

162/C

**SCHEME OF EXAMINATION AND SYLLABI**

**for**

**Bachelor of Architecture (B. Arch.)**

**Offered by**  
**University School of Architecture and Planning**  
**and affiliated institutes**

**w.e.f. Academic Session 2018-19**



**Guru Gobind Singh Indraprastha University**  
**Sector 16-C, New Delhi – 110078 [India]**

[www.ipu.ac.in](http://www.ipu.ac.in)

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V. K.  
N. Gupta  
R. K.  
A. C. Singh

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## B.ARCH SYLLABUS, THIRD SEMESTER-YEAR 2

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Course Code : AP-201  
 Course Title : Architectural Design - III  
 Semester (Year) : Third (Year -2 )  
 Contact Hours : L: 0 S: 8  
                   per week : L: 0 S: 128  
                   per semester : L: 0 S: 128  
 No. of teaching weeks : 16  
 Credit : 8

**Objective:**

To Learn designing for a small Multifunctional and Multi-building domestic or institutional (School, small shopping complex or mixed group, addressing aspects of built internal spaces, external form and open external spaces.

**Syllabus:**

Small educational or other Institutions e.g. Primary Secondary Schools, Health Centres, Post office, Art Gallery or equivalent.

Exercises before beginning of Design

(To be Demonstrated and Taught)

- 2Weeks working out Program/requirements for multiple interconnected functions.
- 1Week Basic options of grouping and arrangements of blocks. Horizontal and vertical interconnections between buildings and outdoor spaces.
- 12Weeks Design Problem
- Conceptualization and Design Development

**Notes.** Any Full Case study, if done should ideally be limited to 01 week maximum and incorporated within the demonstration period of first four weeks.  
 Case studies may also be conducted based on specific themes or aspects of design as necessary.

**Suggested Books/Readings:**

1. Di Mari, Anthony. Conditional Design: An introduction to elemental architecture,: IS Publishers November 17, 2014
2. Rudofsky, B. *Architecture without Architects*. New Mexico: University of New Mexico Press. 1987
3. Tversky, Barbara., *Mind in Motion: How Action Shapes Thought.*: Basic Books; 1 edition New York 2019
4. Rasmussen, S. E., *Experiencing Architecture*. Cambridge, Massachusetts: The MIT Press., 1997.
5. Lyons, Frank. *The Architecture of Nothingness: An Explanation of the Objective Basis of Beauty in Architecture and the Arts* Publisher Taylor & Francis Ltd, London, 2018
6. Watson, D., *Time Savers Standards for Architectural Design*. New York,: Mc Graw Professional Publishing New York:,1973
7. Chiara, J. D., *Time Savers Standards for Building Type*. Mc Graw Professional Publishing New York:,1973
8. Chiara, J. D, *Time Savers Standards for Interior design and Space Planning*. New York,: Mc Graw Hill., 2001

Syllabus of B. Arch. Programme approved by  
 Sub Committee of Academic Council on \_\_\_\_\_ and  
 Board of Studies of USAP on 16<sup>th</sup> July 2019  
 w.e.f. Academic session 2018-19

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9. Watson, Donald / Crosby, Michael J.; Time Savers Standards for Architectural Design, Mc Graw Hill, New York, 2005
10. Harris, C. W., Time Savers Standards for Landscape Architecture, USA: Mc Graw Hill, 1998

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Syllabus of B. Arch. Programme approved by  
Sub Committee of Academic Council on \_\_\_\_\_ and  
Board of Studies of USAP on 16<sup>th</sup> July 2019  
w.e.f. Academic session 2018-19

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Course Code : AP-203  
Course Title : Building Construction - III  
Semester (Year) : Third (Year -2 )  
Contact Hours per week : L: 0 S: 5  
per semester : L: 0 S: 80  
No. of teaching weeks : 16  
Credit : 5

**Objective:**

Learning the process and techniques of RCC Construction

**Syllabus:**

Foundation plan for single storey portion and basement with

RCC raft foundation,

Foundation details,

Waterproofing of basement

Retaining wall and raft foundation using conventional/ improved methods and materials,  
Flooring and sub flooring details,

**Suggested Books/Readings:**

1. Berry, R., The Construction of Buildings Barry, R. Construction of Buildings, East West Press Pvt. Ltd., New Delhi, 1999
2. Mckay, W.B.; Building Construction (Vol. I, II, III & IV), Orient Longman, London, 1988
3. Allen, Edward., Fundamentals of Building Construction : Materials and Methods, John Wiely & Sons, New York, 1999
4. Punamia B.C., Building Construction, Laxmi Publications (P) Ltd, New Delhi, 1993
5. Chudley, R.; Building Construction Handbook, Butterworth Heinemann, Oxford, 1988
6. Published material from HUDCO, CBRI (Roorkee), Development Alternatives, etc

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157/C

Course Code : AP-205  
 Course Title : Architectural Drawing- III  
 Semester (Year) : Third (Year -2)  
 Contact Hours per week : L: 0 S: 3  
 per semester : L: 0 S: 48  
 No. of teaching weeks : 16  
 Credit : 3

**Objective:**

Introduction and the use of software available for architectural applications. Integration of practical exercises along with the design studio project

**Syllabus:**

Basic commands for 2-D AutoCAD

Understanding of Text, and dimension styles etc, supported with suitable exercise

Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, text and dimensioning. Transparent overlays, hatching utilities, line type, line weight and colour, blocks and symbol library.

Understanding complex commands like Pline, spline, x-refs, Attributes, Model space & Paper space etc.

At least one working plan, elevation and section should be completed.

Basic commands for 3D

Introduction of basic 3D commands. Different types of modeling in Auto CAD. Exercise on wire mesh modeling.

**Suggested Books/Readings:**

1. Omura George, Mastering Autocad , Sybex Inc.,U.S.; 2nd edition 1988
2. Zell, M. Architectural Drawing Course: Tools and Techniques for 2D and 3D. 2008. Representation. New York: Barron's Educational Series.

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Course Code	:	AP-207	
Course Title	:	Art Appreciation and Architectural Graphics - I	
Semester (Year)	:	Third (Year -2)	
Contact Hours	per week	:	L: 0 S: 3
	per semester	:	L: 0 S: 48
No. of teaching weeks	:	16	
Credit	:	3	

CH 102  
156/C

**Objective:**

To learn skills of communication to an external audience, in addition to, the task of communication within the design process.

Intention of this course is to learn different techniques of representation and presenting ideas seamlessly. Teaching and learning will be 'hands on' in a studio format.

Skills will be acquired through a series of structured studio exercises.

**Syllabus:**

Studio assignments/exercises will be based on the following:

Learning of different Art/Architectural style/Movements and its theories and analyzing the representation and exploring it

Graphic representations – Visual composition and Abstraction- Exercises involving Logo design, collage, calligraphy and printing

Ideation and translation –hand skills such as cutting, drawing, painting, stitching to explore form, colour, texture, and image as means of expression.

**Suggested Books/Readings:**

1. Gill, Robert W.; Manual of Rendering with Pen and Ink, Thames and Hudson, London, 1997
2. Jax Themier, B.W., "How to Paint and Draw", Thames and Hudson, 1985.
3. Ching, F.D Architectural Graphics. New Jersey, U.S: John Wiley and Sons, 2009
4. Yee, R. , Architectural drawing: a visual compendium of types and methods. New Jersey, U.S: John Wiley and Sons, 2007

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<b>Course Code</b>	:	AP-221
<b>Course Title</b>	:	Theory of Structure – III
<b>Semester (Year)</b>	:	Third (Year -2 )
<b>Contact Hours</b>	per week :	L: 3 S: 0
	per semester :	L: 48 S:0
<b>No. of teaching weeks</b>	:	16
<b>Credit</b>	:	3

**Objective:**

To understand the basic principles and applications of structural design with Concrete including Reinforced Cement concrete (RCC).

**Syllabus:**

**Unit-1**

Plain Cement Concrete: History of Concrete in Building works, Modern Concrete Mix, Curing and strength of concrete, Effect of temperature, Shrinkage, Fatigue.

Reinforced Cement Concrete (RCC): Difference between Plain and Reinforced Cement concrete and their applications. Functions of reinforcement in RCC.

Deflection of Beams: (Cantilever and Simply supported) Introduction, Calculation of slope and deflection by Double Integration, Macaulay's Method and Moment area Method. Conjugate beam method.

Column and Struts Definition, End conditions, Buckling and critical loads, Slenderness ratio, Various column theories, Stress distribution of the section of an eccentrically loaded rectangular column, the middle third rule, Core or kernel of section (Rectangular and Circular sections).

**Unit-2**

Cement: Cement manufacturing & properties, Grades 33, 43 and 53 cements. Different types of cements and their properties.

Concrete: Structural properties, variation of strength with age. Factors affecting strength of concrete, Cube test for strength, standard strength grades of concrete,

Curing of concrete: Need, methods, duration for curing, Implication of inadequate curing.

Workability of concrete: Meaning and its functions, slump and Compaction Factor tests for workability. Workability requirements at site.

W/c ratio & its effect on strength of concrete: Abraham's law of water cement ratio, effect of w/c ratio on strength of concrete.

Durability of Concrete: Meaning of the term causes of deterioration of RCC members, Preventive measures as per IS: 456-2000. Requirement of minimum cement content, concrete grades and maximum w/c ratios for different exposure conditions.

Nominal and Design Concrete Mixes: Basic difference, merits and demerits of each and their applications. Basic principles of concrete mix design. Concept of weigh batching of concrete.

Manufacturing of Concrete: In-situ and Ready Mixed Concrete (RMC), merits, demerits and applications of each Type of reinforcement and their allowable stresses Mild steel Vs High yield strength Deformed bars and relative merits of HYSD bars. Present trends in use of reinforcement

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### Unit-3

Theory of RCC Design: Behavior of heterogeneous materials in Direct Force & Bending. Idea of Neutral Axis, Compression zone, Tension zone, Lever arm and Moment of Resistance of an RC design. Basic assumptions and Methods of RCC Design Concepts of Working stress Method (WSD), Ultimate Load Method (ULM) and Limit State Methods (LSM) of RCC design. (Only LSM of RCC design to be dealt using Fe 415 grade steel reinforcement. Working Stress Method of Design and Mild steel of Fe250 grade are obsolete in use and will NOT be dealt).

### Unit-4

Design of RCC Members: Design & Detailing of following RCC elements using Design Tables of SP-16 (No formula to be derived.)

Use of charts and tables of SP16 to be adopted to avoid memorization of formulae. Students must learn procedure and applications rather than formulae and derivations. Tables/charts/handbooks/IS codes also to be supplied in exams).

- i. Singly Reinforced simply supported Beam Sections under udl.
- ii. Doubly reinforced simply supported beam sections under udl.
- iii. One way simply supported rectangular/square RCC slabs.
- iv. Two ways simply supported rectangular/square RCC slabs.
- v. Axially loaded RCC columns (Rectangular, square and circular sections with or without helical reinforcement). Tie reinforcement in RCC columns.
- vi. Isolated square footings for axially loaded RCC columns (Footings to be designed for only bending, calculations for beam and punching shear NOT included). Option to provide tapered footing or footing of uniform depth to be given in exams).
- vii. Design for shear reinforcement for beams using design tables of SP16 (Only Stirrup shears reinforcement to be covered in design. Calculations for bent up bars as shear reinforcement NOT covered).

**Note.** At second year level, only design for vertical loads as per IS 456-2000 requirements to be covered only for simply supported slabs and beams.

### Suggested Books/Readings:

1. IS: 456, SP: 16, SP: 34, SP: 38
2. IS: 800
3. Jain, A.K., Reinforced Concrete – Limit State Design, Nem Chand & Bros., Roorkee

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Course Code : AP-223  
 Course Title : History of Architecture – III  
 Semester (Year) : Third (Year -2 )  
 Contact Hours per week : L: 2 S: 0  
 per semester : L: 32 S: 0  
 No. of teaching weeks : 16  
 Credit : 2

**Objective:**

To recognize the most important broad Categories of pre industrial Architecture of Europe during Medieval Period and Renaissance.

To identify import of these European styles in India during colonial periods.

**Syllabus:**

**European**

**Unit-1**

Early Christian Romanesque Architecture Byzantine,  
 Focus: Gothic Architecture in Continental Europe and England.  
 Great Cathedrals - Notre Dame, Canterbury

**Unit-2**

Renaissance  
 Early Renaissance, St. Maria Del Fiore, Florence  
 Late Renaissance, Michelangelo, Palladio. St. Peters Rome  
 Baroque, St.Pauls London, Neo Classical.

**Unit-3**

European Architecture in Colonial India -I  
 Goa Portuguese French Pondicherry Focus Forts Church

**Unit-4**

European Architecture in Colonial India-II  
 Madras, Calcutta, Bombay  
 Cantonments Hill Stations  
 Focus: Port Fort Church, Institutions, Bungalows, Barracks.

**Suggested Books/Readings:**

1. Fletcher, B., "A History of Architecture", 20th Ed., Butterworth Heinemann, 1996
2. Moffet, M., Fazio, M. and Wodehouse, L., "A World History of Architecture", McGraw-Hill, 2008
3. Watkin, D., "A History of Western Architecture", Thames and Hudson, 1986
4. Lang & Desai., Architecture and Independence- Oxford University Press, India, 1997

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Course Code	AP-225		
Course Title	:	Building Material Science – III	
Semester (Year)	:	Third (Year -2 )	
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks	:	16	
Credit	:	2	

**Objective:**

To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials  
 To sensitize the students to the use of these naturally occurring materials in the context of creating a green architecture

**Syllabus:**

**Unit- 1**

Cement: Manufacture, Properties, Types, Mix and usage.

**Unit- 2**

Aggregates and Admixtures: Aggregates: material, function properties and usage. Types-Fine, coarse and cyclopean

**Unit- 3**

Plain Cement Concrete: Properties, Mixing, Curing and usage  
 Reinforced Cement Concrete: Reinforcement- Introduction to Types, sizes and placement in beams, columns, lintels, slabs, cover, etc; Properties, Mixing, Curing and usage  
 Ferro-cement and fiber reinforced concrete.

**Unit- 4**

Properties of waterproofing materials, Bituminous and traditional materials for damp proofing and waterproofing  
 Properties of Insulation materials, Traditional heat Insulation materials for roofs and super structure

**Suggested Books/Readings:**

- 1: Merritt S. Frederick, Building design and Construction handbook, MC Graw hill, 2000
- 2: Kumar, S.K., "Building Construction", 19th Ed., Standard Publishers Distributors, 2001
- 3: Allen, E. and Iano, J., "Fundamentals of Building Construction: Materials and Methods", Wiley, 2004
- 4: Mehta, M., Scarborough, W. and Armpriest, Diane, "Building Construction: Principles, Materials and Systems", Pearson Prentice Hall, 2008

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Course Code	:	AP-227	
Course Title	:	Water Supply and Waste Management	
Semester (Year)	:	Third (Year -2)	
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks	:	16	
Credit	:	2	

**Objective:**

The objective of the course is to provide a systematic understanding of environmental support systems as they apply to human habitat, with special reference to water, water borne waste and solid waste. The course will integrate and emphasize issues related to environmental sustainability.

**Syllabus:**

**Unit - 1**

Water availability and Sources of Water, Water source development; rain, ground water, water bodies, sea water.  
 Distribution of Water- regional, urban, local, building. Storage of water, pressure- gravity and pumps, supply systems, piping, metering.  
 Water demand: Requirements of various uses, standards,  
 Water Quality and Treatment: standards of water quality, water treatment methods: primary treatment, secondary treatment.

**Unit - 2**

Terminology used in sanitation and drainages.  
 Collection & Conveyance of Sewage. Sewage Disposal at Urban level.  
 Conventional & Non-conventional methods of sewage disposal, low cost techniques of sewage disposal: CBRI, Sulabh Sauchalaya, etc  
 Sewage characteristics-Grey and black water  
 Primary treatment of sewage. Standards for sewage treatment, disposal and recycling.  
 Secondary Treatment of Sewage Filters, Activated Sludge Process, Decentralised Waste-water treatment systems (DEWATS), Ecosan, grey water treatment.

**Unit -3**

Sewers: Construction & Materials. Manholes: Construction, materials, Types, invert levels, spacing etc., other sewer appurtenances.  
 Sewage disposal through Septic Tanks & Soak Pits: System, Viability conditions, Advantages & Disadvantages.  
 Storm Water: Factors affecting storm water drainage: calculation of run-off, retention period, surface and piped drainage.

**Unit -4**

Systems of water supply in buildings. Hot water supply systems in building.  
 Domestic plumbing fixtures and accessories.  
 Piping layouts and detail layout plan of drains, traps, & fixtures for sanitation & drainage of residential, commercial and multi-storey buildings.  
 Rain water harvesting

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Solid Waste Management: Definitions. /Garbage/ Refuse Collection. Types of waste; segregation, recycling, composting. Waste as resource. 15/1  
Teri-Griha, Leed, evaluating system for water supply and waste disposal.

At least four to five site visits are required for the students to see works related to water treatment plant, sewerage treatment plant, to see Decentralized Waste-water treatment systems (DEWATS), factory making plumbing fixtures (e.g. Hindware plant etc) to supplement and update their knowledge base.

**Suggested Books/Readings:**

1. Rangwala S.C. Water Supply & Sanitary Engineering [Environmental Engineering]. Charotar publishing House Anand, India. (2000)
2. Raju B.S.N., Water Supply & Wastewater Engineer, Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3. S.G. Deolalikar, Plumbing Design & Practice, Tata McGraw Hill Publishing Company Ltd., New Delhi (1994).
4. Panchdhari, A.C., Water Supply and Sanitary Installations, Design Construction and Maintenance, Wiley Eastern Limited 1993.

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Course Code	:	AP-229	
Course Title	:	Sociology	
Semester (Year)	:	Third (Year -2)	
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks	:	16	
Credit	:	2	

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**Objective:**

This course aims to expose the students to the relationship between man and modern society and his larger environment, and to develop a language and vocabulary for discussions/ analysis on the sociological dimensions of architecture

**Syllabus:**

**Unit-1**

What is Sociology,  
Relation between sociology and architecture,  
Classical and modern sociology and architecture, through some examples,

**Unit-2**

Concept of society and its types – rural and urban  
Social Institutions – family, educational institutions, religion  
Social interaction – verbal and non-verbal

**Unit-3**

Sociology of space and built environment, sociology of artifacts  
Requirement of space for various social activities  
Utilization of space in rural and urban areas

**Unit –4**

Marx's relation between structure and superstructure  
Social production of space  
Political economy of space; space as a social product;  
Social history of built environment; space and power;

**Suggested Books/Readings:**

1. Sachdeva DR, Intro to Sociology, Vidya Bhusham Kitab Mahal
2. Giddens, Anthony, Sociology, Polity Press, Cambridge (UK), 2006
3. Porteous, J.D.; Environment Behaviour: Plng and Everyday Urban Life Addison Wesley, 1977
4. Rapoport, Amos, Human Aspects of Urban Form, Pergammon Press, New York, 1977
5. Anthony D. King (ed.), Buildings and Society: Essays on the Social Development of the Built Environment, London 1980
6. Low, Setha., Smith, Neil Ed. The Politics of Public Space 1st Edition Routledge New York 2006

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Course Code  
Course Title  
Semester (Year)  
Contact Hours  
No. of teaching weeks  
Credits

## B.ARCH SYLLABUS, FOURTH SEMESTER-YEAR 2

Arch

Syllabus of B. Arch. Programme approved by  
Sub Committee of Academic Council on and  
Board of Studies of USAP on 16<sup>th</sup> July 2019  
w.e.f. Academic session 2018-19

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Course Code : AP-202  
 Course Title : Architectural Design – IV  
 Semester (Year) : Fourth (Year -2 )  
 Contact Hours per week : L: 0 S: 8  
 per semester : L: 0 S: 128  
 No. of teaching weeks : 16  
 Credit : 8

**Objective:**

To Learn designing with explicit respect or reference to, or within, a larger Socio Cultural or Environmental Setting or Context : urban or rural, traditional or contemporary.

**Syllabus:**

Small Buildings of single or multiple uses and clusters or groups.  
And formations like streets, semi public and public spaces etc.

Exercises before beginning of Design

2 Weeks Preparation of study of the context using existing and first hand documentation.  
2 Weeks analysis

12 Weeks Design Problem  
Conceptualisation and Design Development

**Notes.** The context study may be done to understand the socio-cultural and environmental impacts of context

Design problems should focus on articulation of building fabric and spatial organisation with reference to context.

**Suggested Books/Readings:**

1. Chiara, J. D. ,Time Savers Standards for Building Type. New York: Mc Graw Professional Publishing,1973
2. Chiara, J. D. ,Time Savers Standards for Interior design and Space Planning. New York, : Mc Graw Hill., 2001
3. Ching, F., Architecture Form, Space and Order. New York: Van Nostrand Reinhold Staff, 1996
4. Harris, C. W., Time Savers Standards for Landscape Architecture., USA: Mc Graw Hill,1998
5. Rasmussen, S. E. (1977). Experiencing Architecture. Cambridge, Massachusetts: The MIT Press., 1997
6. Watson, D. /, Time Savers Standards for Architectural Design. New York, : Mc Graw Hill,2005

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<b>Semester (Year)</b>	:	Fourth (Year -2 )
<b>Contact Hours</b>	per week	: L: 0 S: 5
	per semester	: L: 0 S: 80
<b>No. of teaching weeks</b>	:	16
<b>Credit</b>	:	5

**Objective:**

Learning Construction of Predominantly Steel Frame buildings.

**Syllabus:**

Draw plans, Sections and Elevations of a structure of sloping roofs using simple trusses in wood and steel, with details using roofing materials- Tiles, slate, and sheet materials. Details of Steel windows and glazing,

Draw a site plan with external development details.

Design and details of following

Mezzanine floor  
 Construction of steel staircase  
 Toilet and kitchen details,  
 Cabinets, Partitions,  
 False ceiling,  
 Doors and windows in steel

**Suggested Books/Readings:**

1. Berry, R., The Construction of Buildings Barry, R. Construction of Buildings, East West Press Pvt. Ltd., New Delhi, 1999
2. Mckay, W.B.; Building Construction (Vol. I, II, III & IV), Orient Longman, London, 1988
3. Allen, Edward., Fundamentals of Building Construction : Materials and Methods, John Wiely & Sons, New York, 1999
4. Punamia B.C., Building Construction, Laxmi Publications (P) Ltd, New Delhi, 1993
5. Chudley, R.; Building Construction Handbook, Butterworth Heinemann, Oxford, 1988
6. Published material from HUDCO, CBRI (Roorkee), Development Alternatives, etc.

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145/10

Course Code : AP-206  
Course Title : Architectural Drawing - IV  
Semester (Year) : Fourth (Year -2 )  
Contact Hours per week : L: 0 S: 3  
per semester : L: 0 S: 48  
No. of teaching weeks : 16  
Credit : 3

**Objective:**

To learn visualization, drawing and rendering in three dimensions.  
To learn application of relevant softwares.

**Syllabus:**

Project: Visualize a building.

Explore the potential of lights and camera and use the same in the model created for the final submission.

Tools: Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filling.

Exercise to identify and visualize a building using the above said utilities. 3D modeling softwares like Sketch-up, 3D-Max, Autocad Revit, etc

Introduction to Rhino, Digital fabrication- laser cutting/ CNC/ 3D printing

**Suggested Books/Readings:**

1. Yee, R. , Architectural drawing: a visual compendium of types and methods. New Jersey, U.S: John Wiley and Sons, 2007
2. Ching, F.D Architectural Graphics. New Jersey, U.S: John Wiley and Sons, 2009
3. Chopra Aidan, Town Laura , Pichereau Chris, Introduction to Google SketchUp, John Wiley & Sons; 2nd edition (19 April 2012)
4. Kirby Lance , Krygiel Eddy , Kim Marcus, Mastering Autodesk Revit, Wiley (2018)

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Course Code : AP-208  
Course Title : Art Appreciation and Architectural Graphics - II  
Semester (Year) : Fourth (Year -2 )  
Contact Hours per week : L: 0 S: 3  
per semester : L: 0 S: 48  
No. of teaching weeks : 16  
Credit : 3

**Objective:**

Learning Art as a medium of expression of ideas and learning various techniques of representation.

**Syllabus:**

Studio assignments/exercises will be based on the following:

Exploring different graphic techniques and mediums of representation.

Learning representation and abstract interpretation, with additional media such as collage, photomontage.

Learning representation and abstract interpretation, with additional media such as printing.

Learning representation and abstract interpretation, with additional media such as stencils.

**Suggested Books/Readings:**

1. Berger, John. Ways of seeing, Penguin Books. London. 2006
2. Sinha, C.P. & Dwivedi Appreciation of Indian Arts, Ideals and Images , Indian Art History Congress

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Course Code	:	AP-222
Course Title	:	Theory of Structure – IV
Semester (Year)	:	Fourth (Year -2 )
Contact Hours	per week	: L: 3 S: 0
Contact Hours	per semester	: L: 48 S: 0
No. of teaching weeks	:	16
Credit	:	3

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**Objective:**

To understand the basic principles and applications of structural design with Steel

**Syllabus:**

**Unit-1**

Introduction: Merits, demerits and application of steel in structures. Structural properties and allowable stresses, Standard Rolled Steel sections, their designations and applications, Introduction to steel tables.

Theories of Steel Design: Introduction to IS: 800 Working stress and Limit State Methods of Design, basic concepts, merits and limitations of each method, present trends in design,

**Unit-2**

Design of Steel compression members: Effect of buckling, concepts of slenderness ratios and effective lengths of steel compression members. Allowable stresses in steel compression members. Use of Tables for slenderness ratio vs. allowable stress in compression in steel. Concepts of built up steel column sections, and lacings without design calculations.

Steel tension members: Single angle and double angle tension members. Simple cases.

Design of Steel Beams: Simple design of steel beams using M/Z concept. Concept of built up steel beam sections and plate girders without design calculations

**Unit-3**

Connections in Steel structures: Riveted, welded and bolted connections. Merits of welded connections over riveted connections. Present trends. Modes of failure of riveted and welded connections. Design of simple riveted and welded connections.

**Unit-4**

Steel Roof Trusses: Functions, merits and applications of steel trusses. Terminology and structural components. Design of members (No analysis). Introduction to SP38: Handbook on steel roof trusses and its use in systems with steel roof trusses.

**Note:** All tables, handbooks, and formulae to be supplied in exams. Only application to be expected from students.

**Suggested Books/Readings:**

1. IS: 456, SP: 16, SP: 34, SP: 38
2. IS: 800
3. Jain, A.K., Reinforced Concrete – Limit State Design, Nem Chand & Bros., Roorkee.



9/14/8  
142/C

**Course Code** : AP-224  
**Course Title** : History of Architecture – IV  
**Semester (Year)** : Fourth (Year -2 )  
**Contact Hours** per week : L: 2 S: 0  
per semester : L: 32 S: 0  
**No. of teaching weeks** : 16  
**Credit** : 2

**Objective:**

To recognize the characteristics and historical significance of Modern Movement in Architecture.  
Major movements, Western Masters  
To understand the so called universal nature of modern international architecture.  
Late and Post Modernism

**Syllabus:**

**Unit-1**

Introduction to “Modernity” “Modernization” “Modernism”,  
Cultural Technical & Territorial Transformations.(Kenneth Frampton)  
Modern Architecture Industrial Revolution New Materials,  
Concrete, Iron & Steel and Glass.  
Crystal Palace England Eiffel Tower Paris

**Unit-2**

Neo Classical,  
Chicago School  
Art Nuevo Art Deco  
Frank Lloyd Wright

**Unit-3**

Beux art Le Corbusier  
Walter Gropius Mies Van Der Rohe  
Japanese Kenzo Tange Tadao Ando

**Unit-4**

Post Modern  
Venturi James Sterling etc.  
Neo Rational Focus Aldo Rossi etc.  
Late Modern Eisenman etc  
Rem Koolhaas Zaha hadid etc.

**Suggested Books/Readings:**

1. Frampton K, Modern Architecture: critical history. 4th ed. Thames & Hudson, USA, 2007
2. Schulz C N , Meaning in Western Architecture. Rizzoli, New York, 1980
3. Jencks. The language of post-modern architecture. Academy Editions, London., 1991
4. Corbusier, L., Towards a New architecture. Marino Fine Books 2014

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14/12

5. Venturi, Robert., Complexity and Contradiction in Architecture, Museum of Modern Art. New York, 2017
6. Rossi, Aldo., Architecture of The City, New Edition Penguin 2016
7. Leach, Neil., Re-thinking Architecture, Routledge, Imprint London 2005

Semester (Year)

Contact Hours

Period of teaching weeks

Credit

Prerequisite

Co-requisite

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Course Code	:	AP-226
Course Title	:	Building Material Science – IV
Semester (Year)	:	Fourth (Year -2)
Contact Hours	per week	: L: 2 S: 0
	per semester	: L: 32 S: 0
No. of teaching weeks	:	16
Credit	:	2

**Objective:**

The aim is to understand commonly used building materials, their general use in the building industry and to provide a base for environmentally responsible construction.. The course also introduces basic techniques of extraction and processing of materials for building industry and the concepts and techniques of evaluating their impact on the environment and ecology.

**Syllabus:**

**Unit- 1**

Metals used in buildings: Properties constituents and uses of cast iron, Wrought iron, Steel, Stainless Steel,  
Use of Bronze and Copper in buildings  
Hot rolled sections, cold forming of sheets into sections.

**Unit- 2**

Protective coatings for metals: - paints: galvanization, chrome plating, anodization and powder coating, process and application.

**Unit- 3**

Ceramic wall & floor tiles, cement tiles, artificial stones, tiles and pavers-manufacture and applications

**Unit- 4**

Exterior paints for buildings- Cement based paints, Acrylic paints, textured paints, timber protection in outdoors.  
Application of environmental principles: re-use, re-cycle, life-cycle impact, embodied energy in manufacturing and life cycle of materials.

**Suggested Books/Readings:**

1. Merritt S. Frederick, Building design and Construction handbook, MC Graw hill, 2000
2. Soni Kumar Saurabh, Building Materials & Construction, S.K Kataria and Sons
3. Duggal S.K, Building Materials (third revised edition), New Age International(P) Limited Publishers, 2008
4. Kumar, S.K., "Building Construction", 19th Ed., Standard Publishers Distributors, 2001
5. Allen, E. and Iano, J., "Fundamentals of Building Construction: Materials and Methods", Wiley, 2004
6. Mehta, M., Scarborough, W. and Armpriest, Diane, "Building Construction: Principles, Materials and Systems", Pearson Prentice Hall,2008

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 - "Kak me" in the middle.  
 - "Ashok" and "Renuka" in the center.  
 - Two more signatures on the right side.

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139/C

Course Code : AP-228  
Course Title : Lighting and Acoustics  
Semester (Year) : Fourth (Year -2 )  
Contact Hours per week : L: 2 S: 0  
per semester : L: 32 S:  
No. of teaching weeks : 16  
Credit : 2

**Objective:**

To learn the fundamentals of lighting, lighting design and fundamentals of acoustics and principles in designing various built environments.

**Syllabus:**

**Unit 1**

Solar Radiation, Visible Light, Visual Comfort Photometric quantities – frequency, color , lux levels, candela, lumen, illuminance, luminance etc.

Day lighting – Parameters of day lighting, daylight, daylight factor & Penetration Factor, design sky concept.

- Methods, techniques & strategies of day lighting.
- Glare & Types
- Solar light & renewable energy source of light.

**Unit 2**

Artificial lighting, Design Strategies- Integration with daylight, Automatic controls & devices (Interior & Exterior). Lumen method of calculation (MF, RIR etc)

Electric Light sources – Lamps & Types (LED, Solar Lights etc.) (fluorescent, LFL etc) Types of luminaires – Decorative, Commercial industrial, outdoor – performance criteria for luminaries.

**Unit 3**

Acoustical Concepts – Wave theory, Sound power & Intensity, Decibel, Sound Power Level, Sound Intensity Level, Sound Pressure Level, Frequency bands behavior of sound in enclosed spaces. (Reflection, Absorption & transmission) Reverberation time, calculation of RT, RT for various spaces like audio, music room, lectures & Seminar hall etc. (Echos, Fetter Echo, Sound foci).

**Unit 4**

Noise & Noise Control (Methods & strategies)

Absorption, Transmission

Transmission Loss

Sound Absorbing material & Application techniques (Wall, Ceiling floor)

Acoustical Design consideration for enclosed spaces – Auditorium, Music Rooms, Seminar hall, lecture hall etc.

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7/19  
138/C

**Suggested Books/Readings:**

1. Kaorv Mende, Designing with Light & Shadows published by Images.
2. Peter Grvneisen, Sound Scapes- Architecture for Sound & Vision published by Birkhavser.
3. Joseph De Chiara, Time Savers Standards for Interior Design & Space Planning published by Mcgraw Hill

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Course Code	:	AP-230
Course Title	:	Psychology of Spatial Relationships
Semester (Year)	:	Fourth (Year -2 )
Contact Hours	per week	: L: 2 S: 0
	per semester	: L: 32 S: 0
No. of teaching weeks	:	16
Credit	:	2

**Objective:**

The aim of this course is two-fold. On the one hand, it aims to provide undergraduate design students with base level exposure to the various theoretical approaches that are clustered around the following questions:

1. How is the built form an extension of the individual? How is the spatial dimension of human behavior related to mental processes and conceptions of the self?
2. What is the meaning of form? How do built forms express and represent aspects of culture?
3. How do cultures produce forms and the forms reproduce society? What roles do history and social institutions play in generating the built environment? What is the relationship between

**Syllabus:**

**Unit 1**

Household Studies; - Place identity, Place attachment  
Ethno-archaeological Studies; (focus on civilization)  
Social Organization and Dwelling Form: Privacy, Neighborhood space, crowding

**Unit 2**

Cultural organization and built environment  
Concept of culture and its elements - material and non-material culture Material culture- buildings, artifacts, etc.  
Non-material - Folkways, Norms, Mores, Values, Laws Culture as adaptive screen between environment and man  
Cultural Identity, Cultural Diversity, Cultural relativism, Ethnocentrism, Cultural universals

**Unit 3**

Theory of proxemics  
Social Symbolic Accounts; Structuralism;  
Spatial perceptions arising out of basic human needs and learning processes

**Unit 4**

Metaphorical Approaches;  
Theories of Ritual; (more focus on built form)  
Phenomenological perspectives

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**Suggested Books/Readings:**

1. Lévi-Strauss, Claude., Tristes Tropiques Penguin Books, London 1974
2. Porteous, John Dougl; Environment Behaviour: Planning and Everyday Urban Life, Addison Wesley, 1977
3. Hall, T. Edward, The Hidden dimension, Anchor books edition, USA, 1969
4. Rapport, Amos, Human Aspects of Urban Form, Pergammon Press, New York, 1977
5. Rapport, Amos, HuHouse form and Culture, Aspects of Urban Form, Pergammon Press, New York, 1977
6. Lynch, , Kevin; The Image of the City, Joint Centre Publication, USA, 1960

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135/c

Course Code: AT-301  
 Course Title: Architectural Design  
 Semester (Year): Fifth (Year 3)  
 Contact Hours: per week / per semester  
 No. of teaching weeks  
 Credit

### B.ARCH SYLLABUS, FIFTH SEMESTER-YEAR 3

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134/C

Course Code : AP-301  
Course Title : Architectural Design - V  
Semester (Year) : Fifth (Year -3 )  
Contact Hours per week : L: 0 S: 10  
per semester : L: 0 S: 160  
No. of teaching weeks : 16  
Credit : 10

**Objective:**

To Learn designing reasonably complex and large Building for a contemporary function other than residential.

**Syllabus:**

Institutional Office or Education , Commercial, Mall ,Market Cultural, Museums Libraries Entertainment, Cinema Theatre Health, Hotel, Industrial, Sports, Recreational or any combination or equivalent.

Exercises before beginning of Design

4 Weeks Detailed Study of few Examples

Study of relevant systems of spatial organization, services, structure and form.

Formal Typological Options.

(could be distributed as necessary)

12 Weeks Design Problem

Conceptualization and Design Development

**Suggested Books/Readings:**

1. Ching, F.D.K., "A Visual Dictionary of Architecture", John Wiley & Sons,1996
2. Neufert, P., "Architects" Data", 3rd Ed., Blackwell Science,2000
3. Norberg-Schulz, C., "Principles of Modern Architecture", Andreas Papadakis,2000
4. Watson, D. (Editor), "Time-saver Standards for Architectural Design: Technical Data for Professional Practice", 8th Ed., McGraw-Hill,2005

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Course Code : AP-303  
Course Title : Building Construction -V  
Semester (Year) : Fifth (Year -3 )  
Contact Hours per week : L: 0 S: 5  
per semester : L: 0 S: 80  
No. of teaching weeks : 16  
Credit : 5

**Objective:**

Learning techniques of Larger scale RCC Construction and aspects of Composite Construction.

Integration of services.

**Syllabus:**

Two or Three level Basement plans- showing waterproofing techniques, drainage, vehicular access. Fire escape

Fire fighting systems, ventilation system. Service core and Integration of services in multi level building,

RCC /composite construction of super structure- Structural Framing plans, Wall sections, Cladding details, Curtain glazing/ structural glazing,

**Suggested Books/Readings:**

1. Allen, E. a. ,Architectural Detailing: Function - Constructibility - Aesthetics. New Jersey, United States: Wiley,2006
2. Barry, R. , The Construction of Buildings (Vols. 1 to 5). New Delhi: East West Press Pvt. Ltd., 1999
3. Chakraborty, M., Civil Engineering Drawing (including Architectural aspect),. Kolkata: Bhaktividanta Book Trust, 2008
4. Chudley, R. a. , Building Construction Handbook. United Kingdom: Butterworth Heineman,1998
5. Mchugh, R. ,Working Drawing Handbook: A Guide for Architects and Builders. Washington DC: Van Nostrand Reinhold, 1982
6. McKay, W., Building Construction (Vols. 1 to 4). New Delhi : Orient, 2003
7. Punmia, B., Building Construction. New Delhi: Laxmi Publications, 2016
8. Rangawala., Engineering Materials. Anand, India: Charoter Publishers, 2017 -
9. Styles, K., Working Drawings Handbook. U.K: Routledge, 2004

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Course Code	:	AP-321
Course Title	:	Theory of Structure-V
Semester (Year)	:	Fifth (Year -3 )
Contact Hours	per week	: L: 4 S: 0
	per semester	: L: 64 S: 0
No. of teaching weeks	:	16
Credit	:	4

**Objective:**

To identify and understand the effect of various external forces on building structures.

**Syllabus:**

Vertical and Horizontal Loading

**Unit-1**

Loading assessment: Various loads on buildings, Design load codes applicable in India: IS: 875 and IS: 1893, Preview of Dead loads & Live loads as per IS: 875-Parts 1 and 2.  
Calculation of DL+LL in a building. Load intensity on a slab, loads on supporting beams, columns and foundations

Introduction to Soil Mechanics. Classification of Soils for Engineering purposes and their characteristics. Soil Investigations: Soil Test reports, information available in a soil test report. Concept of ultimate and safe bearing capacity of soils and their determination

Foundation Systems: Types & feasibility criteria. Isolated, Combined, Raft and Pile foundations. Foundations for treacherous soils like black cotton soils and filled up soils, under reamed pile foundations and their applications for black cotton soils and filled up soils.

**Unit-2**

Retaining walls: RCC & Masonry retaining walls. Cantilever and counter fort retaining walls, structural components and principles of design (No detailed design required). Basement walls. Earth pressure on retaining walls; calculations for Active and passive earth pressures with and without surcharge on retaining walls with vertical faces, (Calculations for stability of retaining walls and design of base of retaining walls not required).

**Unit-3**

Introduction to Horizontal loads on buildings. General characteristics of horizontal loads. Introduction to Wind Loads, relation between wind speed and wind pressure, factors affecting wind pressure on a building.  
Introduction to IS: 875- Part 3-4; Wind zones of India,  
Calculation of wind loads for a simple building.

**Unit-4**

Earthquake loads: Basic concepts, Causes of earthquakes, plate tectonics, earthquake regions of the world, earthquake terminology viz magnitude, intensity, epicenter, magnitude and intensity scales. Prediction and probability of earthquakes. Some past earthquakes of India and the world.  
Introduction to IS: 1893- 2002; Seismic zones of India seismic zone factors, Calculation of Earthquake loads on a simple building and its distribution along height of the building.

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**Suggested Books/Readings:**

1. IS Codes
  - i) IS 875 ( Part 1 to 5 )
  - ii) IS 1893
  - iii) IS 13920
  - vi) IS 4326
  - v) IS 456:2000
  - vi) SP 34
2. Aggarwal, P & Shrikhande M.(eds.) Earthquake Resistant Design of Structures , Prentice Hall of India, India, 2006
3. V.N.S Murthy , Principles and Practices of Soil Mechanical and Foundation Engineering  
CRC Press , 2002

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Course Code	:	AP-323
Course Title	:	History of Architecture V
Semester (Year)	:	Fifth (Year -3 )
Contact Hours	per week	: L: 2 S: 0
	per semester	: L: 32 S: 0
No. of teaching weeks	:	16
Credit	:	2

**Objective:**

To understand the background of present day practice of architecture with respect to significant developments in recent history- Development and diffusion of concepts and practice of Modern Architecture. Contemporary trends of architecture in India.

**Syllabus:**

**Unit-1**

Beginning of Modern Institutionalization of Architecture in India (Academic & Professional) J.J. School of Architecture, Indian Institute of Architecture PWD's early works

**Unit-2**

Import of Modernism in India  
Corbusier, Chandigarh  
Louis Kahn IIM

**Unit-3**

Habib Rehman, A.P. Kanvinde,  
Charles Correa  
Balkrishna Doshi  
Joseph Allen Stein,  
Case Studies of Selected Contemporary Indian Architects. (Internal Assessment)  
Public Housing in Delhi DDA

**Unit-4**

Regionalism:  
Focus: Examples Raj Rewal and others  
Architecture and Alternative Technology Laurie Baker and Others  
Globalisation: New Urban Architecture Corporate Organisations  
Noida Gurgaon Delhi  
Focus: Exmaples Hafeez Contractor, others  
Architecture responding to issues of Conservation and Sustainability

**Suggested Books/Readings:**

1. Lang & Desai (1997). Architecture and Independence- The Search for Identity – India 1880 to 1980. Oxford University Press, India.
2. Bhatt, V & Scriver, P (1990) Contemporary Indian Architecture: After the Masters, Ahmedabad.
3. Scriver P., Srivastva A, India: Modern Architectures in History, Reaktion Books Ltd London, 2013

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4. Correa, CM (1985) The New Landscape by C M Correa, Bombay Strand Books, India, 1985.
5. Bhatia, G (1994) Punjabi Baroque and other Memories of Architecture, Penguin Books, New Delhi.
6. Bhatia, G (1994) Silent Spaces and other Stories of Architecture. Penguin Books, New Delhi.
7. Architecture of India (1985) Electra Montier Publication on Festival of India in France.

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Course Code	:	AP-325	
Course Title	:	Building Material and Sciences- V	
Semester (Year)	:	Fifth (Year -3)	
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks	:	16	
Credit	:	2	

128/C

**Objective:**

The aim is to understand commonly used building materials, their general use in the building industry and to provide a base for environmentally responsible construction.. The course also introduces basic techniques of extraction and processing of materials for building industry and the concepts and techniques of evaluating their impact on the environment and ecology.

**Syllabus:**

**Unit 1**

**Aluminum:** Manufacture and its environmental impact, Properties, Types of AL sections and sheets and their usage in buildings

**Unit 2**

**Plastic:** plastic (monomers and polymers), Acrylics, Nylon, PVC, Bakelite, Polythene, poly-carbonate, poly ethylene, neoprene, EPDM rubber, glass fiber reinforced plastic in construction industry with its properties. Manufacturing process and its environmental impact

**Unit 3**

**Acoustic materials**

Properties of acoustic materials, various acoustic materials used in buildings for wall/roof assemblies and building components  
Environmental impact evaluation of manufacture and use of acoustic materials

**Unit 4**

**Water proofing materials**

Properties of waterproofing materials, various types water proofing materials used in buildings for foundations, wall and roof assemblies- admixtures, additives, acrylics, sealants-poly-sulphides, adhesives and glues used in building industry.  
Environmental impact evaluation of manufacture and use of water proofing materials

**Suggested Books/Readings:**

1. Soni Kumar Saurabh, Building Materials & Construction, S.K Kataria and Sons
2. Duggal S.K, Building Materials (third revised edition), New Age International(P) Limited Publishers, 2008
3. Kumar, S.K., "Building Construction", 19th Ed., Standard Publishers Distributors, 2001
4. Merritt S. Frederick, Building design and Construction handbook, MC Graw hill, 2000
5. Allen, E. and Iano, J., "Fundamentals of Building Construction: Materials and Methods", Wiley, 2004

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 Handwritten signature: *Manoj Kank*  
 Initials: *my*  
 Initials: *Arch*  
 Initials: *Reena*

- 127
6. Mehta, M., Scarborough, W. and Armpriest, Diane, "Building Construction: Principles, Materials and Systems", Pearson Prentice Hall, 2008
  7. Berry, R., The Construction of Buildings Barry, R. Construction of Buildings, East West Press Pvt. Ltd., New Delhi, 1999
  8. Mckay, W.B.; Building Construction (Vol. I, II, III & IV), Orient Longman, London, 1988
  9. Chudley, R. a. , Building Construction Handbook. United Kingdom: Butterworth Heineman, 1998

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- "Kab" with a checkmark above it.  
- "Archit" with a checkmark above it.  
- "Rana" with a checkmark above it.  
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E/132  
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Course Code : AP-327  
Course Title : Energy and Fire Safety-I  
Semester (Year) : Fifth (Year -3 )  
Contact Hours per week : L: 2 S: 0  
per semester : L: 32 S: 0  
No. of teaching weeks : 16  
Credit : 2

**Objective:**

The objective of the course is to provide a systematic understanding of environmental support systems as they apply to human habitat, with special reference to energy systems. The course will integrate and emphasize issues of environmental sustainability. The course enables students to interact knowledgeably with specialist consultants.

**Syllabus:**

**Unit-1**

Introduction of concepts, techniques and technologies related to use of electrical energy in habitation, elementary ideas of demand generation, distribution, and costs of electrical energy.

**Unit-2**

Electricity transmission.  
AC & DC  
Distribution system (LT) and (HT)  
Earthing  
Planning Electric Sub-Station  
Safety Devices (Fuses,MCBS,ELCBS)  
Captive power generation (DG set) , UPS, Inverter.  
Lightning arrestors,

**Unit-3**

Triangle of fire, Materials to be used in construction, Staircases, Fire escape distances for different buildings, Fire spread in Buildings, Fire doors, Basements, Lifts, Electrical Sub-station, AHU Shut off, NBC Rules for fire.  
Fire safety standards and requirements for various types of Buildings.  
Fire alarm system and components, Hydrant System and Components, Pump house and location.  
Wet riser system, down comer system and Sprinkler Systems for fire Fighting services.  
Security System, Access Control System, Intruder detection and CCTV systems.

**Unit-4**

Lifts, Escalators and travelators- capacity speed and space standards for their use in buildings.

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Suggested Books/Readings:

1. Basic Electric Engineering by M.L. Anwani, Dhanpat Rai and Co.(P)Ltd, 1682,63 NaiSarak, Delhi, Yr of Publication -1972, Edition 2002
2. Electricity for Architects, Consultants, Builders by B. Raja Rao, 162/1Avvai Shanmugam Salai, Chennai, Yr of Publication 1996, Edition 2000
3. Jenson, D., Ed., Fire Protection for the Design Professional
4. Industrial Fire Hazard Hand Book
5. BIS Codes

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Course Code : AP-329  
Course Title : Quantity and Estimation  
Semester (Year) : Fifth (Year -3 )  
Contact Hours per week : L: 2 S: 0  
No. of teaching weeks per semester : L: 32 S: 0  
No. of teaching weeks : 16  
Credit : 2

**Objective:**

Teaching basic concepts of preparation of quantities and estimates measurement of building works.

**Syllabus:**

**Unit- 1**

Area calculations: Types of areas taken for estimation plinth areas, plot area, built up area, covered area etc.

Different types of estimates to be prepared. Preliminary estimates, detailed estimates etc.

**Unit - 2**

Methods of taking out quantities, width, length and depth calculations by long wall & center line methods. Units of different items, for quantity estimations.

Modes of measurement of works on site. Measurements methods of various items, deductions for opening etc. Addition of wastages to the measure

**Unit - 3**

Preparation of preliminary and detailed estimates working out estimates for a buildings whose plans, section and elevations are given.

Working out cost of construction based upon the plinth area rates, covered area rates etc.

Rate analysis of various items concrete, RCC brickwork etc. using the market rates CPWD (97) of materials and labor.

CPWD schedule of rates latest edition of 1997. Rates as given in schedule to be used as guidelines for making estimates.

**Unit - 4**

Use of computers for generating Bill of Quantities

Calculates the cost of the building based on the market rates and working out the rate per sq.mtr. area of the building.

**Suggested Books/Readings:**

1. Dutta B.N., Estimating and Costing in Civil Engineering, UBS Publishers Distributors Ltd, New Delhi, 1992.

Manish Singh  
Lank  
Alok  
Ramesh

Course Title : Elective-I  
 Semester (Year) : Fifth (Year -3 )  
 Contact Hours per week : L: 0 S: 3  
 per semester : L: 0 S: 48  
 No. of teaching weeks : 16  
 Credit : 3

**Objective:**

The objective of this course is to offer opportunities in specialized or advance learning in subjects covering emerging areas of concern to Architecture. The courses will generally be conducted in the seminar/studio mode to encourage research, exploration and skills developments. The subject groups listed below give an indication of the breath and specificity of subjects. The course contents to be followed will be developed by course teachers based on the resources at hand and opportunities for cross fertilization with other courses. This electives programme will be developed to offer a maximum of six subjects choices to which students of the 3rd year can choose, subject to the time table. The subjects would be based on the following suggested groups:

AP-341	Art & Design Disciplines – I
AP-343	Urban Issues – I
AP-345	Advanced Construction Technologies- I
AP-347	Ecology & Environmental Issues- I
AP-349	Landscape Architecture - I
AP-351	Visual Communication
AP-353	Interior Design – I

Note: Concerned faculty of each Elective should develop a weekly program for the course for each term for presenting it to the students

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Course Code : AP-341

Course Title : Art and Design Disciplines-I

**Objective:**

The course is to introduce and explore various modes of expression and communication of creative idea, other than architecture proper. This may include textual, graphic and performing mediums like films and theatre etc of various natures as complements to learning of architecture. The course also underlines the interconnections across various design oriented disciplines and explores the alternative modes of expression of the same idea.

The course would have short exercises and assignments for assimilation of skills and bringing together the knowledge learn to the drafting table. To think "out of the box" and to move away from various preconceived notions.

**Syllabus:**

To engage in personal inquiry, action and reflection on specific topics and issues

To focus on and demonstrate an understanding of the areas of interaction.

To reflect on learning and share knowledge, view and opinion. To develop the ability to appraise work and evaluate performance realistically, and using this evaluation to improve and adapt to their learning strategies.

To work in groups and to consider each others' strength and different points of view.

To develop communication skills of essay, creative writing, as well as other appropriate forms of expression to suite various context.

To build a higher though process cr3eatively generation new ideas and considering issues from multiple viewpoints.

To transfer skills, including the ability to make connections across subjects and apply skills and knowledge in unfamiliar situations.

Course Code : AP-343

Course Title : Urban Issues-I

**Objective:**

The course uses case-studies of urban environments focusing on issues of urban development and urban regeneration with particular preference to societies undergoing rapid urbanization and transformation.

**Syllabus:**

Teaching would be based on case studies which will explore important contemporary urban issues: dealing with expanding cities, dealing with poverty, informal settlements, conserving heritage, mixed land use, traffic and transport, urban services, urban regulation and management, urban form and identity, concept of city in the arts, environmental sustainability etc.

The work may be undertaken individually or in groups. It will require observation, survey and research leading to strategic understanding/propositions in response to the case-studies.

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Course Code : AP-345  
Course Title : Advance Construction Technologies-I

**Objective:**

The course highlights the act of producing a real object based on an abstract set of instructions by direct intervention into physical world, and Building and larger Constructions as a systematic processes.

**Syllabus:**

Processing and conversion of materials  
Elements and components of built structures.  
Methods and equipments of assembly  
Physical and Chemical processes  
Transformation of Methods and Techniques of Building  
New Technologies of Construction

Course Code : AP-347  
Course Title : Ecology & Environmental Issues-I

**Objective:**

The thrust of this elective essentially focuses on the environmental issues at large. Within the realm of the focus the immediate need to address the same is as crucial, as with every passing day these concerns are getting more and more crucial thus introducing the students with the plethora of knowledge base and its application in the building sector.  
The specific objective of the course is to establish the significance of the ecological issues, their impact and initiatives to address the same in the built environs.

**Syllabus:**

To understand the history of environmental degradation and the concepts that underlie a strategy towards sustainable habitat.  
Interrelation between natural and built environment: An Overview  
Energy: conservation, renewable sources: wind, solar, geo-thermal, bio-fuels.  
Materials: minimizing, recycling, reducing energy content, etc.  
Case Studies of traditional / vernacular buildings and settlements demonstrating relationship between climate, local material resources and settlement/ building forms.  
The "natural" or landscape environment as an aspect of deliberate design: Landform, topography, vegetation type and pattern, water bodies, street widths and orientation, ground character. Plan form and elements, building orientation, roof form, fenestration pattern, orientation and configuration, controls like shading devices, design of shading devices.

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Course Code : AP-349

Course Title : Landscape Architecture-I

**Objective:**

Introduction to the role of landscape elements in architectural design  
Impacts of landscape elements on environment

**Syllabus:**

Introduction: Definition, scope, objectives, design process and profession of landscape architecture in relation to architecture, Basic elements of Landscape; Graphics in landscape architecture Linkages with nature and built environment;

Horticulture: Plant classification and nomenclature, Trees, Shrubs, Ground cover, Indoor plants plant identification, Plants for terrace gardens and vertical gardens

Plant Material: A study of Indian vegetation, its characteristics and design aspects  
Characteristics and Use of Plants

Characteristics of various types of plants and their suitability of landscaping, plant selection criteria, landscape design elements and principles.

Services related to landscape:

Plumbing

Electrical

Sewage management

Water supply

Elements of landscape architecture

Land

Water

Vegetation

Study and detailing of hard and soft landscape

Ecological and environmental aspects of landscape design Grading and Slopes

Course Code : AP-351

Course Title : Visual Communication

**Objective:**

To expand general understanding of the efficient use of various media and mixed media rendering so as to prepare students for the higher levels of design thinking communication

Exposure to various media and mixed media in art productions through practical projects.

To develop skill in still photography and video

**Syllabus:**

Advanced exposure in fine arts – pencil and charcoal sketching, mixed media rendering, water colour compositions and primary use of acrylic / oil colours; alternative media work such as glass painting, fabric painting; tile painting

Advanced aspects of visual cognition, psychological responses of humans; Art, design, architecture

Image manipulation using computer software for graphics animation tools-Photoshop and Flash.

Study of essentials of still photography and the camera with its various functions such as- aperture

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and exposure, shutter speed, depth of field, focus, light conditions, light compensation. Comparative assessment of traditional SLR and digital photography. Basic movie camera shooting, traditional analog and digital methods, conversion of analog to digital, memory manipulation and software compatibility exercises; Elementary film editing – video and audio clips, merging, morphing, transitions using Adobe.

**Course Code** : **AP-353**

**Course Title** : **Interior Design-I**

**Objective:**

- To introduce the vocabulary of interior design
- To familiarize the students with an overview of interior and furniture design and design movements through history
- To inform the various components of interior space and treatment and finishes for the same
- To familiarize the students with the various components of interior design like lighting, landscaping and furniture.
- Interior of residence and small commercial spaces

**Syllabus:**

Definition and process of interior design - vocabulary of interior design in terms of principles and elements - introduction to the design of interior spaces as related to typology and function, themes and concepts

Overview of interior and furniture design in the Western context through the ages relating to historical context, design movements and ideas -overview of folk arts and crafts of India with reference to their role in interior decoration

Components of Interior Space- Interior Treatment and Finishes

Treatment of components such as floors, ceilings, walls, partitions, window treatments, accessories, etc., in terms of their choice and design related to materials, methods of construction, colour, texture, etc., based on functional, aesthetic and psychological criteria

Components of Interior Space- Lighting and Landscaping

Interior lighting and their effects and suitability in different contexts Interior landscaping elements: rocks, plants, water, flowers, fountains, paving, artifacts, etc., their physical properties and effects on spaces

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Course Code  
Course Title  
Semester (Year)  
Credit Hours  
No. of Lect. per week  
Credits  
Prerequisites  
Total no. of hours of instruction  
Bibliography

**B.ARCH SYLLABUS, SIXTH SEMESTER-YEAR 3**

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Course Code : AP-302  
 Course Title : Architectural Design – VI  
 Semester (Year) : Sixth (Year -3 )  
 Contact Hours per week : L: 0 S: 10  
 per semester : L: 0 S: 160  
 No. of teaching weeks : 16  
 Credit : 10

**Objective:**

To Learn designing of non fully residential Large Multi Building Campus & Site Planning including Buildings Clusters and Landscape.

**Syllabus:**

Universities, Hospitals Complex, Socio Cultural Centres , Spiritual Complex, Resorts Exhibition Grounds, or combinations.

Exercises before beginning of Design

4 Weeks Detailed Study of few Examples

Study of Site planning, Movement Structure, functional distribution , services.

Site Analysis

12 Weeks Design Problem

Conceptualization and Design Development

**Suggested Books/Readings:**

1. Neufert, P., "Architects" Data", 3rd Ed., Blackwell Science, 2000
2. Watson, D.(Editor), "Time-saver Standards for Urban Design", McGraw-Hill, 2003
3. Watson, D.(Editor), "Time-saver Standards for Architectural Design: Technical Data for Professional Practice", McGraw-Hill, 2005
4. Lynch Kevin, Site Planning, MIT Press; 2nd Revised edition edition (29 October 1971)
5. Kanvinde Achyut , Campus design in India;: Experience of a developing nation, Jostens/American Yearbook Co (1969)

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Course Code	:	AP-304	
Course Title	:	Building Construction – VI(Working Drawing)	
Semester (Year)	:	Sixth (Year -3 )	
Contact Hours	per week	L: 0	S: 5
	per semester	L: 0	S: 80
No. of teaching weeks	:	16	
Credit	:	5	

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**Objective:**

**Working Drawing**

Objective is to understand the principles of construction technology and process of construction.

To be able to further resolve architectural design of buildings for making them executable by a set of standard communicative technical drawings which can be used at site for execution.

**Syllabus:**

Comprehensive working drawings of a previously designed project.

Objective is that students should learn to appreciate that different materials have varying construction potentials and limitations.

Design details carrying forward their architectural design studio thought

**Suggested Books/Readings:**

1. Styles Keith and Bichard Andrew, Working Drawing Handbook, Architectural Press
2. Simmon H.L, Olin's, Construction Principles , Materials and Methods, John Wiley & Sons, 2007
3. Mchugh, R. ,Working Drawing Handbook: A Guide for Architects and Builders. Washington DC: Van Nostrand Reinhold, 1982
4. Barry, R (1999) Construction of Buildings. East West Press Pvt. Ltd., New Delhi.
5. Mckay, WB (1988) Building Construction (Vol. I, II, III & IV). Orient Longman, London.
6. Allen, E (1999) Fundamentals of Building Construction: Materials and Methods. John Weily & Sons, New York.
7. Punamia BC (1993) Building Construction, Laxmi Publications (P) Ltd, New Delhi.
8. Chudley, R (1988) Building Construction Handbook. Butterworth Heinemann, Oxford.

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*Acharya*

Course Code : AP-322  
Course Title : Theory of Structure-VI  
Semester (Year) : Sixth (Year -3 )  
Contact Hours per week : L: 4 S: 0  
per semester : L: 64 S: 0  
No. of teaching weeks : 16  
Credit : 4

115/4

**Objective:**

To understand Elementary of Structural Systems

**Syllabus:**

**Unit-1**

Analysis of Simple portal frames for horizontal loads by Portal Method

**Unit-2**

Structural systems studies: functions of structural system in building, horizontal support systems (Floor systems) and Vertical support systems (Columns and walls).  
Floor systems; various types, Beam and Slab systems, Waffle slab systems, Flat slab and Flat Plate systems, Grid floors.

**Unit-3**

High Rise buildings: Principles of high rise structures Forces on a high rise building, Effects of horizontal loads in a high rise building. Shear walls system; functions, types, Frames acting Along with Shear walls, Tube systems, advantages and disadvantages of each.

**Unit-4**

Introduction to Computer Analysis of building frames. Merits of computer methods of analysis and design compared to manual methods.

Introduction to STADDPRO software; generation of Input files and interpretation of output results for simple building frames and portal frames (simple cases only)

**Note:** In the End Term Annual Examination, Comprising of marks, "Question-1" will be compulsory having short answers covering all the 'Units' Rest any four questions will be from

**Suggested Books/Readings:**

1. IS: 875 (Parts 1 to 5), IS: 1893. IS: 13920, IS: 4326, IS: 456, SP: 34
2. Design of Masonry structures including earthquake resistant design by A.S.Arya
3. RCC Design by Ramamurtham
4. Theory of Structures by R.S. Khurmi
5. Earthquake Resistant Design of structures by Pankaj Aggarwal and Manish Shrikhande, Pub Prentice Hall of India, 2006 Edition

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<b>Course Code</b>	:	<b>AP-324</b>
<b>Course Title</b>	:	<b>Codes of Practice and Building Bye-laws</b>
<b>Semester (Year)</b>	:	Sixth (Year -3 )
<b>Contact Hours</b>	per week	: L: 2 S: 0
	per semester	: L: 32 S: 0
<b>No. of teaching weeks</b>	:	<b>16</b>
<b>Credit</b>	:	<b>2</b>

**Objective:**

The Course covers some of the legal aspects of professional practice and involves the study of relevant codes, bye laws, and regulations for design and construction of buildings.

**Syllabus:**

**Unit-1**

Introduction to Building Bye-Laws What are building bye laws, the need of building bye laws Types of bye-laws, building control laws for elevation control, zoning bye laws, height controls etc.

**Unit-2**

National Building Codes and Services, types and importance of National Building codes Difference between NBC and building byelaws Bye laws related to fire safety, HVAC and services.

**Unit-3**

Delhi Building Bye-Laws and modified Building Bye-Laws Comprehensive study of Building Bye-laws relating to the strength and stability of structures, bye-laws relating to light and ventilation, sanitation and Buildings.

**Unit-4**

Implications of Development Controls  
Role of Development Authorities and Municipal Corporations

**Suggested Books/Readings:**

1. NBC : National Building Code of India 2016, Bureau of Indian Standards (2016)
2. Unified Building Bye Laws for DELHI 2016, Commercial Law Publisher(2016)
3. Delhi Master Plan, Delhi Development Authority

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**Course Code** : AP-326  
**Course Title** : HVAC & Security systems  
Access Control  
**Semester (Year)** : Sixth (Year -3 )  
**Contact Hours** per week : L: 2 S: 0  
per semester : L: 32 S: 0  
**No. of teaching weeks** : 16  
**Credit** : 2

**Objective:**

The objective of the course is to provide a systematic understanding of environmental support systems as they apply to human habitat, with special reference to thermal comfort, HVAC and other mechanical and electrical services.

**Syllabus:**

**Unit-1**

Introduction to Air Conditioning, Sensible heat, Latent heat, Specific Humidity, Relative Humidity, Ton (TR). Comfort, Psychometrics, Adaptive comfort.  
Refrigeration Cycle, Understanding Principles of Air-conditioning.  
Heat Load Estimation, Understanding constituents of heat load calculations like wall, glass, roof, partition equipment, fresh air, lighting & occupants (Mathematical calculations are excluded).

**Unit-2**

Non-Ducted System (Window Units & Split Units), Construction details, installation practices & application.  
Ducted systems (split units & package units), Construction details, installation practices & application  
Direct expansion and chilled water systems. Types of compressors air-cooled & water cooled condensers, introduction to cooling tower air handling unit, fan coil unit, pumps, Hot water generator and chilled/ condenser water piping.

**Unit-3**

Brief introduction to variable air volume water volume and vapor absorption system.  
Fresh Air, Sick building syndrome, Indoor air quality and importance of fresh air.  
Application, Brief introduction to air conditioning system design in hotels, Hospital and commercial buildings. Integration of building design strategies with HVAC  
Ventilation Systems, Basement ventilation, Car park ventilation, Toilet/pantry ventilation,  
Introduction to air-cooling system.  
Site visit/ HVAC working/SHOP org. required to be shown to student

**Unit-4**

Building Automation Systems, Introduction: System architecture, sensors, controllers, energy management functions, (duty cycling, night cooling, time scheduling, optimum start/ stop, maximum demand limiting etc., Application, future trends.  
Elevators, Introduction, passenger lift, goods lift, service lift, hospital lift, waiting time analysis and introduction of IS codes

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**Suggested Books/Readings:**

1. Chadderton, DV (2000) Building Services Engineering. E & FN Spon, London.
2. McQuiston FC, Parker JD & Jeffrey DS (2005) Heating, Ventilating, and Aire Conditioning: Analysis and Design, Wiley.

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Course Code : AP-328  
Course Title : Energy and Buildings-II  
Semester (Year) : Sixth (Year -3 )  
Contact Hours per week : L: 2 S: 0  
per semester : L: 32 S: 0  
No. of teaching weeks : 16  
Credit : 2

**Objective:**

To understand the role of energy in functioning of buildings of buildings  
To inform the need to use alternative sources of energy in view of the depleting resources and climate change  
To understand application of active and passive design considerations in heating and cooling of buildings  
To make students conversant with guidelines of ECBC, to make the students aware of the future trends in creating sustainable built environment

**Syllabus:**

**Unit-1**

Energy Conservation Building code (ECBC) guidelines for energy consumption in buildings.  
Energy Conservation Act 2001- need and importance.  
Definitions-Building or Building complex, Built up area, connected load, certified energy auditor, EPI and EPI ratio.  
Difference between Green Building, Energy Efficient Building, Sustainable Building, Net Zero Building  
Models of Energy consumption in buildings  
Embodied Energy consumption in building materials, energy consumption in functioning of buildings in its life cycle  
Energy consumption in recycling and reuse of buildings  
ECBC standards for-Building Envelope, Lighting (indoor and outdoor), HVAC system, Solar water heating, Electrical systems  
Energy audit of buildings  
Cost Benefit approach for setting up of stringency levels-Component approach, Life cycle approach, EPI approach, Star rating approach-LEED, IGBC, GRIHA, GBI Green Globes Systems

**Unit-2**

Architectural Design as a Response to Climate: Tool for Design in All climatic Conditions of India-  
Microclimatic Factors:  
Simple passive design considerations Site Conditions- Landform, topography, vegetation type and pattern, water bodies, street widths and orientation, ground character  
Plan form and Building Envelope Heat transfer and Thermal Performance of Walls and Roofs  
Plan form and elements, building orientation, roof form, fenestration pattern, orientation and configuration, controls like shading devices, design of shading devices.  
Walls, choice of materials, roof materials, external colors and textures, layouts and internal finishes  
Examples of Vernacular architecture of different climatic zones may be used to illustrate the above design processes

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### Unit-3

Solar Passive Heating

Direct Gain Thermal Storage of Wall and Roof - Roof Radiation Trap - Solarium - Isolated Gain

### Unit-4

Cooling Systems, roof pond, Trombe wall, green house, wind tower, earth air tunnel. Evaporative Cooling - Nocturnal Radiation cooling - Passive Desiccant Cooling – Induced Ventilation - Earth Sheltering - air flow, stack effect Wind Tower - Earth Air Tunnels

#### Suggested Books/Readings:

1. Manual on Solar Passive Architecture, IIT Mumbai and Mines New Delhi, 1999
2. Arvind Krishnan & Others, "Climate Responsive Architecture", A Design Handbook for
3. Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2001
4. Majumdar M, "Energy-efficient Building in India", TERI Press, 2000.
5. Givoni .B, "Passive and Low Energy Cooling of Buildings", Van Nostrand Reinhold, New York, 1994
6. Fuller Moore, "Environmental Control Systems", McGraw Hill INC, New Delhi - 1993
7. Sophia and Stefan Behling, Solpower, "The Evolution of Solar Architecture", Prestel, New York, 1996
8. Patrick Waterfield, "The Energy Efficient Home: A Complete Guide", Crowood press ltd, 2011.
9. Dean Hawkes, "Energy Efficient Buildings: Architecture, Engineering and Environment", W.W. Norton & Company, 2002
10. David Johnson, Scott Gibson, "Green from the Ground Up: Sustainable, Healthy and Energy efficient home construction", Taunton Press, 2008

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Course Code	:	AP-330	
Course Title	:	Specification and Contract Management	
Semester (Year)	:	Sixth (Year -3 )	
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks	:	16	
Credit	:	2	

**Objective:**

Teaching basic concepts for writing of specifications and preparation of Contract documents for small works

**Syllabus:**

**Unit- 1**

Specifications: Definitions, importance, composition of specs, Broad classification of specs, role in a contract document.

Open, restricted specification. Advance & disadvantages of each Standard, special master specification.

Nature, advantages & disadvantages of each.

Streamlined specification – Nature, advantages & disadvantages of each. Types of Technical Specification and provision of each. General provision of specification- Definitions abbreviations.

**Unit - 2**

Legal + public relations, prosecuting progress, measurement + payment. Specification writing – format style, principles of good specification, merits and demerits.

Scheduled and non-scheduled items, CPWD specification for carriage of materials, CPWD specification for mortars, CPWD specification for brick work, CPWD specification for concrete, CPWD specification for flush doors, CPWD specification for whitewash, distemper, CPWD specification for synthetic paint.

**Unit - 3**

Contract: Contractor – definition, essential's types of contracts: Types of contracts: Item rate, percentage rate, Advantage & disadvantages of each.

Types of contracts: Lump sum, labour, materials supply-nature advantages and disadvantages. Types of contractor- cost+ percentage, Cost + fixed fee, other types. Advantage & disadvantages.

Tender, forum, N.I.T, examples, Global tender, sale, opening, Corporative statement, informal tenders.

**Unit - 4**

Conditions of agreement and contract: Acceptance of tender, contract DOX, Earnest Money, Security Money Retention Amount, other important conditions.

Duties of owner, Contractor & liabilities of each.

Duties of the Architect/ Engineer and his liabilities w.e.f. the contract.

Case studies of recent Arbitration in the Industry, Duties of Contractor & liabilities.

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Suggested Books/Readings:

1. Dr. B.C. Punmia and K.K. Khandelwal-Project planning and control with PERT/CPM, Laxmi publications, New Delhi, 1987.
2. Delhi Schedule of Rates, Govt. of India CPWD, 2016
3. NBC : National Building Code of India 2016, Bureau of Indian Standards (2016)

No. of teaching weeks

Credit

Objective:

The objective of this course is to provide the students with the knowledge and skills required for the design and construction of buildings. The course will cover the following topics:

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**Course Title** : **Elective-II**  
**Semester (Year)** : **Sixth (Year -3 )**  
**Contact Hours** per week : L: 0 S: 3  
per semester : L: 0 S: 48  
**No. of teaching weeks** : **16**  
**Credit** : **3**

**Objective:**

The objective of this course is to offer opportunities in specialized or advance learning in subjects covering emerging areas of concern to Architecture. The courses will generally be conducted in the seminar/studio mode to encourage research, exploration and skills developments. The subject groups listed below give an indication of the breath and specificity of subjects. The course contents to be followed will be developed by course teachers based on the resources at hand and opportunities for cross fertilization with other courses.

This electives programme will be developed to offer a maximum of six subjects choices to which students of the 3rd year can choose, subject to the time table. The subjects would be based on the following suggested groups:

AP-342	Art & Design Disciplines - II
AP-344	Urban Issues - II
AP-346	Advanced Construction Technologies- II
AP-348	Ecology & Environmental Issues- II
AP-350	Landscape Architecture - II
AP-352	Computer and Information Technology - I
AP-354	Interior Design - II

Note: Concerned faculty of each Elective should develop a weekly program for the course for each term for presenting it to the students



Course Code : AP-342

Course Title : Art & Design Discipline-II

**Objective:**

The course is to explore the artistic dimension of Architecture. This includes study of perception and experience of built environment. The course would have short exercises and assignments for assimilation of skills and bringing together the knowledge gained to the drafting table.

**Syllabus:**

Aesthetics of formal and spatial patterns in Architecture  
Relationship between natural context and parts of buildings and settlements.  
Impact of light & sound on architectural elements  
Articulation of building elements.

Course Code : AP-344

Course Title : Urban Issues-II

**Objective:**

The course intends to study and understand the typical components of city in order to appreciate how these elements contribute to the generation & sustenance of urban qualities. The work may be undertaken individually or in groups. It will require observation, survey and research leading to strategic understanding/propositions in response to the case-studies.

**Syllabus:**

Buildings in City: Buildings as participants in the making of the cities  
Urban Form & Architecture: Relationship between urban form and the architecture of individual buildings  
The value of design and architecture of the public domain and public spaces; public spaces as settings for architecture  
Landmarks and Monuments: The making of historic, cultural, political, institutional identity and its formal and spatial expression in city networks

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Course Code : AP-346

Course Title : Advance Construction Technologies-II

**Objective:**

The course highlights the role of materials in production and representation of Architectural objects. The course would be conducted through literature survey, case studies, site visits, market surveys and hands on projects.

**Syllabus:**

Select examples from existing buildings covering a range of materials and construction techniques  
Analyze construction assembly and joinery according to functions, performance and process of construction  
Analyze aesthetic and symbolic intentions of the built examples

Course Code : AP-348

Course Title : Ecology & Environmental Issues-II

**Objective:**

The objective of the course is to develop quantitative tools to assess environmental impact of buildings and settlements and approaches to address their negative consequences. Exercises of quantitative evaluation of buildings to city scale examples and strategizing sustainable scenarios may be conducted in groups

**Syllabus:**

GHG emissions and climate change  
Fossil fuels energy demand and CO2 emissions  
Renewable and non renewable sources, water availability versus demand  
Exercise in building scale evaluation and strategy for sustainability  
Exercise in settlement scale evaluation and strategy for sustainability  
Concepts in Ecology and Sustainable Development

Course Code : AP-350

Course Title : Landscape Architecture-II

Semester (Year) : Sixth (Year -3 )

**Objective:**

The objective of the course is to develop understanding the role of landscape design as related to architecture and planning.

**Syllabus:**

Historical Perspective, History of the design concepts of garden design of India, China, Persia, Japan,

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**Site Planning**

Organization of spaces - circulation, built form and open spaces, site planning and micro climate, site planning for neighbourhood parks, children's play area and campus development.

**Landscape Design**

Landscape design for various building types, landscaping parks and roads, rock gardens, Formal and informal landscape design, Water and man-made elements in landscape, garden furniture and embellishments

**Unit-4 Landscaping of Functional Areas**

Urban open spaces and principle of urban landscape; Street landscaping, landscape design for Water front areas and functional areas in urban centers; interior and terrace and vertical gardens

**Landscaping of Functional Areas**

Urban open spaces and principle of urban landscape; Street landscaping, landscape design for Water front areas and functional areas in urban centers; interior and terrace and vertical gardens

**Suggested Books/Readings:**

1. Bose, T.K. and Chowdhury, B., "Tropical Garden Plants in Colour", Allied Publishers. 1991  
Black & Decker, "Landscape Design & Construction", Creative Publishing International. 1993.

**Course Code** : AP-352

**Course Title** : **Computer and Information  
Technology-I**

**Objective:**

The course gives students the ability to write programs for generation of two and three dimensional forms. An appropriate programming language is learnt and creative exercises for generation of form are practiced.

**Syllabus:**

Theory of programming language, with elementary exercises

Principles of parametric generation of form, exercises in two dimensional form generation using first order parameters

Exercises in parametric generation of form using second order parameters

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Course Code : AP-354  
Course Title : Interior Design -II

**Objective:**

To familiarize the students with interior design of large scale projects.  
To inform the various components of interior space and treatment and finishes for the same  
To familiarize the students with the various components of interior design like lighting, landscaping and furniture  
Interior design of large and mono-functional multifunctional spaces e.g. airports, hotel, hospital, large scale corporate office.

**Syllabus:**

Components of Interior Space- Interior Treatment and Finishes  
Treatment of components such as floors, ceilings, walls, partitions, window treatments, accessories, etc. for large spaces

Components of Interior Space- Lighting and Landscaping  
different types of lighting - types of lighting fixtures- their effects and suitability in different contexts  
Interior landscaping elements their physical properties and effects on spaces in different contexts

Components of Interior Space- Furniture  
Furniture design as related to human comfort and function, materials and methods of construction, changing trends and lifestyles, innovations and design ideas - furniture for specific types of interiors: office furniture, children's furniture, residential furniture, display systems, etc

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Course Code  
Course Title  
Semester/Year  
Contact Hours  
No. of working weeks

### B.ARCH SYLLABUS, SEVENTH SEMESTER-YEAR 4

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Course Code	:	AP-401	
Course Title	:	Architectural Design - VII	
Semester (Year)	:	Seventh (Year-4)	
Contact Hours	per week	:	L: 0 S: 12
	per semester	:	L: 0 S: 192
No. of teaching weeks	:	16	
Credit	:	12	

**Objective:**

To Learn designing of Housing and Ideas of housing as Public Service Facility & Private Commercial Product

**Syllabus:**

Mass housing or Residential sectors and enclaves.

Exercises before beginning of Design

2-4 Weeks Study of residential typologies, and Spatial hierarchies  
Gated and Integrated Communities.

12- 14 Weeks Design Problem  
Site, Context and Community Analysis  
Conceptualization and Design Development

**Suggested Books/Readings:**

1. Chiara, J.D., Panero, J., Zelnik, M., "Time Saver Standards for Housing and Residential Development", 2nd Ed., McGraw-Hill, 1995
2. Neufert, P., "Architects' Data", 3rd Ed., Blackwell Science, 2000
3. Watson, D.(Editor), "Time-saver Standards for Urban Design", McGraw-Hill, 2003
4. Watson, D.(Editor), "Time-saver Standards for Architectural Design: Technical Data for Professional Practice", McGraw-Hill, 2005

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Course Code : AP-403  
Course Title : Building Construction -VII  
Semester (Year) : Seventh (Year-4)  
Contact Hours per week : L: 0 S: 5  
per semester : L: 0 S: 80  
No. of teaching weeks : 16  
Credit : 5

**Objective:**

Learning about alternate systems and new materials & techniques in building construction.

**Syllabus:**

Details of building components using new/alternate materials and techniques of construction  
Foundation systems  
Floor systems  
Walling and partition systems  
Roofing systems

**Suggested Books/Readings:**

1. Jagdish, Reddy S.K, Rao Ventarama V.B, Nanjunda, Alternative building Materials and Technologies, New age International Pub(P)Ltd.
2. Jagdish K.S., Building with Stablized Mud, I.K. International Pub. House (P) Ltd, 2009
3. Bhatia Gautam, Lauri Baker, Penguin India
4. Koenigsberger, Q. H. (et. al.); Manual of Tropical Housing & Building, Orient Longman, Madras, 1988

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A. S. (with 'ms' above)  
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Course Code	:	AP-405	
Course Title	:	Seminar	
Semester (Year)	:	Seventh (Year-4)	
Contact Hours	per week	:	L: 0 S: 6
	per semester	:	L: 0 S: 96
No. of teaching weeks	:	16	
Credit	:	6	

99/c

**Objective:**

In a seminar the students will learn how to conduct a study on theme or issue in architecture and compile it as a research paper and make a formal presentation of the study ad findings.  
To equip the students with the art of paper presentations and preparation of report

**Syllabus:**

- Formal research methodology in architecture
- Collection and processing of data
- Presentation of studies and findings in written and graphic format
- Art of paper presentation
- Preparation of audio visual presentation for interactive audience

Note: the seminar can be done individually or in a group of upto 5-6 students assigned to respective guides under the supervision of an overall coordinator.

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**Course Code** : AP-421  
**Course Title** : Theory of Structure-VII  
**Semester (Year)** : Seventh (Year-4)  
**Contact Hours** per week : L: 2 S: 0  
per semester : L: 32 S: 0  
**No. of teaching weeks** : 16  
**Credit** : 2

**Objective:**

To understand the structural concept, applications feasibilities, scope and limitations of technologically advanced systems and techniques. (No detailed designs mathematical calculations or derivation of formulae are needed.)

**Syllabus:**

**Unit-1**

Pre-stressed Concrete, Prefabrication and Industrial Structures : Pre-stressed Concrete : Difference between PSC and RCC, Materials used in PSC, Principles of Pre-stressing, Pre Tensioning and Post tensioning, Axial and eccentric pre-stressing, Modern day use of PSC in buildings, bridges, Flyovers and Metro construction.

Prefabrication in RCC: Merits and demerits of Prefab construction compared to in situ construction. Methods of prefab construction Modern day use in Prefab housing and other fields

**Unit-2**

Pre-stressed Concrete, Prefabrication and Industrial Structures : Pre-stressed Concrete : Difference between PSC and RCC, Materials used in PSC, Principles of Pre-stressing, Pre Tensioning and Post tensioning, Axial and eccentric pre-stressing, Modern day use of PSC in buildings, bridges, Flyovers and Metro construction.

Prefabrication in RCC: Merits and demerits of Prefab construction compared to in situ construction. Methods of prefab construction Modern day use in Prefab housing and other fields

**Unit-3**

Folded Plates: General understanding of folded plate, Different shapes with Examples of modern day use

Shells: General understanding of shell behavior, Shell terminology, Historical perspective, thick shell thin shell, membrane stresses in thin shells, Types of shells; Cylindrical, Conical, Spherical shells. RCC and steel domes, Hyperbolic paraboloid shells, Modern day use

**Unit-4**

Large span systems 1: Characteristics of large span structural systems. Steel roof trusses as large span systems structures in Industrial structures

General understanding of structure of space frame, space structures against plane structures and Geodesic domes, Modern day use, Diagrids

Tensile Structures: Principles of tensile structures, understanding general structural behavior of tension systems, cable suspended and cable-stayed structure, examples of modern day use. 97/c

**Suggested Books/Readings:**

1. Heller Robert and Salvadori Mario, Structures in Architecture: The Building of Buildings, Prentice Hall Inc., 1963.
2. Advanced RCC design by Krishnsraju.
3. Structural Systems for Tall Buildings; Council of Tall Buildings and Urban Habitat; Pub. McGraw - Hill International Edition 1995

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Course Code	:	AP-423
Course Title	:	Town Planning-I
Semester (Year)	:	Seventh (Year-4)
Contact Hours	per week	: L: 2 S: 0
	per semester	: L: 32 S: 0
No. of teaching weeks	:	16
Credit	:	2

96/C

**Objective:**

To have an overview on the vocabulary of Human settlements  
 To understand the various elements of Human Settlements and the classification of Human Settlements. The intention is to make architecture students aware of the problems of cities and how to address the various issues.

**Syllabus:**

**Unit-1**

Introduction: Elements of Human Settlements – human beings and settlements – nature shells & Network – their functions and Linkages – Anatomy & classification of Human settlements – Locational, Resource based Population size & Occupational structure.

**Unit-2**

Forms of human settlements: Structure and form of Human settlements – Linear, non-linear and circular – Combinations – reasons for development – advantages and disadvantages – case studies – factors influencing the growth and decay of human settlements.

**Unit-3**

Planning concepts: Planning concepts and their relevance to Indian Planning practice in respect of Ebenezer Howard – Garden city concepts and contents – Patrick Geddes – Conservative surgery – case study – C.A. Perry – Neighborhood concept Le Corbusier – concept and case studies

**Unit-4**

Planning Problems: Identification of planning problems of land-use distribution and change, communication system, overcrowding, slums, sporadic growth and conurbation.

Regional Planning: Concept of regional planning, types of regions, locational factors of settlements etc.

A critical review of regional theories.

**Suggested Books/Readings:**

1. Gallion Arthur B., Eisner S., The Urban Pattern: City Planning and Design, CBS Pub. and Distributors, Delhi, 1984.
2. Bandopadhyay Abir, The Text Book of Town Planning, Books and Allied (P) Ltd, Kolkata, 2000.
3. Modak & Ambdekar, Town and Country Planning & Housing, Orient Longman Ltd 1971

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Course Title : Elective-III  
 Semester (Year) : Seventh (Year-4)  
 Contact Hours per week : L: 0 S: 3  
 per semester : L: 0 S: 48  
 No. of teaching weeks : 16  
 Credit : 3

**Objective:**

The objective of this course is to offer opportunities in specialized or advance learning in subjects covering emerging areas of concern to Architecture. The courses will generally be conducted in the seminar/studio mode to encourage research, exploration and skills developments. The subject groups listed below give an indication of the breath and specificity of subjects. The course contents to be followed will be developed by course teachers based on the resources at hand and opportunities for cross fertilization with other courses.

This electives programme will be developed to offer a maximum of six subjects choices to which students of the 4th.year can choose, subject to the time table. The subjects would be based on the following suggested groups:

AP-441	Humanities, History, Theory and Philosophy - I
AP-443	Building Economics
AP-445	Advanced Construction Technologies- III
AP-447	Integrated Environmental Design
AP-449	Contemporary Processes in Architecture
AP-451	Computer and Information Technology -II
AP-453	Advance Architectural Theories
AP-455	Intelligent Buildings

Note: Concerned faculty of each Elective should develop a weekly program for the course for each term for presenting it to the students

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Course Code : AP-441

94/c

Course Title : Humanities, History, Theory and Philosophy-I

**Objective:**

To introduce significance of theoretical and philosophical dimensions in architecture The course would be run as a series of demonstrations of selections from the topics below with chosen case examples across time and space, along with lectures on fundamental aspects and assignments / seminars on chosen themes.

**Syllabus:**

Objective knowledge vs. Subjective Ideas,  
Distinction of & relationship between Science and Philosophy.  
Rational process and Empirical process  
Rules, Formulas, Principles and Theories.  
Accuracy vs. Indeterminacy in Design  
Analytic approach vs. Mimetic approach  
Old Architectural treatises in Europe and India  
Liberal Art and Architecture  
Collaboration between Architecture and other disciplines

Course Code : AP-443

Course Title : Building Economics

**Objective:**

To understand the economic principles associated with building design  
To create awareness among students about economic aspects related to construction and real-estate industry

**Syllabus:**

**Elementary concepts of economics**

Building Economics, Fundamental economic concepts and analysis, Demand & Supply, Law of demand, elasticity of demand, law of diminishing marginal utility, law of equi-marginal utility, Market and its typology, equilibrium

**Scenario of construction and real-estate industry**

Cost control, cash-flow analysis, cost projections, cost-benefit, Demand and supply of real-estate in India, Methods of construction project financing, Land market in cities under the policies of various policies/acts, Ownership titles, regulations and registration of immovable property.

**Economic performance of buildings**

Financing, feasibility, Estate investments and returns, rentals, Pre construction, construction and Post construction cost of project, Financial planning of construction projects, Accounting for risks and uncertainties, feasibility analysis, cost benefit analysis, Rate of return analysis

**Valuation of immovable property**

Easement, valuation, law relating to properties and buildings Principles of valuation, cost, price and

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**Course Code** : AP-445  
**Course Title** : **Advanced Construction Technologies- III**

**Objective:**

- To study the advancements in construction with concrete for large span structures.
- To familiarize the students with the manufacture, storage and transportation of concrete.
- To inform the various equipment used in the construction industry and the criteria for choice of equipment.
- To familiarize the students with an overview of construction management, planning and scheduling

**Syllabus:**

**Construction Systems**

Structural systems and design: Planning - pre-stressed, concrete constructions pre-cast concrete and pre- fabrication system - Modular coordination.

**Construction Practice**

Modern Construction Materials- - Manufacture, storage, transportation and erection of pre-cast component forms, moulds and scaffoldings in construction - safety in erection and dismantling of constructions.

**Construction Methods and Equipment**

Uses of the following: Tractors, bulldozers, shovels draglins, cableways and belt conveyors, batching plants - Transit mixers and agitator trucks used for ready mix concrete pumps Guniting equipments - Air compressors - welding equipment - cranes and other lifting devices Choice of construction equipment for different types of works.

**Construction Technology for High-rise Buildings**

Planning and scheduling for high rise building: Scheduling- Simulation – Typical Floor Construction Cycle – Appropriate working schedule.

**Course Code** : AP-447  
**Course Title** : **Integrated Environmental Design**

**Objective:**

ECBC and to focus on the environmental and ecological issues and to assess environmental impact of buildings and settlements

**Syllabus:**

Introduction to “India Habitat” national report. Concepts in ecology and sustainable development Implementation mechanism of ECBC in India.

Integration of Low comfort systems, natural ventilation, set points, controls

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92/c

Day lighting shading requirements with relaxed U value, Provision for inclusion of renewable energy, Requirements for stringent lighting and air-conditioning systems and controls

Compliance mechanism of ECBC – Prescriptive method and whole building performance method. Energy rating systems in buildings with exercises and case studies

EIA: Definition and need, Role of EIA in design and decision making process, methods, advantages and limitation.

Environmental impact of building materials

Eco friendly building materials, their composition, production and recycling, physical properties

**Course Code** : **AP-449**

**Course Title** : **Contemporary Processes in Architecture**

**Objective:**

To investigate various theories of media and its influence on the perception of space

To study the various aspects of Digital Architecture and its exploration through emerging phenomena that relies on abstraction of ideas.

To study the works of contemporary architects who have illustrated the influence of the digital media in evolving architecture. This is to be presented as Seminars.

**Syllabus:**

**Introduction**

Investigation of contemporary theories of media and their influence on the perception of space and architecture

Technology and Art – Technology and Architecture – Technology as Rhetoric – Digital Technology and Architecture

**Aspect of Digital Architecture**

Aspects of Digital Architecture – Design and Computation – Difference between Digital Process and Non-Digital Process – Architecture and Cyber Space – Qualities of the new space – Issues of Aesthetics and Authorship of Design – Increased Automatism and its influence

**Contemporary Process**

Emerging phenomena such as increasing formal and functional abstractions – Diagrams – Diagrammatic Reasoning – Diagrams and Design Process – Animation and Design – Digital Hybrid

**Geometries and Surfaces**

Fractal Geometry – Shape Grammar - Hyper Surface - Liquid Architecture – Responsive Architecture

**Seminar**

Students would make presentation on the ideas and works of the following architects. The proposal must be discussed with course faculty prior to presentation. Greg Lynn, Reiser + Umemotto, Lars Spuybroek

/ NOX Architects, UN studio, Diller Scofidio, Dominique Perrault, Decoi, Marcos Novak, Foreign Office

Architects, Asymptote, Herzog and de Meuron, Neil Denari

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Course Code : AP-451  
Course Title : Computer and Information Technology - II

**Objective:**

The most potent use of Information Technology (IT) in design is its power as a tool for addressing complex design problems. Equally, IT has immense potential in Building Integrated Management Systems that combine 3D Coordination, quantities and measurement for construction and evaluation of performance on cost and energy (BIMS). This course will be an introduction to the above mentioned facets of IT application in Architecture.

**Syllabus:**

Introduction to GIS and Remote sensing

Environmental Simulation software: Eco-tect /Radiance, Energy Ten, Energy Plus. BIMS

Parametric design  
Advanced graphic software's

Development of programs for graphic and database extraction for the purpose of preparation of estimates, specification, BOQ, tender documents, etc.

Course Code : AP-453  
Course Title : Advance Architectural Theories

**Objective:**

The objective of this course is to explore disciplinary and discursive exchanges between architecture and various other disciplines of knowledge through exploration of the following topics in a suitable order; with lectures on fundamental aspects and assignments and seminars on chosen themes and/or case examples.

**Syllabus:**

Introduction to Relationship between Liberal Art and Architecture  
Collaboration between Architecture and other discipline  
Architecture as a knowledge system in Pre Modern times  
Early Modernization of Architectural Discipline  
The idea of Disciplines complementing architecture  
Impact of other disciplines in transforming Architecture

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Course Code : AP-455  
Course Title : Intelligent Buildings

90/2

**Objective:**

To give a direction towards building automation system  
The course brings out the need and functional requirement of automation system and implementation of artificial intelligence in built environment for efficiency in building energy consumption patterns and enhances security and safety systems.

**Syllabus:**

High Tech Building Systems: Introduction to Intelligent building systems and their areas of application in architecture; Concept and application of Automation and Management System; Design issues related to building automation and its effect on functional efficiency; Components of building automation system; HVAC, electrical, lighting, security, fire-fighting, communication etc.; Role, Types and uses of Sensors, Actuators etc in contemporary practice.

Integrated approach in design, maintenance and management system; Current trend and innovation in building automation systems; impact of Information Technology; Concept of artificial intelligence; Knowledge base and decision support systems and building automation and management system; Application of expert system in building automation; Stages in development of expert system, expert system application in architecture; Computerizing building management information.

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### B.ARCH SYLLABUS, EIGHT SEMESTER -YEAR 4

Syllabus of B. Arch. Programme approved by  
Sub Committee of Academic Council on \_\_\_\_\_ and  
Board of Studies of USAP on 16<sup>th</sup> July 2019  
w.e.f. Academic session 2018-19

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Course Code	:	AP-402	
Course Title	:	Architectural Design – VIII	
Semester (Year)	:	Eighth (Year-4)	
Contact Hours	per week	:	L: 0 S: 12
	per semester	:	L: 0 S: 192
No. of teaching weeks	:	16	
Credit	:	12	

**Objective:**

To Learn designing in City Scale, for Urban Design Interventions within city or in Extensions or for New Urban Design Schemes or Town Planning.

**Syllabus:**

Urban Precincts or streets, or Large Multi Use Urban Centres, District centres, Transit Nodes.

Exercises before beginning of Design

2-4 Weeks Significance of Public Domain.

Elements of Physical Urban Structure Morphology and Typologies. Urban Service Networks.

12- 14 Weeks Design Problem

Site, Context and Community Analysis

Conceptualization and Design Development

**Suggested Books/Readings:**

1. Chiara, J.D., Panero, J., Zelnik, M., "Time Saver Standards for Housing and Residential Development", 2nd Ed., McGraw-Hill, 1995
2. Neufert, P., "Architects' Data", 3rd Ed., Blackwell Science, 2000
3. Watson, D.(Editor), "Time-saver Standards for Urban Design", McGraw-Hill, 2003
4. Lynch John R, The Image of the City (Harvard-MIT Joint Center for Urban Studies Series), 1960
5. Cullen Gordon, Concise Townscape, Routledge; 1 edition (1 October 2015)
6. Broadbent Geoffrey, Emerging Concepts in Urban Space Design, Taylor & Francis; 1 edition (22 July 2016)
7. Correa Charles , Mehrotra Nondita Correa, A Place In The Shade: The New Landscape & Other Essays,

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 Ms. S. K. Acharya  
 Ms. Rekha  
 Ms. S. K. Acharya  
 Ms. Rekha

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Course Code : AP-404  
Course Title : Building Construction – VIII  
Semester (Year) : Eighth (Year-4)  
Contact Hours per week : L: 0 S: 5  
per semester : L: 0 S: 80  
No. of teaching weeks : 16  
Credit : 5

**Objective:**

To provide basic understanding of pre-stressing, post-tensioning, pre-fabrication and precast system in building

**Syllabus:**

Introduction to pre-stressing, post tensioning, Prefabrication and precast systems, Jointing, tolerances and modular coordination in construction industry

Large Span Roofing systems in concrete or steel using light weight roofing materials

**Suggested Books/Readings:**

1. Elliot S. Kim, Precast Concrete Structure, A Butterworth- Heinemann, 2002
2. Dr. Ganeshan R., Latha A., Prefabricated Structures, Sree kamlamani Publications 2014
3. Krishna, Cable Suspended Roof, Tata Mc Graw-hill Education, 20015

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Course Code	:	AP-406	
Course Title	:	Dissertation/ Research Paper	
Semester (Year)	:	Eighth (Year-4)	
Contact Hours	per week	L: 0	S: 8
	per semester	L: 0	S: 128
No. of teaching weeks	:	16	
Credit	:	8	

86/C

**Objective:**

The objective of Dissertation is to learn the process of adding something new to the existing body of knowledge. This may involve any aspect of architecture.

Dissertation is intended for students to learn and apply on the fundamentals of research methods and learn to critically evaluate or discuss issues, or make new propositions based on research. This would enlighten students on the fundamentals of research methodology. It should preferably add to the existing body of knowledge.

**Syllabus:**

Emphasis will be on academic rigor of conceptual clarity, analytical techniques and construction of arguments and propositions. The norms for presentation of academic papers-forms, structure, presentation and adherence to the intellectual source acknowledgement and their forms of identification will be learnt.

This paper shall be on a subject of theoretical nature on any aspect of architecture. The overall supervision shall be done by a Dissertation coordinator to be appointed from within the faculty and individual guidance shall be provided to each student. Students are expected to choose topics, which are of special interest to them and write a paper on it. The paper will be submitted in the form of written and bound volume of approximately minimum 5,000 words.

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 K. K. (center)  
 Arch. (right)  
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Course Code	:	AP-422	
Course Title	:	Town Planning-II	
Semester (Year)	:	Eighth (Year-4)	
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks	:	16	
Credit	:	2	

85/C

**Objective:**

To familiarize the students with Planning concepts and process in Urban and Regional Planning The course focus is on the physical and spatial aspects of planning of cities. How have these being affected because of out-population, housing shortage, infrastructure and related problem. The objective of this course is to study socio-economic and demographic characteristic of town and cities, their present growth trends and future needs.

**Syllabus:**

**Unit-1**

Rules and regulations for development controls and principles  
 Factors guiding the framing of regional plans, development plans for state, District, urban agglomeration, municipal corporations and improvement trusts.  
 Regional development authorities and CRZ, SEZ

**Unit-2**

Development Plan: Planning process, concept of master plan, its elements, preparation and implementation.  
 Planning Standards: Formulation of planning standards for land-use, density, road and various community facilities at the local and town level  
 Procedures for formulation/implementation and approval to various authorities

**Unit-3**

Detailed planning proposals for residential neighborhoods  
 Housing as basic fabric of Town Plan  
 Housing Policy elements and their integration in town plan. Introduction to concept of housing shortages and supply systems with focus on needs of non-formal and weaker sections of society  
 Detailed planning proposal for residential/Mix use neighborhood

**Unit-4**

Urban traffic and transportation  
 Planning Legislation: Review of the development of planning legislation in India and UK  
 Detailed understanding of the latest planning of housing acts

**Suggested Books/Readings:**

1. Rangwala, S.C., "Town Planning", Charotar Publishing House, 1989
2. Randall, A., "Crossroads, Hamlet, Village, Town: Design Characteristics of Traditional Neighbourhoods, Old and New", American Planning Association, 2004

*Mason* *hms* *Archs* *Revised*



84/c

Course Title : Elective IV

Semester (Year) : Eighth (Year-4)

Contact Hours per week : L: 0 S: 3  
per semester : L: 0 S: 48

No. of teaching weeks : 16

Credit : 3

**Objective:**

The objective of this course is to offer opportunities in specialized or advance learning in subjects covering emerging areas of concern to Architecture. The courses will generally be conducted in the seminar/studio mode to encourage research, exploration and skills developments. The subject groups listed below give an indication of the breath and specificity of subjects. The course contents to be followed will be developed by course teachers based on the resources at hand and opportunities for cross fertilization with other courses.

This electives programme will be developed to offer a maximum of six subjects choices to which students of the 4th.year can choose, subject to the time table. The subjects would be based on the following suggested groups:

AP-442	Humanities, History, Theory and Philosophy - II
AP-444	Housing and Urban Development
AP-446	Earthquake Resistant Architecture
AP-448	Universal Access Enabled Environment
AP-450	Industrial Architecture
AP-452	Advanced Computing
AP-454	Architectural Conservation
AP-456	Project Management

Note: Concerned faculty of each Elective should develop a weekly program for the course for each term for presenting it to the students

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Course Code : AP-442  
 Course Title : Humanities, History, Theory and Philosophy - II  
 Semester (Year) : Eighth (Year-4)  
 Contact Hours per week : L: 0 S: 3  
 per semester : L: 0 S: 48  
 No. of teaching weeks : 16  
 Credit : 3

**Objective:**

To introduce significance of theoretical and philosophical dimensions in architecture. The course would be run as a series of demonstrations of selections from the topics below with chosen case examples across time and space, along with lectures on fundamental aspects and assignments / seminars on chosen themes.

**Syllabus:**

Objective knowledge vs. Subjective Ideas,  
 Distinction of & relationship between Science and Philosophy.  
 Rational process and Empirical process  
 Rules, Formulas, Principles and Theories.  
 Accuracy vs. Indeterminacy in Design  
 Analytic approach vs. Mimetic approach  
 Old Architectural treatises in Europe and India  
 Liberal Art and Architecture  
 Collaboration between Architecture and other disciplines

Course Code : AP-444  
 Course Title : Housing and Urban Development

**Objective:**

To outline the Issues concerning housing in the Indian Context and the various agencies involved in the production of housing.  
 To outline factors that influence housing affordability and to familiarize students with various schemes and policies of the government in the housing sector  
 To inform about the standards and guidelines for housing  
 To inform about the various housing design typologies and the processes involved in housing project development.

**Syllabus:**

**Introduction to housing and housing issues**

Indian context  
 Housing and its importance in Architecture and its relationship with neighbourhood and city planning

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*Arch*  
*Rekha*



Housing demand and supply – National Housing Policy – Housing agencies and their role in housing development – impact of traditional life style – Rural Housing, Public, private sector housing

### **Socio-economic aspects**

Social economic factors influencing housing affordability – equity in housing development sites and services/-slum up-gradation community participation – Rajiv Awas Yojana Crime prevention Health principles in Housing

### **Housing standards**

UD PFI – guide lines, standard and regulations – DCR – performance standards for housing.

### **Site planning and housing design**

Site Planning : Selection of site for housing, consideration of physical characteristics of site, locational factors, orientation, climate, topography – Landscaping- Housing design – Traditional housing, row housing, cluster housing – apartments and highrise housing relating to Indian situations – case studies in India – integration all types of services, parking, incorporation of green sustainable practices –prefabrication in housing.

### **Suggested Books/Readings:**

1. Richard Kintermann and Robert small, “Site planning for Cluster Housing”, Van Nostrand Reinhold company, Jondon/New York 1977.
2. Joseph de Chiara and others, “Time Saver Standards for Housing and Residential development”, McGraw Hill Co, New York 1995.
3. Forbes Davidson and Geoffrey Payne, “ Urban projects Manual”, Liverpool University press, Liverpool 1983.
4. HUDCO publications – Housing for low income, sector model.
5. Christopher Alexander, “A pattern Language”, Oxford University press, New York 1977
6. Leuris (S), Front to back: “A Design Agenda for Urban Housing”, Architectural Press, 2006.
7. Mohanty. L.N.P., Mohanty. S, “Slum in India” APH Publications 2005
8. Saxena A. K. , “Sociological Dimensions of Urban Housing and Development “, Common wealth Publications, 2004
9. Geol. S. L. Dhaliwal. S. S. “Slum improvement through participatory Urban based Community structures”, Deep & Deep Publications, 2004.

**Course Code** : **AP-446**

**Course Title** : **Earthquake Resistant Architecture**

### **Objective:**

- To understand the fundamentals of Earthquake and the basic terminology
- To provide basic knowledge of earthquake resistant design concepts
- To inform the performance of ground and buildings.
- To familiarize the students with design codes and building configuration
- To understand the various types of construction details to be adopted in a seismic prone area.
- To apply the knowledge gained in an architectural design assignment

### **Syllabus:**

#### **Fundamentals of earthquakes**

- a) Earths structure, seismic waves, plate tectonics theory, origin of continents, seismic zones in India.
- b) Predictability, intensity and measurement of earthquake
- c) Basic terms- fault line, focus, epicenter, focal depth etc.

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Site planning, performance of ground and buildings

- a) Historical experience, site selection and development
- b) Earthquake effects on ground, soil rupture, liquefaction, landslides.
- c) Behaviour of various types of building structures, equipments, lifelines, collapse patterns
- d) Behaviour of non-structural elements like services, fixtures in earthquake-prone zones

Seismic design codes and building configuration

- a) Seismic design code provisions – Introduction to Indian codes
- b) Building configuration- scale of building, size and horizontal and vertical plane, building proportions, symmetry of building- torsion, re-entrant corners, irregularities in buildings- like short stories, short columns etc.

Various types of construction details

- a) Seismic design and detailing of non-engineered construction- masonry structures, wood structures, earthen structures.
- b) Seismic design and detailing of RC and steel buildings
- c) Design of non-structural elements- Architectural elements, water supply, drainage, electrical and mechanical components

**Suggested Books/Readings:**

1. Guidelines for earthquake resistant non-engineered construction, National Information centre of earthquake engineering (NICEE, IIT Kanpur, India), 2004.
2. C.V.R Murthy, Andrew Charlson. "Earthquake design concepts", NICEE, IIT Kanpur, 2006.
3. Agarwal.P, Earthquake Resistant Design, Prentice Hall of India, 2006.
4. Ian Davis, "Safe shelter within unsafe cities: Disaster vulnerability and rapid urbanization", Open House International, UK, 1987
5. Socio-economic developmental record- Vol.12, No.1, 2005
6. Mary C. Comerio, Luigia Binda, "Learning from Practice- A review of Architectural design and construction experience after recent earthquakes" - Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto, Italy.

<b>Course Code</b>	:	<b>AP-448</b>
<b>Course Title</b>	:	<b>Universal Access Enabled Environment</b>
<b>Semester (Year)</b>	:	<b>Eighth (Year-4)</b>

**Objective:**

Universal barrier free access is mandatory part of architectural environment. It is the basic human right to be able to access any place without any hindrance.

Objectives of subject are

To emphasize the need for Barrier Free Design – rising concerns, statistics study, and aged population increase.

To discuss the various dimensions of Barrier – physical, psychological and social barriers

To explain the different types of disability

To briefly introduce the available national and international norms on Barrier free Design

Discusses exhaustively the best practices in the field of Universal building, transportation system and urban design across the globe

Explain the steps of conducting an access audit by citing practical examples and referring to actual

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national and international level work that has been done.

Cover different aspect of Human – Environment Interaction system and techniques of way finding for creation of a psycho – physiologically responsive environment.

### Syllabus:

Importance and need for Barrier Free Design; Defining Barrier and dimensions of Barrier - physical, psychological and social; Types of Disability; Approaches towards Disability; Medical Model and Social Model; Universal Design principles and aspects; Study of Human-Environment Interaction system;

Development of Barrier Free initiatives taken across the globe; Norms and Standards for Barrier Free Design; anthropometrics; Access Audits; approach and methodology; Simulation Exercise; Best Practice in Barrier Free Design; Design Consideration for Internal and External Environment - site planning, parking, approach to plinth levels, corridors, entrance and exit, windows, stairways, lifts, toilets, signage, guiding and warning systems, floor materials. Design elements outside the building – accessing footpath from road and public facilities, signage;

Constitutional and Statutory provisions to implement Barrier Free Design; Barrier Free transportation; Barrier Free Tourism;

Access Audit- case study and giving design solution to an existing environment

### Suggested Books/Readings:

1. Accessibility for the Disabled - A Design Manual for a Barrier Free Environment by United nation [available online]  
<http://www.un.org/esa/socdev/enable/designm/index.html>.
2. Bednar, M.J., Barrier Free Environments.
3. Harkness, S., Building without Barriers for the Disabled.
4. Manual on Barrier Free Environment, CPWD.
5. The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995.

Course Code : AP-450

Course Title : Industrial Architecture

### Objective:

To highlight the importance and need for Designed Industrial environment for improved working and effective use of machineries to enhance the production levels.

To create awareness among students regarding psychology of workers highlighting the fact that good working environment can enhance the productivity and quality of products.

### Syllabus:

A brief introduction to history of Industrial Architecture

Role of Architects in the design of modern Industrial Buildings

Planning process and considerations in the development of master plan including site selection and site layout, need of Environmental impact assessment in project feasibility reports.

Industrial design requirements

Design for Loading / unloading area.

Design considerations in development of industrial buildings considering:

Production and flow diagrams, need for flexibility and compliance of design;

Structural system suitability and the criterion for adopting it in design;

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Integration of structure and Services; Roof lighting;  
Internal circulation and Material Handling;  
Alternative technology and materials for industrial use  
Working environment for industrial workers which will contribute to comfort and productivity by considering: Work space and Ergonomics; Use of color; Illumination; Light and Glare; Noise and vibration; Temperature, Humidity and Ventilation; Building fabric; Visual environment and landscaping; Safety security and warning controls.  
Consideration of other facilities like: Rest room; Locker room; Sanitary; Changing room; Cafeteria; Recreational etc. Health, welfare and childcare in Industrial Premises

**Suggested Books/Readings:**

1. Adam, J., Hausmann, K., and Juttner, F., A Design Manual – Industrial Buildings.
2. Blum, M.L., and Naylor, J.C., Industrial Psychology, CBS, Delhi.
3. Drury, J., Factories – Planning, Design and Modernization.
4. Hansen, D., Indoor Air Quality Issues.
5. Munce, J.F., Industrial Architecture – an Analysis of International Building Practice, F.W. Dodge Corporation, New York.
6. Philips, A., The Best In Industrial Architecture.
7. Reid, K., Industrial Buildings: The Architectural Record of a Decade; F.W. Dodge Corporation, New York.
8. Sinha, R.K., and Heart, S., Cleaner Production – Greening of Industries for Sustainable Development.

**Course Code** : AP-452  
**Course Title** : Advanced Computing

**Objective:**

Use of computers in architecture has been progressing at a fast rate; students should be exposed to developments taking place globally. Students should be made conversant with use of Computers in architecture and with associated knowledge of Information technology on architectural knowledge system and practice.

**Syllabus:**

Use of Computer in complex Drawings of free forms & Sketching  
 Use of Computer in advanced Presentation and Rendering techniques  
 Creation of walk through a design  
 Advanced Software as Design aids  
 Programming tools for architectural data organization.  
 Principles of Scripting Languages  
 Artificial intelligence and architectural design

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Course Code : AP-454  
Course Title : Architectural Conservation

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**Objective:**

The field of Architectural Practice is intensely interdisciplinary in nature and the aspects of Heritage Conservation or Historic Precinct is one of the inseparable components to be taken into consideration, hence it is most inevitable to include the aspects of Heritage Conservation in the Architectural Pedagogy. The Discourse at the graduate level though should be focused on optimum Sensitization of the students on the above aspects of both Tangible and Intangible Heritage.

- To introduce the various issues and practices of Conservation
- To familiarize the students with the status of conservation in India and the various agencies involved in the field of conservation worldwide and their policies.
- To outline the status of conservation practice in the country and the various guidelines for the preservation, conservation and restoration of buildings
- To inform the students about the character and issues in our heritage towns through case studies

**Syllabus:**

The discussions to engage and build basic understanding of Heritage conservation can be fruitfully carried out through case studies, Site Visits, Presentations etc.  
Introductory discussions on Architectural Conservation may include aspects on the Architect's Role in responding to Historic Context.

**Introduction to Conservation**

The evolution of theories in Conservation and their relevant influence on the field of practice and Global Guidelines (International Charters) may be traced.  
Understanding Heritage Types of Heritage  
Heritage conservation- Need, Debate and purpose  
Defining Conservation, Preservation and Adaptive reuse.  
Distinction between Architectural and Urban Conservation  
International agencies like ICCROM, UNESCO and their role in Conservation  
The conservation Principles and Ethics which become the basis for all decision making in Heritage Conservation may be elaborated. The restrains and strength of the legal legislation framework and policies at both national and international level may be discussed

**Conservation in India**

Museum conservation – monument conservation and the role of Archeological Survey of India –role of INTACH – Central and state government policies and legislations – inventories and projects- select case studies of sites , the role of different Government, Non Government bodies and Locals at large. The challenges of Practice highlighting on funding, Risk preparedness and Management plan may be put forth.

**Conservation Practice**

Brief Discussions on multiple conservation interventions like Conservation led regeneration , Urban Conservation, Cultural Landscapes, Historic Landscapes, Cultural Conservation, Living Heritage, Adaptive Reuse and Designing in Historic Context, etc may be taken up.  
Listing of monuments- documentation of historic structures- assessing architectural character – historic structure report- guidelines for preservation, rehabilitation and adaptive re-use of historic structures- Case studies seismic retrofit and disabled access/ services additions to historic buildings- heritage site management

Syllabus of B. Arch. Programme approved by  
Sub Committee of Academic Council on and  
Board of Studies of USAP on 16<sup>th</sup> July 2019  
w.e.f. Academic session 2018-19

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**Conservation Planning**

Conservation as a planning tool.- financial incentives and planning tools such as Transferable Development Right (TDR)-urban conservation and heritage tourism-case studies of conservation project management.

**Suggested Books/Readings:**

1. A Orbasli Aylin; Architectural Conservation: Principles and Practice, Wiley Blackwell, 2007.
2. Weiler Katharina; Authenticity in Architectural Heritage Conservation: Discourses, Opinions, Experiences in Europe, South and East Asia, Springer, 2016
3. Yang Minja; Don't Tear it Down! Preserving the Earthquake RESISTANT Vernacular Architecture of Kashmir, Oinfroin Media, 2009.
4. Feilden Bernard; Conservation of Historic Buildings, Routledge, 1982.
5. Cohen Nahoum; Urban Conservation, MIT Press, 1999.
6. Jodidio Philip; The Aga Khan Historic Cities Programme: Strategies for Urban Regeneration, Prestel, 2011.
7. Douet James; Industrial Heritage Re-tooled: The TICCIH Guide to Industrial Heritage conservation, Routledge, 2015.
8. Park Seong-Yong; On Intangible Heritage Safeguarding Governance: An Asia Pacific Context, Cambridge Scholars Publishing, 2013
9. Antonio Ampil and Melchor Senen; Urban Conservation and Development: Sustaining the Spirit of Place, Open Dissertation Press, 2017
10. Donald Appleyard, "The Conservation of European Cities", M.I.T. Press, Massachusetts, 1979.
11. James M. Fitch, "Historic Preservation: Curatorial Management of the Built World" University Press of Virginia; Reprint edition, 1990
12. Robert E. Stipe, "A Richer Heritage: Historic Preservation in the Twenty-First Century" Univ. of North Caroling press, 2003.
13. Conservation Manual, Bernard Fielden; INTACH Publication, 1989.
14. B.K. Singh, "State and Culture", Oxford, New Delhi
15. A.G. K. Menon ed. "Conservation of Immovable Sites", INTACH Publication, N.Delhi., 1988 Seminar Issue on Urban Conservation

**Course Code** : **AP-456**  
**Course Title** : **Project Management**

**Objective:**

The student should be exposed to the importance of management of construction activities on site and their repercussions on quality, time and cost control. A knowledge of different management techniques prevalent for planning and construction projects in Indian context.

**Syllabus:**

Various concepts of project management with associated objectives, planning, scheduling  
 Controlling and role of decision in project management.  
 Conventional management systems with their limitations  
 Relative study of Gantt's approach, construction progress chart, bar charts,

Project Network-Events Activity, Dummy, Network Rules, Graphical Guidelines for Network, numbering the events, Cycles, Development of Network-planning for Network Construction, Models of Network construction, steps in development of Network. Work Break down Structure,

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hierarchies.

Critical path method-process, activity time estimate, Earliest Event time, Latest allowable Occurrence time, start and finish time of activity, float, critical activity and critical path problems.

Cost model-Project cost, direct cost, indirect cost, slope curve, Total project cost, optimum duration contracting the network for cost optimization. Steps in cost optimization, updating, resource allocation-resource smoothing, resource leveling.

PERT network, introduction to the theory of probability and statistics. Probabilistic time estimation for the activities for the activities of PERT Network. Use of computers in project management-various software.

**Suggested Books/Readings:**

1. Dr. B.C. Punmia and K.K. Khandelwal-Project planning and control with PERT/CPM, Laxmi publications, New Delhi, 1987
2. Elaine Marmel, Microsoft office Project 2003 Bible, Wiley Dreamtect (P) Ltd., New Delhi, 2004.
3. Sam Kubba, "Green Construction Project Management and Cost Oversight", Elsevier, 2010
4. S.P. Mukhopadyay, "Project Management for architects and Civil Engineers", IIT, Kharagpur 1974.
5. Jerome D. Wiest and Ferdinand K. Levy, "A Managementuide to PERT/CPM", prentice hall of Indian pub. Ltd. New Delhi 1982.
6. SR.A. Burgess and G. White, "Building production and project management", the construction press, London 1979.

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Course Code: AP-501

Course Title: Architectural Design

Semester (Year): 5

Contact Hours: 45

Practical Hours: 15

Theory Hours: 30

Number of working weeks: 15

Prerequisites: None

### B.ARCH SYLLABUS, NINTH SEMESTER-YEAR 5

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Syllabus of B. Arch. Programme approved by  
 Sub Committee of Academic Council on \_\_\_\_\_ and  
 Board of Studies of USAP on 16<sup>th</sup> July 2019  
 w.e.f. Academic session 2018-19

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Course Code	:	AP-501	
Course Title	:	Practical Training	74/c
Semester (Year)	:	Ninth (Year-5)	
Contact Hours	per week	:	L: 0 S: 40*
	per semester	:	L: 0 S: 640*
No. of teaching weeks	:	16	
Credit	:	30	

\* Practical Training should be 40 hours per week for 16 weeks

**Objective:**

Practical training is an integral part of the requirements for registration of Architects with the Council of Architecture. Students will be apprenticed under a registered architect in any organization which provides services related to habitat design and construction. This work is expected to include assistance in design, preparation of construction drawings and documents, site visits and attendance of meetings with clients/ consultants etc.

To strengthen further the understanding of students to the nuances of architectural practice through Practical Training

- To facilitate an understanding of the evolution of an architectural project from design to execution.
- To enable an orientation that would include the process of development of conceptual ideas, presentation skills, involvement in office discussions, client meetings, development of the concepts into working drawings, tendering procedure, site supervision during execution and coordination with the agencies involved in the construction process.

Architectural training to be taken in the office of an experienced architect registered with COA with minimum five years experience post COA registration, and working in the field of architecture and allied disciplines. In case the student chooses to work in an office where the principal is not an architect, he/she must be mentored by a COA registered architect who is an employee of office and has necessary experience. All aspects of training will also be certified by the employee architect. Training anywhere in the world is permitted subject to the above conditions.

**Requirements:**

1. The overall supervision shall be done by Training Coordinator/s to be appointed from within the faculty. Student must abide by the instructions and schedule provided by coordinator from time to time.
2. Students shall maintain a monthly record of their engagement for the period of training in the prescribed format, to be countersigned by the architect at the end of each month.
3. At the end of the training period student shall submit a Certificate of completion of training in the prescribed format signed by concerned office.
4. The monthly logs and a portfolio of works done by the student during the training will be assessed for internal evaluation in the ratio of 70:30 (Employer: Practical Training coordinator)

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**The students would be evaluated based on the following criteria:**

1. Adherence to time schedule, Discipline.
2. Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings.
3. Ability to work as part of a team in an office.
4. Ability to participate in client meetings and discussions
5. Involvement in supervision at project site.
6. At the end of the Practical Training a portfolio of work done during the period of internship along with certification from the offices are to be submitted for evaluation for the End Term viva voce examination. This will evaluate the understanding of the students about the drawings, detailing, materials, construction method and service integration and the knowledge gained during client meetings, consultant meetings, site visits etc.

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**B.ARCH SYLLABUS, TENTH SEMESTER-YEAR 5**

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Course Code	:	AP-502
Course Title	:	Architectural Thesis
Semester (Year)	:	Tenth (Year-5)
Contact Hours	per week	: L: 0 S: 26
	per semester	: L: 0 S: 410
No. of teaching weeks	:	16
Credit	:	26

983  
2/77  
7/10

**Objective:**

Thesis is a capstone project demonstrating the level of academic learning achieved by the student. This is a guided self-study course in which students are expected to explore any of the architectural issues they were exposed to during the course of the academic programme to a greater level of resolution and sophistication.

**Syllabus:**

Design Thesis: This is a guided self-study course consisting of the design of a project of the student's choice to demonstrate the ability of the student to design a building with command on design strategy and with technical proficiency. The Thesis will require a comprehensive documentation of the design intent, the rationale and development of the design brief, the understanding and analysis of the climatic, physical, social and economic contexts of the design, design methodology and history of design development, selecting and devising appropriate construction systems, leading to a final design presentation with three dimensional representation and model. Students will be encouraged to explore debatable and complex design issues and to construct methods of design to apply their creative imagination. The design thesis is seen as the culmination of the Architectural Design Course and the evidence of the student being independently proficient in architectural design.

The thesis will require demonstrating comprehensive research and documentation ability employing rational methodologies and processes. The final output could be an architectural design project with architectural drawings, model and report.

The overall supervision shall be by a Thesis coordinator to be appointed from within the faculty and individual guidance shall be provided to each student.

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Course Code	:	AP-522
Course Title	:	Professional Practice
Semester (Year)	:	Tenth (Year-4)
Contact Hours	per week	L: 4 S: 0
	per semester	L: 64 S: 0
No. of teaching weeks	:	16
Credit	:	4

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70/C

**Objective:**

The objective of the course is to familiarize students with the legal, economic and social issues related to professional practice. Focus will be on the role of the architect in a developing society and the emerging influence of economic liberalization. Emphasis will be on the ethical dimension governing professional conduct in serving the client/society.

**Syllabus:**

**Unit-1**

Understanding who is a professional and why architecture is considered a profession. The architects Act 1972. Process of Registration. Rules, Regulations and guidelines of council of Architecture. Code of professional practice, Fees, Agreements and contracts, categories of membership, election procedure and code of conduct

**Unit-2**

Role of professional bodies and institutions - Indian Institute of Architecture. Economic reality of practicing the profession in India. Scale of charges – responsibilities of architect, copy-rights, scale of charges, variation of charges, mode of payment, termination of services.

**Unit-3**

Conditions of Engagements and Professional liability and indemnity. Architecture competitions and getting work. Negotiation and Arbitration. Indian Arbitration Act.

**Unit-4**

Architect's office and organizational structure, responsibilities, office management, project coordination between client, consultant and project managers, office accounts and billing. Office automation, information, storage and retrieval.

**Suggested Books/Readings:**

1. Handbook of professional Documents published by the Council of Architecture.
2. Nanavati R (1993) Professional Practice, Lakhani Book Depot
3. Kahr J & Thomsett MC (2005) Real Estate Market valuation and Analysis, Wiley Publishers.
4. Gelbtuch HC, Mackmin D & Gelbtuch M (1997) Real Estate Valuation in Global Markets, Chicago: Appraisal Institute.

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