Principles and different types of Air-conditioning, and schematic layout in hotel, building, auditorium.
- b) Vertical Transportation, types, plan and sections, functioning and automatic controls.
- c) Fire detection and fire safety measures in a building.

#### **Section C.**

- a) Evolution of Garden Design: A brief study of different garden types: Mughal gardens, Indian Vedic Gardens, Japanese gardens, Chinese Gardens, English Gardens, French Gardens, Renaissance Gardens and Contemporary thoughts of landscape.
- b) Major and minor elements of Landscape: Land, water, plants, climate and their role in landscape design
- c) Relationship of site, landscape and people, Areas, Nodes, Circulation, Passive and Active recreation spaces, Aesthetics, Landscape situations etc.
- d) Man made Elements of Landscape and examples of Rock garden, terrace garden, Indoor garden

**NB:** The media of presentation, submittals and specific topic will be finalized by the teacher responsible for the subject.

## SESSIONAL SUBJECTS

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### SIXTH SEMESTER

**Arc 6014**

**Tour Report and Field trip Drawing**

**Unit:0.5**

**(Compulsory attendance in the field trip organized by the department is required in order to register for this subject)**

#### Section (A) Tour Report

The students are required to prepare a report based on the Educational Tour, taken on the current academic year, which will develop the skills and methods of report writing.

This will be supported by presentations in sheets, drawings, sketches, photographs and in electronic media.

The report should include the following:

1. The duration of the trip, the itinerary, the places visited, the number of pupil and teachers accompanying them.
2. The specific places, the important monuments, their description, historic background, architectural styles, present status, structural systems, special or notable features and an architectural unbiased criticism.
3. The people, societal framework, economical status, density, traditions and culture of the place/region.
4. Environment, natural flora and fauna, and manmade interventions- urban scape and its specific features, problems.
5. Summary: New things learnt questions that remained unsolved, conclusion.

#### Section (B) Field Trip Drawing

The measured drawing conducted during the tour, will be presented as well drafted drawings by the students.

It should be **hand drafted** and rendered and all the methods for **proper documentation** of the structure measured will be considered in the presentation.

This will follow a seminar, where the students will present their work verbally.

**NB:** The media of presentation, submittals and specific topic will be finalized by the teacher responsible for the subject.

## 7<sup>th</sup> SEMESTER STRUCTURE

Subject Code	Subjects	Units
	<b>THEORY SUBJECTS</b>	
Arc. 7204	Pre-fabrication & Modular Co-ordination	1.0
Arc. 7109	Principles of Human Settlement & Urban Design	1.0
Arc. 7010	Building Economics, real estate management &, marketing.	1.0
Arc. 7011	Estimation and Costing	1.0
Arc. 7012	Structural Systems	1.0
	<b>SESSIONAL SUBJECTS</b>	
Arc. 7206	Architectural Design – VII	2.0
Arc. 7107	Structural Design (Steel)	0.5
Arc. 7013	Seminar-V	0.5
	<b>Total Units.</b>	<b>8.0</b>

# THEORY SUBJECTS

## SEVENTH SEMESTER

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Arc. 7204

Prefabrication & C. E. C. Technologies

Unit: 1.0

Module 1:

### **Introduction to the concepts of standardization**

Need, Importance and aim

Evolution of practice of standardization

Classification, Requirements & Validity of standards

Terms and definitions

Process of standardization & Actions for establishment of standards

Module 2:

### **Introduction to concepts of Modular coordination**

Objectives of Modular coordination & Definition of Basic Module

Modular controlling dimensions, Planning Modules and preferred Multi-modules, Nominal size vis-à-vis Actual size

Planning & placing of components

Annotations for Modular Drafting practice

IMG recommendations on choice of multi-modules & BIS (NBC) recommendation on choice of modules for various building components

Module 3:

### **Concepts of system building & Number Patterns**

Definition and classification of systems buildings

Concept of open system

Concept of closed system

Preferred sizes & need of Number Patterns

Importance of Arithmetic, Geometric, Fibonacci Series etc

Ehrenkratz's Modular Number Pattern

Module 4:

### **Introduction to concepts of prefabrication**

Factors affecting the growth of prefabrication industry

Advantages & disadvantages of on site & off-site prefabrication with respect to Indian scenario

Terms & Definitions as in IS (NBC)

Methods of prefabrication & Examples of prefabricated components

Process of prefabrication

Various issues related to prefabrication industry & Examples of early prefabrication concepts

Module 5:

### **Concepts of Standardization of Joints and Tolerances**

Importance of standardization of Joints & classification of joints

Considerations for corner connections & examples of various joints

Concept of Tolerance for Deviations in component sizes

Tolerance equalization at joints

Module 6:

**Cost Effective & environment Friendly Technologies**

Innovative Building materials:- Sand-lime, Flyash lime, clay- flyash bricks, pre-cast concrete blocks, precast concrete stone masonry blocks

Cost Effective Foundation & walling techniques: arch foundation. Rat trap bond etc.

Cost effective roofing techniques: Ferro-cement vaults, Wardha technique, Pyramidal roof etc.

Module 7:

**Cost Effective Pre-cast Roofing & Flooring Components**

RCC Planks & Joists, Pre-cast Channel units, Thin RC ribbed slab, Pre-cast Waffle slabs, Pre-cast RC/ Pre-stressed cored slabs, Pre-cast Brick panels

Pre-cast RC Door & window frames, Pre-cast manhole covers, Ferro-cement door shutters, Ferro-cement water tanks

Reference Books:

1. Kelly; *The Prefabrication of Houses*
2. Nagarajan R.; *Standards in Building*;
3. Standards & Specifications for Cost-Effective, Innovative Building Materials and Techniques; BMTPC; New Delhi
4. Nissen H.; *Industrialized Building and Modular Design; Cement & Concrete Association; London; 1972*
5. Time Saver Standards: Design Data;
6. National Building Code; Bureau of Indian Standards; New Delhi; 1983

## **THEORY SUBJECTS**

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### **SEVENTH SEMESTER**

#### **Arc. 7109 Principles of Human settlement and Urban Design**

**Unit: 1.0**

Module 1. Objectives and scope of Urban design, Basic functions, principles and techniques. Value enhancement, aesthetics and conservation aspects.

Module 2. Surveys in Urban Areas, Scale in Urban design, Urban mass, perceiving & mapping a city, Urban Space. Urban activity & circulation. Examples at regional, metropolitan, Urban and project level.

Module 3. Designing the parts of city - central areas, the town center, civic spaces, shopping centres, Industrial Areas and estates. Residential areas & Housing.

Module 4. Techniques of Urban Design with emphasis on public policies, conservation and economic considerations, Road forms, serial, grid iron, Hierarchy of access routes - Pedestrian areas and malls & Urban elements.

#### Recommended Books:

1. Paul D. Spreiregen :*Urban Design. The Architecture of towns & cities*- McGraw Hill
2. Gordon Cullen ; *Town Scape*
3. Frederick Gibberd ; *Town Design*
4. Edmond Bacon ; *Design of cities*
5. Kevin Lynch; *Image of the city*
6. Lewis Mumford; *The City in history*
7. S. C. Rangwala; *Town Planning*
8. M. N. Buch ; *Planning the Indian City*
9. Gallion ,A.B; *The Urban Pattern*.

# THEORY SUBJECTS

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## SEVENTH SEMESTER

### Arc. 7010 Building Economics, real estate management &, marketing. Unit:1.0

Module 1	Introduction	<ol style="list-style-type: none"><li>1. Elements of Economics- concept of Utility, demand, production</li><li>2. Land Economics- concept, objective, scope.</li><li>3. Levels of Decision Making</li></ol>
Module 2	Values of Money	<ol style="list-style-type: none"><li>1. Concept and factors governing.</li><li>2. Time Values of Money &amp; Cost of Capital- Derivations of Annuity Formulae<ul style="list-style-type: none"><li>• Continuous Compounding and Discounting</li><li>• Various Costs of Capital</li><li>• Rate of Returns</li><li>• Weighted Costs of Capital</li></ul></li></ol>
Module 3	Demand Analysis	<ol style="list-style-type: none"><li>1. Demand forecasting and common methods of Demand Forecasting- Delphi Method, Trend Projection Method, and Exponential Method.</li><li>2. Uncertainties of Demand Forecasting</li></ol>
Module 4	Analysis of Projects	<ol style="list-style-type: none"><li>1. Project Constraints</li><li>2. Method of Ranking</li><li>3. Facets of Project Analysis</li><li>4. Introduction to Project Appraisal &amp; Feasibility Study</li></ol>
Module 5	Introduction to Valuation	<ol style="list-style-type: none"><li>1. What is valuation</li><li>2. Purpose of valuation and functions of a Valuer</li><li>3. Difference between value and cost and different types of values.</li><li>4. Essential characteristics of an ideal investment</li><li>5. Sinking fund</li><li>6. Year's Purchase</li><li>7. Depreciation, Obsolescence, Amortization, Annuity.</li></ol>
Module 6	Methods of Valuation	<ol style="list-style-type: none"><li>1. Rental Method, direct comparison method, profit based method, development method, land &amp; building method.</li></ol>
Module 7	Land its acquisition	<ol style="list-style-type: none"><li>1. Rent – definition and different types</li><li>2. Lease – definition and different types</li><li>3. Easement – characters, methods of creating and acquiring of easement</li><li>4. Land acquisition</li><li>5. Land ceiling</li></ol>

#### Recommended Books:

1. Prasanna Chandra, "Projects: Planning, Analysis, Selection, Implementation and Review"; Tata Mc-Graw Hill Publishing Company Limited; ISBN 0-07-462049-5
2. Baumol, "Linear Programming"; Tata Mc-Graw Hill Publishing Company Limited; ISBN 0-07-462049-5
3. Hamdy H. Taha, "Operations Research: an Introduction"; Prentice Hall of India Private Limited ISBN 81-203-1222-8
4. M. Chakraborty, "Estimating, Costing, Specification and Valuation in Civil Engineering"; Published by the author
5. BK Sengupta, Somnath Sen; ITPI Reading Journal; "Land Economics"

# THEORY SUBJECTS

## SEVENTH SEMESTER

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**Arc. 7011**

**Estimation Costing and Specification.**

**Unit: 1.0**

Module: 1 INTRODUCTION TO ESTIMATION & COSTING FOR BUILDING.

- Definition of “Building estimate”
- Purpose of Estimating.
- Different Types of Estimate.

Module: 2 APPROXIMATE ESTIMATE.

- Importance & purpose of Approximate / Rough estimation
- Different methods of approximate estimate

Module: 3 DETAILED ESTIMATE.

- Preparation of Detailed estimate.
- Function of “Measurement form” & “Abstract of estimate form”.
- Description & significance of Item in BOQ.

Module: 4 METHODS OF MEASUREMENT OF WORKS.

- Different methods estimating building works.
- Estimation of a simple building at different stages:
  - a) Foundation up to plinth
  - b) Superstructure
  - c) Finishing works

Module: 5 REINFORCEMENT QUANTITIES FOR RC WORKS.

- Calculation of quantity for Reinforced concrete(RC) for:  
Column, Lintel, Slab & Beam.

Module: 6 ANALYSIS OF RATE & QUANTITY OF MATERIALS.

- Purpose of Rate analysis.
- Quantity of Materials.
- Different components of rate

Module: 7 GENERAL SPECIFICATION & TYPES OF CONTRACT.

- General idea of specification of composite works in a building.
- Types of Tender / contract and the reflection in BOQ.
- Writing Items for BOQ for Item rate contract.

Reference Book

1. M. Chakraborty; *Estimating, Costing, Specification & Valuation*
2. B.N. Dutta; *Estimating & Costing*



# THEORY SUBJECTS

## SEVENTH SEMESTER

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**Arc7012**

**Structural Systems**

**Unit: 1.0**

Module 1. Prestressed Concrete

Analysis and approximate design of determinate beams, and losses of prestressing.

Module 2. Multistoried Buildings

Introduction, load action on high-rise buildings, various structural systems, approximate structural analysis and design. (no problem).

Module 3. Pneumatic Structures

Concept, development, laws of formation, merits and demerits.

Module 4. Cable Structures

Basic principles, various forms, their merits and demerits.

Module 5. Special Structures

Grids, Domes, shells, folded plates.

Module 6. Bulk active structures, form active structures, Vector active structures, surface active structures.

Module 7. Membrane structures, kinetic, mobile structures.

Recommened Books:

1. P.Dayaratnam, *Prestressed Concrete Structures*; Oxford and IBM Publishing Co.;New Delhi,1982
2. Wolfgang Schuller- *High Rise Building Structures*, John Wiley & Sons; New York1976.
3. Frei Otto; *Tensile Structures ; Vol-II, Pneumatic Structures, Cable Structures*: The MIT Press London.
4. N.Subramaniam; *Principles of Space Structures*: Wheeler& Co.; Allahabad 1983.

## SESSIONAL SUBJECTS

### SEVENTH SEMESTER

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Arc. 7206

Architectural Design-VII

Unit:2.0

- Design theory and application in the problems covering functional relationship, climatic condition and social aspects along with structural considerations. The project should also include all types of **building services** required for modern buildings and a **complete report, showing cost of the Project.**
- Design Programme prepared by the students should take into account relevant building bye-laws and provision of **National Building Code:**
- The broad parameter for the design assignments are:

<b>Main Design Problem</b>	<b>Duration (approx.)</b>
1. General or Specialist Hospital/ Campus Planning for Institutional Project	8 weeks (12 classes/week)
2. Multiplex / ANDC project	5 weeks
<b>Design (Time) Problem</b>	<b>Duration</b>
Any one of the above, not covered in the class	8 hrs.

#### **Viva voce**

- Final Viva-vice on all the design assignments done in the semester

## **SESSIONAL SUBJECTS**

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### **SEVENTH SEMESTER**

**Arc. 7107**

**Structural Design (Steel)**

**Unit:0.5**

1. Model design of different Steel Structural components: Beam, Column, Connection and Foundation.
2. Design Exercise: Complete Analysis and Design of a Simple roof truss. With various load combinations
3. Design Exercise: Complete Analysis and Design of a Steel Moment Resistant Frame building, under different types of load combination.
4. Seminar presentation on various aspects of Steel structures.

*Same IS-Code and books should be referred as mentioned in the theory course*

**Arc. 7013****Seminar-V****Unit: 0.5**

The purpose of this subject is to develop the student's capability to study, analyse and to improve their presentation skills on the knowledge acquired in the architectural subjects that are taught so far. They are required to submit reports and prepare presentations on the topics pertaining to the subjects that are taken in the current semester.

**Section A**

1. Concepts of basic modular coordination and examples
2. The examples of prefabrication and their use.
3. concept of System building and number pattern
4. Cost effective building construction techniques

**Section B**

1. Valuation of a property using various methodologies.
2. The working principles of Financial Institutions, term loan procedures.
3. Preparation of a project appraisal report.

**Section C**

1. Design methodologies for a typical barrier free building
2. Design inputs to make public space barrier free.
3. Examples for barrier free environment from across the world.

**Section D**

1. Examples from master architects on structural systems.
2. Working principals of some of the structural systems.

**NB:** The media of presentation, submittals and specific topic will be finalized by the teacher responsible for the subject.

## 8<sup>th</sup> SEMESTER STRUCTURE

Subject Code	Subjects	Units
	<b>THEORY SUBJECTS</b>	
Arc. 8301	Housing and settlement systems	1.0
Arc. 8204	Energy Efficient Building	1.0
Arc. 8010	Disaster Management and barrier free environment	1.0
Arc. 8105	* Elective I	1.0
	<b>SESSIONAL SUBJECTS</b>	
Arc. 8206	Architectural Design-VIII	2.0
Arc. 8207	Interior Design	1.0
Arc. 8011	Introductory Seminar on thesis project	1.0
	<b>Total Units</b>	<b>8.0</b>

Subject Code	* Elective-1
Arc. 8105	Conservation And Heritage Management
Arc. 8106	Advanced Landscaping
Arc. 8107	Introduction to Urban and Regional Planning
Arc. 8108	Industrial Architecture

# THEORY SUBJECTS

## EIGHTH SEMESTER

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Arc. 8301

Housing and settlement systems.

Units: 1.0

### 1.0 Module 1: Introduction to Housing

- 1.1 Definition & concept of Housing
- 1.2 Types of Housing: Detached, semi-detached, row, town house, apartment, Farmhouses etc.
- 1.3 Form of Housing provision: Plotted, Group Housing, Cooperative, Self Help, Leasehold, Freehold / Condominium, Rental Housing etc.
- 1.4 Special Housing types: Barrier free, Mobile homes, congregate housing for assisted living, disaster housing, Student & public housing, Guest house, Night shelters, Incremental Housing etc.

### 2.0 Module 2: Housing Scenario & Housing Finance

- 2.1 Housing situation in India: an overview
- 2.2 Census classification of houses, Computation of Housing Shortage
- 2.4 Housing Finance: Formal & Informal Housing Finance Markets, Mobilisation of Savings, Sources of Capital & Institutional Finance
- 2.5 Housing Micro-finance for Poor: Issues & Constraints
- 2.6 Housing Need vis-à-vis Demand, Public vis-à-vis Private Sector

### 3.0 Module 3: Housing & Urban slums

- 3.1 Understanding the causes of growth of Slums, Squatter settlements & Urban sprawl
- 3.2 Assessment of the needs of their residents vis-à-vis other citizens
- 3.3 An overview of measures & approaches to slums & squatter settlements
- 3.4 Objectives of National Slum Policy (2002)
- 3.5 Concept of few schemes e.g.: Site & Services, EIUS, UBSP, VAMBAY
- 3.6 Concept of Slum Networking

### 4.0 Module 4: Affordable Housing, new trends & Housing Policy

- 4.1 Components of Housing Cost & approach for affordable housing
- 4.2 Characteristics of Urban housing vis-à-vis Rural housing
- 4.3 Goals, Objectives & contents of National Housing Policy (1994)
- 4.4 Examples of housing schemes & programmes e.g., IAY, IHSDP etc.
- 4.5 Study of rural housing characteristics in the eastern region

### 5.0 Module 5: Urban settlement Planning system & Processes

- 5.1 Recommended Planning system & inter-related plans
- 5.2 Scope, purpose & inter-relationship of various plans
- 5.3 Plan formulation & approval process
- 5.4 Public sector & private sector actions & concept of joint venture
- 5.5 Contents of a Development plan

### 6.0 Module 6: Norms & Standards for Urban & Housing Development

- 6.1 Town & Residential density, FAR, Different types of codes/ norms affecting settlement development planning,
- 6.2 Land –use Classification & concept of compatibility of uses (e.g., compatible uses in residential zone)
- 6.3 Impact of distance & standards of community facilities
- 6.4 Land area requirement for different uses in a town & for community facilities in a sector/ residential planning area
- 6.5 Empirical formula for space standards (facilities)
- 7.0 Module 7: Lot layout & subdivision for Housing**

- 7.1 Concepts of cluster, Blocks & Neighbourhood
- 7.2 Neighbourhood planning principles & examples
- 7.3 Neighbourhood street classification
- 7.4 Considerations for typical street layouts
- 7.5 Design considerations for subdivisions

Recommended books:

1. J.D.Chicara et al; *Time Saver Standards For Housing & Residential Development.*
2. Bawa R. L., Fernandes B. G.; *Design for Living: A Guide for Planning of Residential Neighbourhoods; Galgotia Publishing Company; N. Delhi*
3. Ilay Cooper, Barry Dawson, *Traditional Buildings of India*
4. Modak & Ambedkar; *Town & Country Planning & Housing*
5. Poulouse K T(compiled); *Reading Material on Housing; Institute of Town Planners, India; New Delhi; 2002*
6. ITPI; *Urban Development Plan Formulation & Implementation Guidelines; Ministry of Urban Development & Poverty Alleviation; Govt. of India*
7. Charles Abrams; *Housing in the third world*

# THEORY SUBJECTS

## EIGHTH SEMESTER

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**Arc. 8204**

**Energy Efficient Buildings.**

**Unit:1.0**

Module1 Introduction **energy issues:**

Definition of Energy, its types and different sources. Historical Growth of use of energy, Global Energy Scenario, Energy Crisis.

Module2 Energy **and Building**

- (a) Energy consumption in Buildings
- (b) Use of Solar energy in buildings.

Module 3 Energy **efficient landscapes-** site planning, Role of landscape in climate moderation, Factors affecting energy consumption, Microclimatic design.

Module 4 **Passive Architecture**

- (i) Energy efficient features- built structures, special materials and construction techniques.
- (ii) Passive solar heating – Solar building types and their special considerations, Factors affecting heating, storage and distribution of energy in buildings. Passive solar heating techniques.
- (iii) Passive cooling techniques. e.g. Use of water, earth air tunnel, earth-berms, etc. hybrid techniques.

Module 5 **Active Solar Architecture - Solar system components:**

- Solar collectors, storage, distribution, factors of efficiency etc.
- Design aspects of cooling systems.
- Other applications of solar energy – Swimming pool heating, water purification, solar cooling, and agricultural drying.

Module 6 **Other techniques of saving energy in building construction.**

Efficient Illumination, Efficient use of day lighting, Use of grey water, Waste recycling. Concept of High performance buildings, Green building concepts. (Brief introduction to the concept of LEED ratings).

Module 7 Discussion on recent development and work on energy efficient buildings by the experts in this field.

Recommended Books:

1. Bruce Anderson; "Solar Energy : Fundamentals in Building design "
2. Anna Main, S. Rangarajan ; "Solar radiation over India ."
3. B. J. Brinkworth; " Solar energy for Man ."
4. H. P. Garg.; "Advances in solar energy Tech. "
5. Lunde; "Solar Thermal Engg. "



# THEORY SUBJECTS

## EIGHTH SEMESTER

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**Arc. 8010            Disaster Management and barrier free environment.    Unit: 1.0**

### MODULE I

**Contemporary, Natural & Man-made Disaster:** Fundamentals of Disaster, Dimension & typology of Disaster, Phases of Disaster, Social & Political imperatives, Scale of Disaster, Causes of Disaster, and Disaster Cycle.

**Agencies in Relief:** Organisations dealing with disaster, UNDRO's mandate in Disaster relief and management, Role of UN in emergencies, IDNDR. Risk assessment & Analysis: Estimation of Risk, Problems with risk assessment, Risk perception and communication, instruments and equipments involved, Objectives of assessment, Type of risk.

### MODULE II

**Common Disasters:** Causes, General characteristics, Predictability, Factor contributing to vulnerability, Risk reduction measures, Management measures, Specific preparedness, Plan for cyclone, flood, drought, earthquake, landslides and arsenic contamination.

Earthquakes: Causes, Plate tectonic and seismic waves, Magnitude and Intensity of earthquake, Seismic Zones, BIS provisions on earthquake resistant built environment for non-engineered and reinforced concrete buildings. Fundamental of ductile detailing.

### MODULE III

**Planning Considerations:** Study of disaster and effects on settlements, disaster atlas, Intervention into land use plan. Post Disaster Action & Institutional Involvement: Post disaster action, Community rehabilitation, Temporary and permanent basis, Institutional involvement and policy institutes

### MODULE IV

Types of disability, Devices and Controls, Defining Architectural design requirements, Classification of Buildings and Access provisions.

### MODULE V

**Design Elements with in the buildings:** Site planning, parking, approach to plinth levels, corridors, entrance and exit, windows, ramps, stairways, lifts, toilets, signage, guiding and warning systems, floor finishes and materials. Design Elements Outside the building; kerb at footpath, road crossing, public toilet, bus stop, telephone booth, signage.

### MODULE VI

Provisions in residential buildings, auditorium, parks, restaurants, railway stations etc. Access Audit; definition, purpose and method, retrofitting techniques for barrier free environment.

### MODULE VII

Model Building Byelaws related with Barrier.Free.Environment. Universal Design; Concept, definition, purpose and principles.

### Recommended Books:

(Disaster Management)

1. Vinod Kr. Sharma; *Disaster Management, IIPA, New Delhi.*
2. Robert McNamara; *Blundering into Disaster, 1987, Bloomsbury, London.*
3. Disaster Prevention and Mitigation, 1984, UNDRO Publication, Geneva.
4. Disaster Response,- A Handbook for Emergencies, Babu Thomas, 1993, Church's Auxiliary for Social Sector.

(Barrier free Environment)

5. Guidelines and Space Standards for Barrier Free Built Environment for

Disabled and Elderly Persons, CPWD, Ministry of Urban Affairs and Employment, India.

6. Universal Design, Selwyn Goldsmith, Architectural Press.

7. Timesaver Standards for Building Types,

8. National Building Code, 2005.

## **ELECTIVE-I SUBJECTS**

### ***EIGHTH SEMESTER***

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**Arc. 8105**

### **Architectural Conservation And Heritage Management(Elective I)**

**Units: 1.0**

Module 1: Definition of conservation and its socially accepted meanings, objectives, Theories, Principles and concepts of conservation and its application. Values and Ethics in conservation and Degrees of intervention in historic buildings & monuments & Why to conserve issues.

Module 2: History of conservation movement in the world and Indian response to the movement. History of Indian conservation movement. Development of theory of conservation and various charters of International importance like Venice Charter, Burra Charter, Bombay Heritage Act.

Module 3: Causes of Decay in Cultural property, External causes of Decay, Biological & Botanical causes, Natural disasters & Man made causes of decay, Remedies for these decay. The context of inspecting historic building – Inventory – Initial inspections of buildings – continuing Documentation, norms for grading and enlisting.

Module 4: Actual conservation techniques for relevant building materials. Some specifications & instruction about parts of buildings. Such as foundations walls, chhajjas, wall tops, roofs & terraces with various examples of conservation practised globally.

Module 5: Concept of Historic towns, quarters & areas concept of Heritage zone and concept of Integrated conservation with global examples.

Module 6: Conservation Planning based on inspections and surveys. Examples of Revitalization projects all over the world. Reuse and Redevelopment of historic building and areas with examples of actual projects. Procedures for giving new uses to old buildings, examples of infill.

Module 7: Planning and Management aspects in conservation. Policies, legislation and agencies of conservation. Intra-disciplinary monitoring and management techniques. Economics in conservation, Public management of heritage, heritage ecosystem,

#### Books :

1. Sir Bernard M. Feilden; *Conservation of Historic Buildings*, Architectural Press, London.
2. Sir Bernard M. Feilden; *Guidelines for conservation*; Architectural Press, London.
3. A. G. K. Menon & B. K. Thapar; *Heritage Zones*
4. Xavier Greffe; *Managing our Cultural Property*; Aryan Book International, New Delhi.
5. Anthony Tugnutt & Mark Robertson; *Making Townscape*;
6. Robert Pickard; *Policy involved in Heritage Conservation*;
7. Eduardo Rojas & Claudio de Moura Castro; *Lending for Urban Heritage Conservation*.
8. Nahoum Cohen, *Urban Conservation*.

## **ELECTIVE-I SUBJECTS**

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### ***EIGHTH SEMESTER***

**Arc. 8106**

**Advanced Landscaping (Elective I)**

**Units: 1.0**

Module 1. Relationship of man and nature - Relevance of landscape in urban context.

Module 2. Process of designing a landscape and role of the landscape Architect.

Module 3. Need for harmony – difference between natural and planned landscape – the planning process.

Module 4. Visual elements in the landscape.

Module 5. Landscape on different types of site/landform – site analysis.

Module 6. Details of

- (a) Soil                      (b) Drainage              (c) Soft landscaping
- (c) Hard landscaping; With respect to different use of spaces.

Module 7. Highlights of

- (a) Residential landscaping
- (b) Commercial landscaping
- (c) Recreational landscaping
- (d) Industrial landscaping

Module 8. Preparation of layout of landscaping for a residence and an amusement park.

Text/Reference Books :

- 1.Leroy Hannebaum; *Landscape Design ( A practical Approach)*.
- 2.Howard Loxton; *The Garden*.
- 3.James B. Root; *Fundamentals of landscaping and site planning*.

## **ELECTIVE-I SUBJECTS**

### **EIGHTH SEMESTER**

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#### **Arc. 8107 Introduction to Urban & Regional Planning (Elective I) Units: 1.0**

##### Module:1 TOWN PLANNING PRINCIPLES.

- Physical nature and characteristics of urban environment, categories of town.
- Planning surveys, types & techniques.
- The interim & comprehensive plans: Structure Plan, Master plan, Zonal dev. plans

##### Module: 2 URBANISATION AND CITY / METROPOLITAN PLANNING IN INDIA

- Trend of urbanization and urban development in India.
- Effect of migration, conurbation and population growth, both physical & social.
- Changing urbanity between city and metropolis.
- Metropolitan region and problem of major agglomeration
- Decentralization: merits and demerits for the growth of metropolis

##### Module: 3 TOWN PLANNING PRACTICES IN DIFFERENT PARTS OF THE GLOBE

- Utopian concepts of Robert Owen, J.S. Buckingham, etc.
- Concept of Garden City & Satellite garden towns.
- City planning concept of as proposed by Tony Garnier, Le Corbusier, F.L. Wright, etc.

##### Module: 4 URBAN RENEWAL AND REGENERATION

- Restructuring of existing Urban Areas
- Renewal through Urban infrastructure upgradation
- Urban Governance and Reforms
- Economically productive, equitable and responsive Urban areas.

##### Module: 5 TRAFFIC AND TRANSPORTATION PLANNING.

- Basic terminologies of Traffic & Transportation.
- Classification of Urban roads & types of street system.
- Transportation system and its impact on urban planning.
- Traffic management & traffic surveys.
- Traffic control measures.

##### Module: 6 ENVIRONMENTAL PLANNING.

- Environmental issues, acts / legislations
- Environmental Impact Assessment
- Environmental economics
- Environmental management specific to Soil waste management, forest management, watershed, natural resource management. (concepts of cleaner products/ green building)

##### Module: 7 REGIONAL PLANNING.

- Definition, scope and content of Regional planning.
- Methods and purpose of regionalization.
- Regional growth process & growth centres.
- Regional economic / industrial locations.

##### Reference Books

1. A.B. Gallion; *The Urban Pattern*
2. Edmund N. Bacon; *Design of Cities*
3. Lewis Mumford; *The City in History*
4. Abir Bandyopadhyay; *Textbook of Town Planning*,
5. R.L. Bawa & B.G. Fernandes; *A Guide for Planning of Residential Neighbourhood*
6. J. Glasson; *Introduction to Regional Planning*
7. C.A. Doxiadis; *EKISTICS: An Introduction to the science of human settlement pattern*
8. Christopher Alexander, *Pattern Language*, Oxford University Press, Oxford.

## ELECTIVE-I SUBJECTS

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### EIGHTH SEMESTER

Arc. 8108

Industrial Architecture (Elective I)

Units:1.0

Module: 1 HISTORICAL DEVELOPMENT OF INDUSTRIAL ARCHITECTURE.

- Definition of Industrial structure
- Evolution & classification of Iron used for structure
- Use of Iron / Steel in industry in post Industrial revolution
- Contribution of Walter Gropius and other architects in design of industrial structures

Module: 2 CLASSIFICATION OF INDUSTRIES

- Classification as per Nature of dependence, product & nature of production, etc.
- Classification as per pollution norms.

Module: 3 ARCHITECTS' ROLE IN DESIGN OF INDUSTRIAL PREMISES

- Understanding the Plant layout and its requirements
- Finalisation of Structural form
- Selection of fabric ie. Flooring, roofing, wall covering, etc.
- Preparation of Lighting & colour scheme.
- Human comfort in work place.

Module: 4 ARCHITECTS' ROLE IN NON-PLANT & WELFARE FACILITIES IN INDUSTRY

- Administrative building
- Change, Shower & Locker facilities.
- First aid / Health care, Child care etc.
- Refreshment / canteen, Rest room, Recreation facilities.
- Time & Pay Office, Security & gate complex.

Module: 5 PLANNING CONSIDERATION OF INDUSTRIAL AREA & INDUSTRIAL ESTATE

- Planning of plant facilities in terms of infrastructure, movement pattern of man, raw materials & finished products, security and connectivity.
- Planning of Auxiliary facilities & Services for the plant.
- Planning of Non-plant & Welfare facilities, like Administrative Bldg., Canteen, Health, etc.
- Planning of Residential facilities, (if required).
- Development of Industrial Estates in Europe and India.

Module: 6 VARIOUS STAGES OF INDUSTRIAL PROJECTS & MODERN APPROACH IN DESIGN OF INDUSTRY

- Site selection for the industry.
- Preparation of F.R. & D.P.R.
- Detail design & Engineering.
- Project execution, monitoring & commissioning
- Present trend in industrial architecture in terms of concept, materials & construction.

Module: 7 ENVIRONMENTAL ASPECTS, FACTORY ACTS & OTHER STATUTORY RULES & REGULATIONS RELATED TO INDUSTRY

- EIA / EMP reports,
- Pollution control measures in terms of air, water, waste, noise etc. and landscaping.
- Safety measure & warning system.
- Factory acts & its input to factory design
- Role of various agencies for statutory clearance for industries.

### RECCOMENDED BOOKS

James F. Munce; *Industrial Architecture*

Carls Broto; *Architecture for Industry*

Alan Phillips; *The best in Industrial Architecture*

## SESSIONAL SUBJECTS

### EIGHTH SEMESTER

Arc. 8206

Architectural Design-VIII

Unit:2.0

- Design theory and application in the problems covering functional relationship, climatic condition and social aspects along with structural considerations. The project should also include all types of **building services** required for modern buildings and a **complete report showing cost of the Project**.
- Design Programme prepared by the students should take into account relevant building bye-laws and provision of **National Building Code**:
- The broad parameter for the design assignments are:

#### Main Design Problem

- |  | Duration (approx.)        |
|--|---------------------------|
| 1. Terminal facilities for Bus or Modal interchange for Rlys / Housing Project | 8 weeks (12 classes/week) |
| 2. Public building / Bank or Departmental store                                | 5 weeks                   |

#### Design (Time) Problem

- |  | Duration |
|--|----------|
| Any one of the above, not covered in the class | 8 hrs.   |

#### Viva voce

- Final Viva-vice on all the design assignments done in the semester

## **SESSIONAL SUBJECTS**

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### ***EIGHTH SEMESTER***

**Arc. 8207**

**Interior Design**

**Unit:1.0**

Introduction, definition, scope and necessity of Interior design; Exercises to demonstrate role of building materials, furnishings, furniture, illumination, services, fixtures, hardware, plants etc in Interior design; Interior design of the following spaces considering the modern development of materials, fittings and fixtures, illumination, furniture, plants, and the cost of the proposed design work.

**Projects :**

Interior designs for homes, offices, factories, library, hospitals, hotels, shopping malls, showrooms, cinema and exhibition halls. Interior Design of Minimum two projects must be undertaken.



## **SESSIONAL SUBJECTS**

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### ***EIGHTH SEMESTER***

#### **Arc. 8011      Introductory seminar on thesis Project**

**Units-1.0**

The purpose of the subject is to develop within students, the faculty of research in architecture, scientific methods with special emphasis on architectural research, Presentation Methodologies, Evaluation, Report writing.

#### **Thesis Project Proposal.**

Each student shall submit three proposals for the project, he/she wants to undertake in order of preference. The project shall be LIVE as far as possible. Each of the proposal should have following information presented in form of properly typed/neatly hand written on A-4 size paper.

- (a) Title of Project
- (b) Authority Proposing the project with address
- (c) Site area, location
- (d) Brief about the project giving broad requirement, cost etc.

The synopsis shall be properly bound.

#### **Thesis Project introduction.**

After the thesis topic is finalized, the student has to present a seminar on his/her topic. (Stage I)  
The introductory seminar will include presentation of the topic furnishing the above mentioned information along with a research –based **conceptual study** on any aspect of architecture/ case study of the buildings, structures that is directly associated with the thesis topic.

Presentation at this stage should have the following:

- a) “Project Profile” explaining the project and scope, its ownership/client along with reason for selecting the project.
- b) “Case Study” ( min 2 nos) and Literature study (min. 1 no.) of similar projects executed, with comparative statement and inferences drawn.

## 9<sup>th</sup> SEMESTER STRUCTURE

Subject Code	Subjects	Units
	<b>THEORY SUBJECTS</b>	
Arc. 9102	Professional Practice and Building regulations	1.0
Arc. 9103	Construction Management	1.0
Arc. 9005	* Elective2	1.0
	<b>SESSIONAL SUBJECTS</b>	
Arc. 9104	Thesis Project	5.0
	<b>Total Units</b>	<b>8.0</b>

Subject Code	* Elective-2
Arc. 9005	Visual Communication
Arc. 9006	Architectural Journalism
Arc. 9007	Vernacular Architecture
Arc. 9008	Control And Systems Of Services For Intelligent Building

## **THEORY SUBJECTS**

### **NINTH SEMESTER**

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#### **Arc. 9102 Professional Practice and Building Regulations**

**Unit:1.0**

Module 1. Role of Professional body - Indian Institute of Architects, its working, constitution and bye laws, categories of membership, election procedures. Code of conduct. Role of its conventions, Its publications etc.

Module 2. Architects Act 72 :

Detailed study of the act and its provisions and recent amendments. Role and responsibilities of Council of Architecture. Role of its electorate, procedure of membership.

Module 3. Scale of charges :

Responsibilities of the architects, copy rights, scale of charges, variation of charges, mode of payment, termination of services. Specialized building services. Professional service tax.

Module 4. Building bye laws, submission plans, Methods of municipal approval, National Building Code and other regulatory aspects such as Master plan and zonal plans.

Module 5. Architects in practice :

- (a) Private practice - Partnership office management, methods of organization, filing, documentation and working.
- (b) Salaried appointment - Public sector, Private sector jobs, procedure of operation in government organization.

Module 6. Contracts and Construction process:

Types of building contracts, their merits and demerits. Preparation of tender documents, method of writing tenders, opening of tenders. Preparation of contract documents, general conditions of contract, interim certificates, defect liability periods, retention amount, security deposits, mobilization money and virtual completion.

Module 7. Architectural Competitions: Its purpose, Types of Architectural competitions, Its guidelines for participation, prizes, assessment, etc.

#### Recommended Books :

1. Roshan Namavati; *Professional practice*.
2. Code of Professional Practice : I. I. A.
3. Architect Act 1972.
4. Handbook of Professional Documents- 2005, by Council of Architecture.

# THEORY SUBJECTS

## NINTH SEMESTER

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**Arc. 9103**

### **Construction Management**

**Unit:1.0**

#### **Module 1. Introduction and various stages of Construction Management.**

Introduction to Management Principles. Introduction and objective of Construction Management. Types of construction Projects. Responsibilities of Project Manager. Life cycle of Project and various stages of Construction Management.

#### **Module 2. Bar Chart & Milestone chart**

Introduction to Construction Planning & Scheduling techniques. Traditional techniques: concept of Bar Charts and Milestone charts. Cost & Resource Scheduling through Bar Chart Examples. Merits and demerits of Bar Chart.

#### **Module 3. Network Theory –I (CPM)**

Introduction of Network Theory. Definitions and different types of: Event, activity, dummy, Network rules, Network event numbering (Fulkerson Rule), Hierarchies of complex network, Examples. CPM. Different element of CPM network with examples, Floats, Numerical Problems.

#### **Module 4. Network Theory –II (PERT)**

Introduction to PERT, Conceptual difference between PERT and CPM, Time Estimates, Event times, Slack, Time Computations with normal probability theory. Numerical Problems

#### **Module 5. Project Feasibility & Monitoring Technique**

Project alternative selection technique, Time value of money, Investment Criteria: Pay Back Period, IRR NPV, Benefit Cost Ratio, and Break-Even Analysis.

Project Monitoring Technique: Work Breakdown Structure, Progress Curve Method, Line of Balance.

#### **Module 6. Cost & Resource Optimization Techniques**

Cost Model: Direct & Indirect Cost component of Project, Cost Slope. Project Cost-Time analysis and optimization. Resource Usage Profile, Histograms. Resource allocation, smoothing & levelling Techniques. Project Updating

#### **Module 7. Construction Equipments, safety and quality control**

Different types of Construction Equipments, Construction Safety requirements, Factor effecting quality of construction, Introduction to computer aided project management techniques.

1. Dr. B. C. Punmiya and K. K. Khandelwal – *Project Planning and Control with PER\CPM* Laxmi Publications, New Delhi, 1987.
2. Jerom wiert and F. K. Lavy; “*A management Guide to PERT/CPM*”
3. S. P. Mukhopadhaya; “*Project Management for Architect and Civil engineers*”
4. P.C.Tulsian & Vishal Pandey; “*Quantitative Techniques*”
5. Peurifoy & Schexnayder; “*Construction Planning, Equipment, and Methods*”
6. Prasanna Chandra; “*Projects Planning, Analysis, Financing, Implementation, & review*”
7. D.Upadhayay; “*Construction Management*”
8. Mantri Institute; “*Building Construction Management*”
9. James J .O’Brien,Fredrick L Plotnik; *CPM in Construction Management*; Mc Grawhill;Construction Engineering.

## **SESSIONAL SUBJECTS**

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### ***NINTH SEMESTER***

**Arc 9104**

**Thesis Project**

**Units:5.0**

Students have to submit and present their work for this project in following stages:  
In continuation to the Thesis presentations made in Stage I, in the Ninth Semester in the subject Arc.9002 research Skills and Thesis Project Introduction, the next stages will follow.

**Stage II:**

#### **Site Analysis and project Requirements**

'Detailed site analysis', which will reflect complete physical and environmental characteristics of the project site as detailed in 'Guidelines for sequence of Project presentation'.

'Project requirements', which should have complete requirement of the project under the scope, in terms of facilities and area (as detailed) in the guidelines, with reference to the case studies made earlier.

**Stage III:**

#### **Concept Design**

This stage will have the following:-

- Basic concept/principal ideas leading to the design
- Site Plan, Zoning of activity spaces, movement pattern and building blocks.
- Schematic floor plans of all the buildings under the scope of the project
- Conceptual built form, in terms of elevations, sections, views, study models etc. (For further details refer the guidelines)

**Stage IV:**

#### **Design Development**

This stage will have detail design of the projects, which will comprise the following drawings in suitable scale:-

- Site plan
- Building plans of all the building units and all floors.
- 'Furniture layout' of typical areas.
- Elevations and sections of all building units.
- Working Drawings (min 2 nos) and services drawing (min 2 nos).
- Study model
- Perspective/view of interior
- Walk through (optional)

**Stage V:**

#### **Finalization of Project drawings**

Students have to produce all the drawings of the previous review along with the corrected drawings based on the comments of that review for final approval on the design.

**Stage VI:**

**Project Synopsis**

Students have to submit Thesis report (3 copies) comprising the salient points (as stated in the guidelines) of their project.

**Stage VII:****Thesis report**

Students have to submit Thesis report (3 copies) comprising write ups, case studies and drawings in the specified format as stated in guidelines.

**Stage VIII:****Final presentation to external jury**

Final design, comprising project introductions, case study/literature study, site analysis and the final proposal and model, is to be put up and presented to a panel of jury members comprising external experts.

## **ELECTIVE-II SUBJECTS**

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### ***NINTH SEMESTER***

#### **Arc. 9005 Visual Communication (Elective-II)**

**Units:1.0**

##### **Module1: Semantics & Communication Theory**

Introduction to concept of semantics as related to visual phenomena & imageries  
Importance & meanings attached to visual signs, symbols, motifs, elements, metaphors etc. in general and in architecture  
Processing of visual information & Gestalt theory

##### **Module2: Trends in Physical Art Forms**

A historical analysis of various forms of visual communications e.g. painting, sculpture and architecture with emphasis on changing patterns of techniques, thinking and its influence on society  
A comparative survey of major developments of 20th century paintings, sculpture and architecture

##### **Module3: Design Communication**

Identifying the role of imagery and visualization in analysis  
Expression of thoughts & conversion of verbal conception into visual messages  
Considerations for design of representative symbols e.g. Emblem, Logo, Insignia etc.

##### **Module4: Signage Design**

Study of signage in public spaces e.g., airports, hospitals, railway stations  
Study of traffic & directional signage  
Considerations for signage design

##### **Module5: Exhibition Design**

Approach to exhibition design- basic methods and techniques  
Design of display systems, structures and connections  
Special effects and advanced techniques in exhibition design

##### **Module6: Photography, Photo-Editing (Photoshop) & Use of Animation (Flash)**

Aesthetics and communication in the photographic medium  
Photo-techniques for audiovisuals  
Planning, scripting, shooting, editing and programming audiovisuals  
Introduction to use of Macromedia Flash animation package

##### **Module7: Movie-making & Editing (Director, Moviemaker, Dream-weaver, etc.)**

Capturing and importing source clip, Editing Video, Adding transition  
Mixing audio, Creating titles, Superimposing and Composing  
Animating a Clip, Applying effects, Producing video

Recommended Books:

## **ELECTIVE-II SUBJECTS**

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### ***NINTH SEMESTER***

**Arc9006**

**Architectural Journalism (Elective II)**

**Units:1.0**

Concept:

- Structure of Architectural journals,
- Writings descriptive and analytical reports,
- Editing write ups
- Photo journalism
- Book reviews
- Page compositions
- The public process, Electronic media.



## ELECTIVE-II SUBJECTS

### NINTH SEMESTER

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Arc. 9007

Vernacular Architecture (Elective-II)

Units: 0.5

- Module 1. Introduction to the field of vernacular architecture:  
Description and definitions of basic building types and essential technologies,  
Broad historical themes in vernacular architecture.  
Regional patterns in the distribution of Indian domestic structures, and evolution of vernacular styles.  
Materials and Techniques used in Traditional Architecture  
Influence of climate, social, religious, cultural factors  
Building Types: A Vernacular Vocabulary
- Module 2. Vernacular Architecture in the Northern Plains – UP, Bihar, Jharkhand, Punjab & Haryana
- Module 3. Vernacular Architectural forms in the Desert West- Rajasthan, northwest Gujarat
- Module 4. Architecture for the Tribal Heartland – Maharashtra, Madhya Pradesh, Western Orissa
- Module 5. Architecture in the South – Andhra Pradesh, Karnataka, Goa, Kerala, Tamil Nadu
- Module 6. Architecture in the Eastern Hills – Bengal, coastal Orissa, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura
- Module 7. Present Usage of Vernacular Architectural elements and construction techniques; Concepts of Laurie Baker – examples and Comparison.

Each student will be expected to prepare an assignment (20 to 25 pages) on some aspect of vernacular architecture in India.

#### Reccomended Books:

1. Dawson Bary, Cooper Ilay : *Traditional Buildings of India*,1998
2. Michell, G., *Penguin Guide to the Monuments of India, Vol I*, Viking, London 1989.
3. Tadgell, *The History of Indian Architecture, Design and Technology Press*, London 1990.
4. Paul Oliver, *Encyclopedia of Vernacular Architecture of the World*, Cambridge University Press, 1997.
5. V.S. Praman, Havali – *Wooden Houses & Mansions of Gujarat*, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
6. Kullrishan Jain & Minakshi Jain – *Mud Architecture of the Indian Desert*, Aadi Centre, Ahmedabad, 1992.
7. G.H.R. Tillotsum ;*The tradition of Indian Architecture Continuity, Controversy – Change since 1850*, Oxford University Press, Delhi, 1989.
8. Richardson,Vickey; *New Vernacular Architecture*: Laurance King Publishing,2001

## **ELECTIVE-II SUBJECTS**

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### ***NINTH SEMESTER***

#### **Arc. 9008 Control and Systems of Services for Intelligent Building. (Elective-II)** **Units:1.0**

- Module 1. **Building Intelligence**  
Introduction to intelligent Buildings - history and development  
IB Features and definitions  
Use of artificial intelligence in building systems  
Developments in tech. contributing to the intelligent buildings concept
- Module 2 **Building Automation and Controls**  
Interfaces and components of Building Automation Systems  
Hardware and software requirements of Build. Automation Sys.  
Analysis of stability of analogue and digital control systems used  
in different services in the building
- Module 3. **Various Artificial Intelligent Techniques**  
such as - expert systems, genetic algorithms, Artificial Neural Networks  
Fuzzy Systems, and their application in IB especially for HVAC, Electrical  
Fire , Vertical Transportation, safety and security systems and energy  
management and design
- Module 4. **Intelligent buildings - *Various aspects of Intelligent Building Design***  
At work - office space and major systems, typical feature, future development  
At home- present technology, future homes,
- Module 5. **About -**  
Environmental control-includes all traditional building controls,  
Lighting control- the integration of automatic lighting control for buildings  
Sensors, actuators, and end devices-including adjustable speed drives, chillers  
complete packaged air-conditioning,  
Fire and Life Safety integration with the automated buildings  
Security integration for the tenants of automated buildings  
Elevators integration for the tenants of automated buildings
- Module 6. Best practices guide for evaluating intelligent building technologies ,  
Life-cycle cost optimization  
Intelligent and Green - key issues, common objectives.
- Module 7. **Case Studies**  
Recommended Books:  
1.Dubin, Freds; Energy Conservation Standards: For building design, construction and  
operation.

## 10<sup>th</sup> SEMESTER STRUCTURE

<b>Subject Code</b>	<b>Subjects</b>	<b>Units</b>
	<b>SESSIONAL SUBJECTS</b>	
Arc. 10105	Architectural Apprenticeship	8.0
	<b>Total Units</b>	<b>8.0</b>

## **SESSIONAL SUBJECTS**

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### **TENTH SEMESTER**

**Arc. 10105**

**Architectural Apprenticeship**

**Unit:8.0**

Each candidate shall have to prepare a detailed report along with necessary drawings, sketches, measurement records, readings, observations, survey analysis, log sheets about the following aspects.

1. Critical appraisal of any building that his office has designed and executed. The building should be in use and the students may record the reactions of the users to support his appraisal in addition to photographs, drawings etc.
2. Site Supervision and practices – A detail report of any part of a building that has been personally supervised by the student/ his supervisor. If the student does not get an opportunity to supervise their office work, he can give site report of any other work. It may include checking site measurements, preparation of a bill, Site instructions and checking of the executed work.
3. Log Sheet and Office Certificate – A student shall fill the log sheets, as a record of his every day work and shall submit the same, along with the certificate and confidential report from his Employer.
4. A student shall submit all the working details prepared by him during his practical training along with quantity survey of a small project or any special work done during his training such as any computer programme, lighting scheme, glazing details for energy efficiency and calculations, acoustical details, etc.
5. Grand Viva in the Institute on the portfolio of student's work of all five years. It will be important here to see the progressive development of the student since the time he joined the architecture course. It will be conducted by minimum three internal examiners and one external examiner.

For report making, the following guidelines have to be followed:

\*The student is advised to stick to the syllabus and keep preparing his training report while working in the office where he is undergoing the training and make himself ready for his Grand Viva to be held in the institute.