

**SCHEME OF EXAMINATION AND SYLLABI**

**for**

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

**Offered by**

**University School of Architecture and Planning  
And affiliated institute**



**GURU GOBIND SINGH  
INDRAPRASTHA  
UNIVERSITY**

**Guru Gobind Singh Indraprastha University  
Kashmere Gate, Delhi – 110403 [India]  
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## University School of Architecture and Planning (USAP)

The University School of Architecture and Planning (USAP) of the Guru Gobind Singh Indraprastha University (GGSIPU) was established in 2001 and has been conducting a five year B.Arch. programme since then. In August 2009, USAP started its own B.Arch. degree programme at the University campus in addition to conducting the programme for affiliated institutes. The B.Arch. programme of USAP is its core activity. The school is in the process of developing Post Graduate and Ph.D. Programmes along with active consultancy and research.

### Academic Programme

The USAP usually commences its academic programme in the month of August every year. The duration of the B.Arch. programme is 5 years.

### Structure of the B.Arch. Programme

The broad objective of the programme is to impart both theoretical knowledge and practical skills to students to prepare them for a professional career in the field of architecture. Much of the theoretical knowledge is gained in application and research mode being integrated into practical / studio and seminar activity based courses. The programme is also designed to meet the guidelines of the Council of Architecture for B.Arch. degree that meets the eligibility criteria for registration with the COA as an “Architect”. The courses are divided into three broad streams:

		Credits				
		I Year	II Year	III Year	IV Year	V Year
1	Practical/Studio core courses*	46	42	36	52	56
2	Theory core courses	10	16	20	8	8
3	Elective courses	8	8	8	4	
	<b>Total Credits</b>	<b>64</b>	<b>66</b>	<b>64</b>	<b>64</b>	<b>64</b>

\* 1 hour of Practical / Studio = 1 Credit

### Core Courses

Core Courses represent the central learning of the discipline. Considering that architecture is a synthesizing discipline that integrates many fields of knowledge, emphasis is given to “learning by doing” or learning through application. This is reflected in the structure of the broad stream stated above. The learning of Architectural Design, Building Construction and Drawing and Communication are principally learned in this mode. Supplementary formal knowledge about technical aspects of building as well as abstract aspects of architectural thought that draw upon other related disciplines of humanities and the Arts, are learned in a “theory” mode.

### Elective Courses

The first four years of the B.Arch. programme devotes some credits in each year to Elective Courses that enable students to develop specialized skills or broaden their knowledge beyond the core subjects. These Elective Courses also reflect diverse technical and cultural

developments of current relevance, and provide access to valuable specialized expertise or knowledge available with the faculty of the institution or in the city. These courses will be seminar or practical/studio courses.

### **Examination Pattern for B. Arch. Programme**

- i. For Practical Examinations for courses having 8 credits or less than, one External Examiner for each course will be invited.
- ii. For Practical Examinations for courses having above 8 credits, except otherwise specified, each batch/section of 40 students shall be examined simultaneously by 2 External Examiners owing to the large quantum and variety of practical work produced by each student.
- iii. For Practical Examinations for Course Codes AP-404 (Architectural Thesis) and AP- 403 (Research Paper), each student shall be examined by 2 External Examiners. The examination may be conducted over two days.
- iv. Examination for all Theory courses shall be held at the end of the Academic Session. The question paper will be for maximum 75 marks and duration of examination shall be 3 hours for each Theory Paper.

## First Year Scheme

Course Code	Course Title	Hours per week		Total Credits	Total Hours per year
		Term I	Term II		
<b>Studio/Practical</b>					
AP - 101	Architectural Design - I	6	6	12	216
AP - 102	Building Construction and Material - I	5	5	10	180
AP - 103	Drawing Communication - I	6	6	12	216
AP - 104	History of Human Settlement & Vernacular Architecture	2	2	4	72
AP - 105*	Model Workshop*	3	3	6	108
AP - 106*	Surveying and Leveling*		2	2	36
<b>Theory</b>					
AP - 111	Theory of Structures - I	2	2	4	72
AP - 112	Climatology, Environmental Studies and Landscape	2	2	4	72
AP - 113	Sociology of Architecture		2	2	36
<b>Elective-I (Studio / Practical)</b>					
AP - 121	Art & Design Disciplines(s) - I	4	4	8	144
AP - 122	Urban Issues (s) – I	4	4	8	144
AP - 123	Construction Technologies & Advance Sciences(s) – I	4	4	8	144
AP - 124	Computer and Information Technology(s) – I	4	4	8	144
AP - 125	Ecology and Sustainable Developments (s) – I	4	4	8	144
AP - 126	Advance Architectural Theories (s) - I	4	4	8	144
	<b>Total</b>	<b>30</b>	<b>34</b>	<b>64</b>	<b>1152</b>

**Note:**

1. \* NUES
2. Out of up to six elective courses that may be offered only one course has to be selected by each student.
3. The One Elective Course selected by each student is to be followed for both terms by the student.

## Second Year Scheme

Course Code	Course Title	Hours per week		Total Credits	Total Hours per year
		Term I	Term II		
<b>Studio/Practical</b>					
AP - 201	Architectural Design – II	10	10	20	360
AP - 202	Building Construction and Material - II	5	5	10	180
AP - 203	Drawing Communication - II	6	6	12	216
<b>Theory</b>					
AP - 211	Theory of Structures – II	3	3	6	108
AP – 212	Water supply and Waste Disposal		2	2	36
AP – 213	History of Architecture - I	2	2	4	72
AP – 214	Built Environment and Spatial Culture	2		2	36
AP – 215	Lighting and Acoustics	2		2	36
<b>Elective-II (Studio/Practical)</b>					
AP - 221	Art & Design Disciplines(s) - II	4	4	8	144
AP - 222	Urban Issues (s) - II	4	4	8	144
AP - 223	Construction Technologies & Advance Sciences(s) - II	4	4	8	144
AP - 224	Computer and Information Technology(s) - II	4	4	8	144
AP - 225	Ecology and Sustainable Development (s) - II	4	4	8	144
AP - 226	Advance Architectural Theories (s) – II	4	4	8	144
	<b>Total</b>	<b>34</b>	<b>32</b>	<b>66</b>	<b>1188</b>

**Note:**

1. Out of up to six elective courses that may be offered only one course has to be selected by each student.
2. The One Elective Course selected by each student is to be followed for both terms by the student.

### Third Year Scheme

Course Code	Course Title	Hours per week		Total Credits	Total Hours per year
		Term I	Term II		
<b>Studio/Practical</b>					
AP - 301	Architectural Design - III	10	10	20	360
AP - 302	Building Construction and Material - III	6	6	12	216
AP - 303	Theory of Architecture	2	2	4	72
<b>Theory</b>					
AP - 311	Theory of Structure - III	4	4	8	144
AP - 312	Energy Systems & Fire Safety	2	0	2	36
AP - 313	History of Architecture-II	2	2	4	72
AP - 314	Quantities, Specification, Estimation and Contract Management	2	2	4	72
AP - 315	Communication and HVAC	0	2	2	36
<b>Elective-III (Studio/Practical)</b>					
AP - 321	Art & Design Disciplines (s) – III	4	4	8	144
AP - 322	Urban Issues (s) – III	4	4	8	144
AP - 323	Construction Technologies & Advance Sciences (s) – III	4	4	8	144
AP - 324	Computer and Information Technology (s) – III	4	4	8	144
AP - 325	Ecology and Sustainable Development – III	4	4	8	144
AP - 326	Advance Architectural Theory (s) – III	4	4	8	144
	<b>Total</b>	<b>32</b>	<b>32</b>	<b>64</b>	<b>1152</b>

**Note:**

1. Out of up to six elective courses that may be offered only one course has to be selected by each student.
2. The One Elective Course selected by each student is to be followed for both terms by the student.

### Fourth Year Scheme

Course Code	Course Title	Hours per week		Total Credits	Total Hours per year
		Term I	Term II		
<b>Studio/Practical</b>					
AP - 401	Architectural Design - IV	10		10	180
AP - 402	Building Construction and Material - IV	6		6	108
AP - 403	Research Paper	8		8	144
AP - 404	Architectural Thesis		28	28	504
<b>Theory</b>					
AP - 411	Theory of Structure – IV	2		2	36
AP - 412	Town Planning	2		2	36
AP - 413	Professional Practice - I		4	4	72
<b>Elective-IV**(Studio/Practical)</b>					
AP - 421	Art & Design Disciplines(s) - IV	4		4	72
AP - 422	Urban Issues (s) – IV	4		4	72
AP - 423	Construction Technologies & Advance Sciences(s) – IV	4		4	72
AP - 424	Computer and Information Technology(s) – IV	4		4	72
AP - 425	Ecology and Sustainable Development – IV	4		4	72
AP - 426	Advance Architectural Theory (s) – IV	4		4	72
	<b>Total</b>	<b>32</b>	<b>32</b>	<b>64</b>	<b>1152</b>

**Note:**

1. Out of up to six elective courses offered only one has to be selected by each student.

### Fifth Year Scheme

Course Code	Course Title	Hours per week		Total Credits	Total Hours per year
		Term I	Term II		
<b>Studio/Practical</b>					
AP - 501	Practical Training	28	28	56	1008
<b>Theory</b>					
AP - 502	Professional Practice-II ( Online Course)	4	4	8	
	<b>Total</b>	<b>32</b>	<b>32</b>	<b>64</b>	<b>1152</b>

**Note:**

- 1) **Total number of credits in B. Arch. programme = 322**
- 2) **The Minimum number of credits to be earned for the award of B.Arch. degree = 322**



<b>Course Code</b>	:	<b>AP-101</b>
<b>Course Title</b>	:	<b>Architectural Design - I</b>
<b>Year</b>	:	First Year / Term I and II
<b>Contact Hours</b>	per week :	L :0 S: 6
	per year :	L :0 S: 216
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	12

**Objective:**

Architectural Design is seen as a central discipline of the B.Arch programme. The focus of this programme is to develop skills of design while engaging with pragmatic and speculative propositions about the making of the built environment. The studio is an arena where knowledge gained in the technologies, humanities and professional streams of the programme is synthesized into built environment solutions through the act of design with the exercise of the creative imagination of the designer.

The learning of Architectural Design is seen as a cumulative process with a spiral structure of development where it is used as a base for increasing the depth and breadth of knowledge and development of skills in the following year. The range of design exercises will therefore move progressively from exercises with a relatively limited scope and size of the individual component or small shelter toward the complexity and scale of city so that the student experiences the range of complexities that characterizes the Indian habitat.

The studio design exercises are intended to develop a student's subjective abilities in the appreciation and creation of architectural form and the crafting of built objects, to consciously deploy processes and methodologies of design in response to varied design tasks and to develop a capability in deploying established and innovative design strategies. The iterative process of designing will also be used to develop verbal and graphic communication skills using a range of techniques and tools for representation such as hand drawn drawings, computer graphics and scale models, for presentation of design ideas and solutions.

Design exercises shall be devised by the course faculty acknowledging and building upon - the cultural and intellectual assets of the student, opportunities offered by local environments, theoretical and philosophical issues thought to be relevant, and the knowledge gained by previous and parallel courses. The design work will be supplemented by research, discussion and lectures arranged during studio hours to assimilate a rich reference store of the culture of design. There may be several short and discreet exercises within an overall semester programme.

The design exercises and the studio programme for the semester, stating the learning outcomes and evaluation stages, shall be set well in advance in consultation with the course coordinator. The exercises may be designed in part requiring group work; however the intent shall be of developing and evaluating design capability for each individual student.

**Study Tour:** A study tour will be conducted at least once in a year. The educational tasks of the trip will be assessed as part of the studio work of Architectural Design upto 15 days.

## **Syllabus:**

### **Term - 1**

Design exercises for subjective experience of the fundamental architectural elements of space and objects and to learn the vocabulary to describe and discuss these elements. Application of these elements to the analysis and making of a single building using, say, sequential traditional construction; exploration of the visual articulation of construction assemblies and learning of the terminology to describe building parts; understanding built objects in relation to the human body, human scale and sensory perception.

### **Term - 2**

Design exercises to-explore and manipulate organizational pattern for small multi-cellular buildings with defined function, as a response to the physical characteristics of a site and environmental settings, supported by methods of observation, recording, and interpretation of physical environments; pursuit of design intent through iterative modulation of form and arrangement; complete three dimensional visualization and testing with three dimensional tools to achieve complete formal resolution.

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

1. Ching, F.D.K.; Architecture Form, Space and Order, Van Nostrand Reinhold Staff, New York, 1996
2. Rudofsky, Bernard; Architecture without Architects, University of New Mexico Press, New Mexico
3. Rasmussen, Steen Eiler; Experiencing Architecture, The MIT Press, Cambridge, Massachusetts, 1977
4. Watson, Donald / Crosbie, Michael J.; Time Savers Standards for Architectural Design, Mc Graw Hill, New York, 2005
5. Chiara, Joseph De / Crosbie, Michael J.; Time Savers Standards for Building Type, Mc Graw Professional Publishing, New York, 1973
6. Harris, Charles W. / Dines, Nicholas T.; Time Savers Standards for Landscape Architecture, Mc Graw Hill, USA, 1998
7. Chiara, Joseph De / Panero, Julius / Zelink Martin; Time Savers Standards for Interior design and Space Planning, Mc Graw Hill, New York, 2001
8. Gideon, Siegfried; Space, time & Architecture, Harvard University Press

<b>Course Code</b>	:	<b>AP-102</b>
<b>Course Title</b>	:	<b>Building Construction and Material - I</b>
<b>Year</b>	:	First Year / Term I and II
<b>Contact Hours</b>	per week :	L: 0 S: 5
	per year :	L: 0 S: 180
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>10</b>

**Objective:**

This course is designed to expose students to obtain a technical understanding of the process of building construction, the components of buildings and the materials, skill and equipment used in shaping them. The emphasis is on familiarization by direct observation. Students shall be encouraged to acquire a taste for good workmanship and quality and to develop a capability to use this understanding as an integral aspect of architectural expression.

In parallel the course will teach the systems and standards for making construction drawings for formal as well as informal construction trades.

The Course has been envisaged as a spiral of knowledge through progressive complexity of instructions.

To understand the basic principles of building construction taking into cognizance the simple elements and components used commonly in buildings of ordinary complexity. It will also entail learning to prepare building construction drawings using standard notations and systems. It is recommended that the complete assembly of a simple building from foundations to roofing is studied and represented by drawing/ model to understand the sequence and logic of all components.

**Materials:**

The aim is to understand commonly used building materials and their general use in the building industry. Impact of using building materials on our environment and ecology. The course also intends to introduce the student to basic techniques of extraction and processing of the materials for building industry.

**Syllabus:**

**Term - 1**

**Construction Process and Components**

Sub-structure: Foundations, plinth

Superstructure:

Masonry & masonry work techniques

corbelled, arched and opening with Lintels

roofing & terracing

External Wall Section

**Materials:**

Brick; Stone; Lime; Cement;

Mortars; Introduction to Concrete;

**Term -2**

Joinery methods in simple wood work

Doors & Windows

Staircase and its details

Protecting the building from the natural elements.

Commonly used tools in simple construction

**Materials:**

Timber and wood based products;

Steel, Iron, Brass, copper, Bronze

**Suggested Books/Readings:**

1. 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 Wiley & 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

<b>Course Code</b>	:	<b>AP-103</b>
<b>Course Title</b>	:	<b>Drawing Communication - I</b>
<b>Year</b>	:	First Year / Term I and II
<b>Contact Hours</b>	per week :	L: 0 S: 6
	per year :	L: 0 S: 216
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	12

**Objective:**

The process of design requires varied techniques of visualization and representation to aid design development. These may be in two, three or four dimensions using physical media with hand sketching, mechanical drawing and making models or virtual representation using computer software and audio visual media. This aspect is addressed under the title of Art & Graphics. In architectural practice the precise and communicative representations of designed objects follows certain conventions of representation and also employ graphic techniques to express “soft” aspects of design. This aspect is addressed under the title Architectural Drawing. The primary objective of this course is the development of these skills. The two subcomponents of the course: Art & Graphics & Architectural Drawing are not mutually exclusive and are fruitfully synthesized.

These skills also provide techniques of sensitizing and catalyzing the designer’s imagination and subjective expression in the use of form and image. In this respect the course overlaps with the Design Studio course and may be seen as a complementary and symbiotic set of exercises for development of designing abilities and design presentation skills.

**Syllabus:**

**Term -1**

**Art & Graphics**

Iterative exercises for development of dexterity and applied techniques to achieve fluency of eye-mind-hand representation and expression. **Perception and representation** – free hand drawing and coloring using a variety of media. **Ideation and translation** –hand skills such as cutting, drawing, painting, stitching to explore form, colour, texture, and image as means of expression.

**Architectural Drawing:**

Freehand and instrument based drawing appropriate to architectural applications, Orthographic projections, axonometric three dimensional views, rendering techniques in different media.

**Term -2**

**Art & Graphics**

Extension of dexterity for representation and abstract interpretation, with additional media such as collage, photomontage, printing, stencils.

**Architectural Drawing:**

Isometric and oblique three dimensional views, perspectives. Rendering for sciography, tones, texture, colors, and light.

**Suggested Books/Readings:**

1. Gill, Robert W.; Manual of Rendering with Pen and Ink, Thames and Hudson, London, 1997
2. JaxThemier, B.W., "How to Paint and Draw", Thames and Hudson, 1985.

<b>Course Code</b>	:	<b>AP-104</b>
<b>Course Title</b>	:	<b>History of Human Settlement and Vernacular Architecture</b>
<b>Year</b>	:	First Year / Term I and II
<b>Contact Hours</b>	per week :	L: 0 S: 2
	per year :	L: 0 S: 72
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	4

### Objectives:

This Course, for the first year architecture students, is to be viewed & taught from an architect's perspective in order to familiarize the student with basic concepts & theories of human settlements, as relevant to architecture at the foundation level, to introduce the key issues in historical and contemporary examples and develop a vocabulary for discussions/analysis. It shall also introduce significant architectural products of the habitats which are being studied.

This course is also perceived as the prelude to the 'history of architecture' course as well as the 'humanities (sociology & psychology)' course that follow in the subsequent terms of the program.

The syllabus has been dealt with the premise that all civilizations evolved a central thought, which was shaped by individual beliefs & local factors. The course, covering prehistoric age and early civilizations, attempts at sensitizing the students to view architecture as one of the many products of the civilization. The emphasis is on the understanding of conceptual basis rather than specific & complex questions of the architecture. The focus of the discussions is on the nature & essence of the architectural product.

- To recognize the Human Habitat through Natural & Human-made environment.
- To understand the Human Civilization through Human Settlements (rural & urban).
- To appropriate the role of Architecture in Human Settlements.
- To realize Time & Place through History & Vernacular in Settlements & Architecture.
- To appreciate the conflicts & coexistences within the human-made environment.

### Syllabus:

- 1) **Settlement Level: Prehistoric, Paleolithic, Neolithic times; Nomadic, Pastoral, Agrarian systems.**
  - 1.1) Significant markers: Cave Dwellings in Europe: Lascaux, Chappelle-Aux-Saints; Terra Amata, Skara Brae, Compositions such as StoneHenge; First Settlements like Jericho, Catal Huyuk.
- 2) **Settlement Level: River Valley & Maritime civilizations and other evolutions; Agrarian & Mercantile systems.**
  - 2.1) Significant markers: **Egypt** : Mastabas, Pyramids at Saqqara, Medun and Giza, Mortuary & Cult Temples at Luxor and Karnak. **Mesopotamia**: the Sumerians, Babylonians, Assyrians and the Persians, the Ziggurats at Ur, Choga Zanbil, etc.; the cities of Ur, Babylon, Khorsabad and Persipolis. **China**: Dynasties such as the Shang,

Chou, Ch'in, Ming, etc.; palaces like the Imperial Palace, forbidden city. **South America:** the Mayas, Aztecs and the Incas, Pyramid Temples at Cuicuilco, Palenque; Pyramid of the Sun, Teotihuacan; Tikal; Tenochtitlan, Chichen Itza and Machu Pichu. **INDIA: Bronze Age Indus Valley Civilization :** Town Planning, Trade and Commerce; Mohenjodaro and Harappa.

- 3) **Settlement Level: Classical & Medieval evolutions; effects of wars, trade, religions, conquests, colonization & political systems**
- 3.1) Significant Markers : **INDIA - Early Iron Age Civilisation :** the coming of the Aryans and Vedic Age; Epic Age; development of Hinduism, Religious and Caste systems, Wooden Origins of Indian Architecture: Forest Dwellings, Kutiya and Grama. Beginning of Buddhist and Jain Architecture; philosophy and teachings; the Hinayana and Mahayana Sects and their contribution to the development of architecture in India. Ashokan School, Buddhist Rock Cut Architecture: the Chaityas and Viharas at Ajanta and Ellora; the Stupa: Form and Evolution; Buddhist Architecture in Gahdhara. **GREECE - Early Iron Age Civilisations :** Minoan, Mycenaean and Classical Greek Minoan and Mycenaean: Palace at Knosos, the Lion Gate, the appearance of the Megaron. Classical Greek: Developments in philosophy: Socrates, Aristotle, Plato; Greek City states – Athens, Delphi, Sparta; Evolution of the Temple; the Orders; the Parthenon. **ROME -** Political, social, philosophical and military developments. Structural and Engineering Achievements: the arch, Vault and the dome; Temples: Pantheon; Arenas: Colosseum; Therma: Caracalla; Aqueducts; the forum and the basilica
- 4) **Settlement Level : Medieval & Later evolutions (Renaissance) ; effects of wars, trade, religions, conquests, colonization & political systems**
- 5) **Settlement Level : The impact of Industrial & Global impositions; Technology & Information.**
- 6) **Primitive, Traditional, Vernacular practices; Techniques & Material.**

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

1. Brown, Percy; Indian Architecture: Buddhist & Hindu Period, D. B. Faraporevela Sons & Co. Ltd., Bombay, 1959
2. Kostof, Spiro; History of Architecture, Oxford University Press, New York, 1995
3. Raeburn, Michael; Architecture of the Western World, Popular Press, England, 1988
4. Fletcher, Banister; History of Architecture, CBS Publishers, Delhi, 1992
5. Rapoport, Amos, Human Aspects of Urban Form, Pergammon Press, New York, 1977
6. Shukla, D.N.; Vastu Shastra, Munshiram Mohanlal, New Delhi, 1993
7. Alexander, Christopher; A Pattern Language, Oxford University Press, New York, 1977
8. Alexander, Christopher; The Timeless Way of Building, Oxford University Press, New York, 1979
9. Lynch, Kevin; The Image of the City, Joint Centre Publication, USA, 1960
10. Eisner, Simon & Gallion, Arthur B.; The Urban Pattern, Van Nostrand Reinhold Company, New York, 1969
11. Tadgell, Christopher.; The History of Architecture in India, Phaidon Press, London, 1990



<b>Course Code</b>	:	<b>AP-105</b>
<b>Course Title</b>	:	<b>Model Workshop</b>
<b>Year</b>	:	First Year / Term I and II
<b>Contact Hours</b>	per week :	L: 0 S: 3
	per year :	L: 0 S: 108
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>6</b>

**Objective:**

This course is aimed at imparting basic skills necessary for making architectural solid 3D models of objects while inculcating values of good craftsmanship. This course shall also familiarize students with the technical skills involved in building trade in construction of buildings. The course is to be conducted at workshop on campus under the supervision the workshop coordinator.

**Syllabus:**

**Term -1**

Preparation of model using material like:

Paper, wood, plastic and others

Making of models as per design in various scales

**Term - 2**

Basic construction skills: Exercise in handling of building materials, demonstration and moulding carpentry and joinery, sheet metal, steel welding and forging, assembly of components and laminating.

<b>Course Code</b>	:	<b>AP-106</b>
<b>Course Title</b>	:	<b>Surveying and Leveling</b>
<b>Year</b>	:	First Year / Term II
<b>Contact Hours</b>	per week :	L: 0 S: 2
	per year :	L: 0 S: 36
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	2

**Objective:**

Tools and equipment for land surveying. Interpretation and preparation of contour maps. Exercises in setting out of building works. Lectures and practical exercises involving fieldwork and working with survey equipments. Some old methods and techniques of surveying that are no longer used may only be conceptually understood. Effort may be made to introduce latest developments in common practice.

**Syllabus:**

**Introduction:** Introduction to surveying, understanding land topography, and its relevance in Architecture. Types of surveys. Introduction to main surveying equipments

**Chain Surveying:** Equipments required, selection of stations, method of taking offsets, recording measurements in survey field books, obstacles in chain surveying, chaining on sloping ground.

**Compass Surveying:** The Prismatic compass, its construction and uses. Reduced and whole circle bearings, effect of local attraction, compass traversing and balancing of closing error.

**Plane Table Survey:** Introduction to basic principles and instruments used in Plane Table surveys. Simple exercises on Plane Table survey

**Leveling:** Different types of levels, leveling staff, fixing bench marks and recording levels, methods of leveling, Rise and fall method, Height of Instrument method, finding Reduced levels, Fly leveling, L-sections and cross sections along an alignment.

**Theodolite Surveying :** Introduction to use of Theodolite in surveying.

**Contour Surveying:** Definition of contours, Characteristics of contour lines, methods of contour surveying, Direct and indirect methods of contouring and interpretation contour maps.

**Setting out of Building works:** Exercises on setting out of Building works.

**Introduction to modern surveying instruments/Techniques : like Total Station, etc.**

**Suggested Books/Readings:**

1. Surveying and leveling (Vol. 1) by R.N. Arora; Standard Book House, Post Box No. 1074, Delhi -11006
2. Surveying and leveling by T.P.Kanetkar and Kulkarni, Standard Publishers

<b>Course Code</b>	:	<b>AP-111</b>
<b>Course Title</b>	:	<b>Theory of Structures - I</b>
<b>Year</b>	:	First Year / Term I and II
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 72 S: 0
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	4

### **Objectives:**

The objective of this course is to develop a feel for structural principles as they relate a building design, to enable him to make an informed choice regarding the most appropriate structural system for this building and to develop a reasonable understanding of its operational and economic implications

### **Syllabus:**

#### **Unit - 1**

**Center of gravity:** Definition, Calculation of CG of plane figures, like I,T,L,C,O, hallow & Box sections.

**Moment of inertia (MOD):** Definition, calculation of CG & MOI of plane figures about the principal axes e.g. rectangle, triangle & circle. Parallel axes theorem, perpendicular axes theorem.

**Introduction to Statics:** Forces, their definition, characteristics & types, composition & resolution of forces, moment & couple, Concepts of resultant and equilibrium of forces: Parallelogram and polygon, laws of forces, conditions of equilibrium, Lami's theorem

#### **Unit - 2**

**Stress & Strain, Hooke's law:** Concept of direct forces (compression & tension), Elasticity, Plasticity etc. Hooke's law, modulus of Elasticity, Elastic limit stress/ strain curve for mild steel under constant tension. Problems on Hooke's law & introduction to temperature stresses

**Concept of Euler's load & Buckling of compression members:** Idea of short & long columns. Effective length for various end conditions. Euler's formula and calculation of buckling loads

#### **Unit - 3**

**Support Reactions:** Statically determinate and indeterminate systems, Degrees of freedom, free body diagrams. Types of supports, Introduction to simple, hinged, roller and fixed supports. To determine the Support Reactions for a simply supported, roller supported & hinged beams for UDL, Concentrated loads, triangular, & trapezoidal loads.

**Introduction to simple determinate frames:** Method of Joints, Method of Sections

**Shear Force and Bending Moment Diagrams (SFD & BMD):** Definitions of SFD & BMD, standard sign conventions for SFD & BMD. Drawing SFD & BMD for simply

supported, cantilevered & overhanging beams for various loads like UDL and Concentrated loads simple cases only. Concept of locations for max BM

**Concept of Eccentric loads:** Calculation of combined Direct & Bending stresses and drawing of net stress diagrams

#### **Unit-4**

**Introduction to Basic Concepts in Structural Design,** the students are to be introduced about the concepts of structural concepts to be studied in detail in the subsequent years

**List of important Basic Indian Standards related to Structural Design** viz loading standards, Basic Indian standards on RCC, Steel and Timber design. (Primarily listing only, Detailed description not needed).

**Introduction to Basic structural materials** viz Timber, Steel, Bricks, and Concrete; their basic properties and their relative merits, demerits and suitability in structures

**Concepts of forces as loads:** Dead loads, live, loads, Horizontal loads like Earthquake & wind load

**Structural components of a Building and their functions:** Concept of load bearing distribution on structural components like Slabs, Beams, Columns & Foundations

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

1. Khurmi, R.S.; Strength of Materials, S. Chand & Company, New Delhi, 2001
2. Ramamrutham, S.; Strength of Materials, Dhanpat Rai Publication, New Delhi, 1998.

<b>Course Code</b>	:	<b>AP-112</b>
<b>Course Title</b>	:	<b>Climatology, Environmental Studies and Landscape</b>
<b>Year</b>	:	First Year / Term I and II
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 72 S: 0
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	4

### **Objectives:**

This course provides a background on issues of the built environment related to environmental sustainability. The systematic relationships between buildings and settlements with natural ecosystems and natural resources are sought to be understood.

The course also introduces the modern science of Climatology in the context of climate and weather as determinants of design and form of habitat and landscape through the ages at the macro and micro levels with an emphasis on application of knowledge to building design.

### **Syllabus:**

#### **Unit - 1**

Historical Background: Club of Rome, “Limits of Growth”, The Brundtland Report (UN), An Inconvenient Truth; these texts are to be read to understand the history of environmental degradation and the concepts that underlie a strategy towards sustainable habitat. The Changing Climate, Factors Responsible for Change, Global Warming, Ozone Depletion, etc.

Interrelation between natural and built environment: An Overview

Mapping the ecology of settlements and buildings

Water and Waste cycles; energy demand for production, transportation, construction and operation of buildings; material consumption and natural resources

Water: conservation, harvesting, recycling.

Waste: minimizing, recycling, eliminate toxicity and management.

Energy: conservation, renewable sources: wind, solar, geo-thermal, bio-fuels.

Materials: minimizing, recycling, reducing energy content, life-cycle cost.

#### **Unit-2**

Concept of Sustainable development, 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. Case study illustrating traditional concepts of “garden”, “park”, relationship with river, lakes, drawn from different cultures. Analysis of contemporary city (case-study) and its challenges of environmental sustainability- Energy, water, waste, air quality, transportation vis-à-vis the integration of open space, water bodies and other natural systems into city form.

### **Unit-3**

- a) Introduction to Climatology, Relation to Architecture, Macro and Micro Climate, Climatic Zones. Climatic data- parameters- relevance to design of built environment. Describing climate-climate summary chart, solar geometry- sun path diagram, heating and cooling periods. Psychrometric charts.
- b) Thermal Comfort: Factors and Balance, Body's Mechanism of Heat Production and Loss, Methods of Heat Transfer, Comfort Scale, Effective Temperature, operative temperature, CET, Adaptive comfort.
- c) Heat transfer in Buildings: Sol Air Temperature, Solar Gain Factor, Thermal Quantities: Temperature, Heat, Heat Flow Rate Specific Heat, Conductance, Resistance, Surface Conductance, U value, Periodic Heat Flow, Time Lag & decrement factor, Effect of Different Materials, Effect of Multilayered Bodies - Insulation/Cavity (Ecotect software may be used). Ventilation: Principles of Ventilation in Buildings.

### **Unit-4**

Architectural Design as a Response to Climate: Tool for Design in All climatic Conditions of India- Microclimatic Factors:

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 using available softwares.

Walls, choice of materials, roof materials, external colours and textures, layouts and internal finishes. (Ecotect and sketch up software may be used).

Solar Passive Heating and Cooling Systems, roof pond, trombe wall, green house, air flow, stack effect, wind tower, earth air tunnel.

Examples of Vernacular architecture of different climatic zones may be used to illustrate the above design processes.

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

1. Koenigsberger, Q. H. (et. al.); Manual of Tropical Housing & Building, Orient Longman, Madras, 1988
2. Arvind Krishan, Climate Responsive Architecture, Tata McGraw- Hill Publishing Company Limited New Delhi, 2001.
3. Harris, Charles W. / Dines, Nicholas T.; Time Savers Standards for Landscape Architecture, Mc Graw Hill, USA, 1998

<b>Course Code</b>	:	<b>AP-113</b>
<b>Course Title</b>	:	<b>Sociology of Architecture</b>
<b>Year</b>	:	First Year / Term II
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 36 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	2

### **Objectives:**

This course aims to expose the students to the relationship between man and his larger environment, with special emphasis on aspects that are likely to affect intervention in or creation of, the built environment (predominantly urban) and to develop a language and vocabulary for discussions/ analysis on the sociological/ psychological dimensions of architecture.

### **Syllabus:**

#### **Unit-1**

- a) What is sociology,  
Relation between sociology and architecture,  
classical and modern sociology of architecture,  
Role of architects in modern society
- b) Concept of society and its types – rural and urban  
Social Institutions – family, educational institutions, religion  
Social interaction – verbal and non-verbal  
Sociology of space and built environment, sociology of artifacts  
Requirement for space for various social activities  
Utilization of space in rural and urban areas

#### **Unit-2**

- a) Concept of culture and its elements - material and non-material culture  
Material culture- buildings, artefacts, 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
- b) Social and cultural change,  
Factors of Social Change, discovery and invention, culture diffusions, ideas & ideologies, collective action, technology  
Resistance to Social Change, Theory of Cultural lag, Technology & Social change

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

1. Giddens, Anthony, Sociology, Polity Press, Cambridge (UK), 2006
2. Porteous, John Douglas; Environment Behaviour: Planning and Everyday Urban Life, Addison Wesley, 1977

3. Hall, T. Edward, *The Hidden dimension*, Anchor books edition, USA, 1969
4. Rapoport, Amos, *Human Aspects of Urban Form*, Pergammon Press, New York, 1977
5. Lynch, Kevin; *The Image of the City*, Joint Centre Publication, USA, 1960
6. Guy Ankerl, *Experimental Sociology of Architecture. A Guide to Theory, Research and Literature*, Mouton de Gruyter Publ. (The Hague, Paris, New York) 549 p. 1983 ISBN 90-279-3440-1 (paper) Hardcover ISBN 90-279-3219-0.
7. Anthony D. King (ed.), *Buildings and Society: Essays on the Social Development of the Built Environment*, London 1980



<b>Course Title</b>	:	<b>Elective - I</b>
<b>Year</b>	:	First Year/ Term I and II
<b>Contact Hours</b>	per week :	L: 0    S: 4
	per year :	L: 0    S: 144
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>8</b>
<b>Max. No. of Electives offered per year</b>	:	<b>6</b>
<b>Minimum No. of students per course</b>	:	<b>10</b>

**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 1<sup>st</sup> year can choose, subject to time table. The subjects would be based on the following suggested groups:

AP - 121:	The Arts & Design Disciplines (s) – I
AP - 122:	Urban Issues (s) – I
AP - 123:	Construction Technologies & Advance Sciences (s) – I
AP - 124:	Computers & Information Technology (s) – I
AP - 125:	Ecology & Sustainable Development (s) – I
AP - 126:	Advance Architectural Theories (s) – I

Note: Concerned Faculty of each elective should develop a weekly programme for the course for each term for presenting it to the students.

**Course Code:** AP – 121

**Course Title:** Art & Design Disciplines (s) – 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 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 learnt 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 suit various contexts.
- To build a higher thought process creatively generating 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 – 122

**Course Title:** Urban Issues (S) – 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, affordable housing, 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.

**Course Code:** AP - 123

**Course Title:** Construction Technologies & Advance Sciences (s) – 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 - 124

**Course Title:** Computer and Information Technology (s) – I

**Objective:**

To familiarize students with use of Computers in architecture and with impact of Information technology on architectural knowledge system and practice.

**Syllabus:**

- Use of Computer in simple Drawing & Sketching
- Use of Computer in Presentation and Rendering
- Use of Computer in Measured & Working Drawing
- Elementary Use of Software's as Design aids
- Simple Programming tools for architectural data organization.
- Principles of Scripting Languages

**Course Code:** AP – 125

**Course Title:** Ecology and Sustainable Developments (s) – 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.

**Course Code:** AP - 126

**Course Title:** Advance Architectural Theories (s) – I

**Objective:**

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

**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

<b>Course Code</b>	:	<b>AP-201</b>
<b>Course Title</b>	:	<b>Architectural Design - II</b>
<b>Year</b>	:	Second Year / Term I and II
<b>Contact Hours</b>	per week	: L :0 S: 10
	per year	: L :0 S: 360
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>20</b>

**Objective:**

Architectural Design is seen as a central discipline of the B.Arch programme. The focus of this programme is to develop skills of design while engaging with pragmatic and speculative propositions about the making of the built environment. The studio is an arena where knowledge gained in the technologies, humanities and professional streams of the programme is synthesized into built environment solutions through the act of design with the exercise of the creative imagination of the designer.

The learning of Architectural Design is seen as a cumulative process with a spiral structure of development where it is used as a base for increasing the depth and breadth of knowledge and development of skills in the following year. The range of design exercises will therefore move progressively from exercises with a relatively limited scope and size of the individual component or small shelter toward the complexity and scale of city so that the student experiences the range of complexities that characterizes the Indian habitat.

The studio design exercises are intended to develop a student's subjective abilities in the appreciation and creation of architectural form and the crafting of built objects, to consciously deploy processes and methodologies of design in response to varied design tasks and to develop a capability in deploying established and innovative design strategies. The iterative process of designing will also be used to develop verbal and graphic communication skills using a range of techniques and tools for representation such as hand drawn drawings, computer graphics and scale models, for presentation of design ideas and solutions.

Design exercises shall be devised by the course faculty acknowledging and building upon - the cultural and intellectual assets of the student, opportunities offered by local environments, theoretical and philosophical issues thought to be relevant, and the knowledge gained by previous and parallel courses. The design work will be supplemented by research, discussion and lectures arranged during studio hours to assimilate a rich reference store of the culture of design. There may be several short and discreet exercises within an overall semester programme.

The design exercises and the studio programme for the semester, stating the learning outcomes and evaluation stages, shall be set well in advance in consultation with the course coordinator. The exercises may be designed in part requiring group work; however the intent shall be of developing and evaluating design capability for each individual student.

**Study Tour:** A study tour will be conducted at least once in a year. The educational tasks of the trip will be assessed as part of the studio work of Architectural Design upto 15 days.

## **Syllabus:**

**Term-1:** Design exercises to explore – formation of spatial systems in formally planned settlements integrating the built and open spaces in response to multi functional social demands; strategically manipulating spatial and scalar hierarchies for, say, a school and community centre; incorporation of climate responsive strategies and constructional systems appropriate to social and economic contexts.

**Term-2:** Design exercises to explore – the cultural frameworks of meaning and symbolism in architecture; expression of abstract meaning through the language of form, space and materiality; innovation and development of technical systems of making buildings as means and embodiment of meaning, say, for a religious, ceremonial or culturally defined buildings.

## **Suggested Books/Readings:**

1. Ching, F.D.K.; Architecture Form, Space and Order, Van Nostrand Reinhold Staff, New York, 1996
2. Rudofsky, Bernard; Architecture without Architects, University of New Mexico Press, New Mexico
3. Rasmussen, Steen Eiler; Experiencing Architecture, The MIT Press, Cambridge, Massachusetts, 1977
4. Watson, Donald / Crosbie, Michael J.; Time Savers Standards for Architectural Design, Mc Graw Hill, New York, 2005
5. Chiara, Joseph De / Crosbie, Michael J.; Time Savers Standards for Building Type, Mc Graw Professional Publishing, New York, 1973
6. Harris, Charles W. / Dines, Nicholas T.; Time Savers Standards for Landscape Architecture, Mc Graw Hill, USA, 1998
7. Chiara, Joseph De / Panero, Julius / Zelink Martin; Time Savers Standards for Interior Design and Space Planning, Mc Graw Hill, New York, 2001
8. Gideon, Siegfried; Space, Time & Architecture, Harvard University Press

<b>Course Code</b>	:	<b>AP-202</b>
<b>Course Title</b>	:	<b>Building Construction and Material - II</b>
<b>Year</b>	:	Second Year / Term I and II
<b>Contact Hours</b>	per week :	L :0 S: 5
	per year :	L :0 S: 180
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>10</b>

**Objective:**

The basic objective for the student here is not only to understand basic principles of construction technology, but also be able to apply to her/his proposed architectural expressions. Attempt must be made to culminate the year with the learning of making self explanatory drawings which are also good in their logical technical content. The Course has been envisaged as a spiral of knowledge through progressive complexity of instructions.

The Course outlined below gives a general direction to be taken in the fulfillment of the objectives and each institute may choose to select topics according to its chosen thrust / philosophy. The range of the topics mentioned leaves sufficient scope of freedom for the institute to exercise freedom in its detailed teaching programme. Thus, a breakup into term-wise course has been left to the individual teacher.

**Materials:**

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:**

**Building Construction Methods**

Continuing the course with understanding the methods of building construction with their underlying principles using components and elements of buildings of medium complexity. Introduction to details of simple assemblies and their representation as construction drawings. RCC forms a major part of the material under detailing

The thrust of the second year thus focuses on the basic construction drawings with details from the following range of topics:

**Term - 1**

Construction Process, techniques and Building Components- Framed Structures using R.C.C

1. RCC staircase, basements, foundations, shading devices, vertical and horizontal components etc.
2. Infill walls, partitions (including timber and brick), including finishes
3. Flooring, roofing, waterproofing with/without insulation

**Materials:**

- a) Cement: Manufacture, Properties, Types, Mix and usage.
- b) Aggregates and Admixtures: Types, grading, properties and usage.
- c) Plain Cement Concrete: Properties, Mixing, Curing and usage
- d) Reinforced Cement Concrete: Reinforcement- Introduction to Types, sizes and placement in beams, columns, lintels, slabs, cover, etc; Properties, Mixing, Curing and usage
- e) Damp Proofing, Waterproofing and Insulation materials.

**Term – 2**

Construction Process, techniques and Building Components- Framed Structures using Steel and Elements of Interiors

1. Framed steel structures with roofing and walling assemblies, principles and techniques of structural connections
2. Fabrication of building components using steel e.g. stairs, windows, gates etc.
3. Dry construction building subcomponents: e.g. partition (Aluminium and steel), ceiling (including false ceiling) , cabinets
4. Alternative Building Materials and Methods of Construction: e.g. foundations, walling, spanning and roofing elements.

**Materials:**

- a) Steel: Manufacture, Properties, Types of steel sections and usage
- b) Protective coatings: Various Types, Application and usage.
- c) Materials of rolled sections building sub-components: e.g. block board, ply board, MDF etc.
- d) Application of environmental principles: re-use, re-cycle, life-cycle impact, embodied energy.
- e) The students are advised to undertake regular visits to construction sites, market surveys and case studies to supplement and update the knowledge base.

**Suggested Books/Readings:**

1. 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 Wiley & 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



<b>Course Code</b>	:	<b>AP-203</b>
<b>Course Title</b>	:	<b>Drawing Communication - II</b>
<b>Year</b>	:	Second Year / Term I and II
<b>Contact Hours</b>	per week :	L :0 S: 6
	per year :	L :0 S: 216
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	12

**Objective:**

One of the most important skills that an architect needs is the skill to communicate to an external audience, in addition to the task of communication within the design process.

Computer technology have facilitated and enriched the ways in which architects can develop and present their ideas. This mode of communication can enhance and extend the skills of visualization gained in the previous year through hand drawing, sketching etc. The use of IT is a new skill set. Capacities for using IT tools to creatively express design intention rather than fall prey to “default” settings of available software are to be developed. This would require “customizing” codes of available softwares. This leads into computer aided design and the communications of design process itself. This course would teach this new skill set through a set of applications, allowing students to express their design intentions in personalized ways.

The other intention of this course is to learn techniques of data management & sharing, interoperability & presenting ideas seamlessly.

Teaching and learning will be ‘hand on’ in a studio format. Skills will be acquired through a series of structured studio exercises.

**Syllabus:**

**Term -1**

Studio assignments/exercises will be based on the following: The softwares given below are indicative and may be replaced or added to.

- i) Operating Systems: MAC, Windows, Limax
- ii) Data management and communication: Word, excel, Autocad, MS Powerpoint, Google earth, Webmail, social networking.
- iii) Drafting and Visualization: AutoCAD/Revit/Microstation, photoshop, Coral Draw, sketch Up.

**Term -2**

Studio assignments/exercises on the following: The softwares given below are indicative and may be replaced or added to.

- i) Data management and communication: Video conference, virtual studio.
- ii) Drafting and Visualization: Rhino, 3D Studio Max
- iii) Customizing software: AutoCAD, Photoshop.

**Suggested Books/Readings:**

1. Architectural drawing: a visual compendium of types and methods; Rendow Yee; John Wiley and Sons, 2007
2. Architectural Graphics; Francis D. Ching; John Wiley and Sons, 2009

<b>Course Code</b>	:	<b>AP-211</b>
<b>Course Title</b>	:	<b>Theory of Structures - II</b>
<b>Year</b>	:	Second Year / Term I and II
<b>Contact Hours</b>	per week :	L: 3 S: 0
	per year :	L: 108 S: 0
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	6

**Objective:**

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

**Syllabus:**

**Unit - 1**

**Masonry Structures:**

**Introduction:** Characteristics of load bearing masonry structures, their merits, demerits and limitations vis a vis RCC framed structures. Classification of bricks and mortars according to strength. Allowable stresses in masonry; effects of slenderness ratio, area and shape factors on allowable stresses.

**Design of Simple two storeyed House in load bearing masonry construction:** Load calculations on slabs, transfer of load from slabs to load bearing masonry supporting walls. Design of load bearing masonry walls. Design of simple spread footings for load bearing masonry walls.

**Masonry Arches, Masonry Vaults & Masonry Domes:** Conceptual study as compression structures. (Without design calculations)

**Timber Structures:** Structural timbers available in India, Structural properties and their allowable stresses, Design of timber Beams. (Simple M/Z application and shear check for forces along the grains (no slopes) Design of timber posts & trusses for simple cases. (No mathematical analysis for timber trusses).

**Unit – 2**

**Steel Structures:**

**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 Design:** Working stress and Limit State Methods of Design, basic concepts, merits and limitations of each method, present trends in design,

Note: Keeping in view the present trends in design, Teaching is proposed to cover primarily Limit State Method of Design as per the recommendations of IS: 800 (latest version).

**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.

**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.

**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.

### Unit - 3

#### Concrete Technology:

**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.

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

**Manufacturing of Concrete:** In-situ and Ready Mixed Concrete (RMC), merits, demerits and applications of each,

#### **Unit - 4**

**RCC Design:** Behavior of heterogeneous materials in Direct Force & Bending.

**Methods of RCC Design:** Present trends in RCC design. Concepts of Working stress Method (WSD), Ultimate Load Method (ULM) and Limit State Methods (LSM) of RCC design. Idea of Neutral Axis, Compression zone, Tension zone, Lever arm and Moment of Resistance of an RC design. Basic assumptions in 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).*

#### **General Principles of Limit State Method of Design:**

Concept of Limit States and load factors in LSM of RCC design.

#### **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. Design and detailing for continuous beams and slabs and for Earthquake resistant design including ductility requirements as per IS: 1893-2002 and IS: 13920-1993 are to be covered in 3rd year, when earthquake loading as per 1893-2002 and IS: 13920 are also dealt.

#### **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

<b>Course Code</b>	:	<b>AP-212</b>
<b>Course Title</b>	:	<b>Water supply and Waste Disposal</b>
<b>Year</b>	:	Second Year / Term II
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 36 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	2

### **Objectives:**

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**

##### Part A

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

##### Part B

- 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 -2**

##### Part A

- 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.

## Part B

- 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
- Solid Waste Management: Definitions. /Garbage/ Refuse Collection. Types of waste; segregation, recycling, composting. Waste as resource.
- 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.

<b>Course Code</b>	:	<b>AP-213</b>
<b>Course Title</b>	:	<b>History of Architecture-I</b>
<b>Year</b>	:	Second Year / Term I and II
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 36 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	4

### **Objectives:**

The course broadly focuses on architectural products of various times and places within a broad chronological band. The emphasis of the discussions is on the nature and essence of the architectural product, related as far as possible to history of the process of their conceptualization, (with specific reference to the architecture as a result of the major religious ideologies across the globe) and process of construction. Use of the concepts of Style/ Typology/ Morphology in 'histories' of architecture.

The course objective is to understand the process of history in its making, and the markers it leaves behind and their subsequent interpretations.

Understanding – social scenario, concept and philosophies prevalent, to give rise to forms, which get converted into styles, distinction between styles, and their understanding in a modern day context.

### **Syllabus:**

#### **Unit- 1**

- (RECAP)Architecture of Buddhist origin and associations in India, Sri Lanka Far Eastern Countries, Tibet, China, Japan Viharas Chaityas and Stupas and Monasteries
- Early Vedic & Iron Age Civilisations in India: Beginning of Hindu Temple Architecture under the Guptas and Chalukyas. Appearance and Evolution: Experiments at Badami, Aihole of examples such as Ladh Khan, Durga, Maleguti.
- North Indian Temple architecture (circa 6th –12th C), important temples in North and Central India. Orissa. Khajuraho etc.
- South Indian temple architecture under the Chalukyas, Pallavas, Cholas, Pandyas and important temples like Meenakshi Brihadishwara etc.
- Understanding all these concepts and developments in today's context – with an understanding of the dynamics of the variables and the statics in these concepts in today's temple architecture

#### **Unit- 2**

- Islamic architecture in India. Brief Chronological introduction to dynasties in North India, Slaves Khaljis, Tughlaqs, Lodhis and Mughals. History written in terms of "Styles" indicating dynastic and regional variations
- Morphologies / Functional Typologies, Mosque Tomb and Garden Pavilion Forts Palaces with examples The Quwwat-ul-Islam Mosque/Qutab-Minar Tughlaq - Alai Darwaza/Tomb of Ghias-ud-din Tughlaq. Gujarat – Jami Masjid in Champaner, Bijapur - Gol Gumbad & Ibrahim Rauza

- The Mughal Period Babur and Humayun – Tomb gardens/pleasure gardens, Akbar – Fatehpur Sikri, Shahjahan – Taj Mahal (Agra), Jami Masjid (Delhi)
- Exchanges between Islamic Traditions and Local building practices like Rajasthan and other Regions including the Ganga Yamuna Doab. The Riparian Ghat structures of North and Central India
- Understanding all these concepts and developments in today’s context – with special reference to their continued usage and presence in the city of DELHI

### **Unit- 3**

- Early Islamic architecture in the Middle East, Architecture in Mediterranean region, North Africa, South Spain.
- Early Christian Architecture – adaptation of basilica form, Orthodox Christian, Byzantine &, Venice, Constantinople,
- Romanesque
- Ecclesiastical Gothic Architecture in Continental Europe and England.
- Great Cathedrals - Notre Dam, Canterbury, etc.

### **Unit- 4**

- Advent of Renaissance in Europe and impact on Architecture.
- Early to High Renaissance, St. Maria Del Fiore, (Florence), Late Renaissance, Michelangelo, Palladio, St. Peters (Rome). St. Paul’s (London).
- Baroque

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

1. Brown, Percy, Indian Architecture, Buddhist and Hindu
2. Brown, Percy, Indian Architecture (Islamic Period)
3. Volwhasen Andreas, Architecture of the World: Indian & Islamic
4. Raeburn, Michael, Architecture of the Western World
5. Grover, Satish , History Indian of Architecture
6. Kostoff, Spiro, History of Architecture, Rituals and Settings.
7. C. Tadgell, The History of Architecture in India
8. Bannister Fletcher, History of Architecture
9. Nader Ardalan and Laleh Bakhtiyar, Sense of Unity,
10. Watkin, David, History of Architecture
11. Wittkower, Roger, Architecture of Humanism



<b>Course Code</b>	:	<b>AP-214</b>
<b>Course Title</b>	:	<b>Built Environment and Spatial Culture</b>
<b>Year</b>	:	Second Year / Term I
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 36 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	2

**Course Outline, Objective and Structure:**

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. In what ways do built forms accommodate human behavior and adapt to human needs? How does the social group "fit" the form it occupies?
2. What is the meaning of the form? How do built forms express and represent aspects of culture?
3. 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?
4. How do society 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 space and power?

On the other hand, the course shall also afford to the students, chance to do some hands-on cultural, sociological and psychological studies of the built environment themselves, that is, in effect relate their own 'knowledge's to practice.

**Syllabus:**

**Unit-1**

**SOCIAL ORGANIZATION AND BUILT ENVIRONMENT**

Household Studies;  
Ethno-archaeological Studies;  
Social Organization and Dwelling Form:

**SYMBOLIC APPROACHES TO THE BUILT ENVIRONMENT**

Social Symbolic Accounts; Structuralism;  
Metaphorical Approaches;  
Theories of Ritual;  
Phenomenological perspectives.

## **Unit-2**

### **PSYCHOLOGICAL APPROACHES**

Psycho symbolic approaches: Freud; Jungian collective unconscious;  
Archetypes and primordial images; Ethno semantic approaches;  
Psycho cultural approaches;  
Spatial perception and orientation as ecological /cultural traits;  
Spatial perceptions arising out of basic human needs and learning processes;

### **SOCIAL PRODUCTION OF SPACE**

Political economy of space; space as a social product;  
Marx's relation between structure and superstructure;  
Ideology and Ideological Apparatus;  
Social history of built environment; space and power;  
Race, caste, gender and space

Note: The concerned faculty may prepare a comprehensive reader apart from using recommended texts and readings

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

1. Giddens, Anthony, Sociology, Polity Press, Cambridge (UK), 2006
2. Porteous, John Douglas; Environment Behaviour: Planning and Everyday Urban Life, Addison Wesley, 1977
3. Hall, T. Edward, The Hidden dimension, Anchor books edition, USA, 1969
4. Rapoport, Amos, Human Aspects of Urban Form, Pergammon Press, New York, 1977
5. Lynch, Kevin; The Image of the City, Joint Centre Publication, USA, 1960

<b>Course Code</b>	:	<b>AP-215</b>
<b>Course Title</b>	:	<b>Lighting and Acoustics</b>
<b>Year</b>	:	Second Year / Term I
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 36 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	2

**Objectives:**

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 lighting and acoustics.

**Syllabus:**

**Unit - 1**

- Light: Solar radiation and visible light; colour; visual comfort; day lighting of interiors- principles and techniques.
- Day lighting: Physical parameters of day lighting Day light penetration: Day light factor.
- Integrating day lighting with artificial lighting; automatic control of artificial lighting in relation to day lighting calculation of requirements of artificial lighting in relation to availability of day lighting.
- Electric light sources and their efficiency; Lamps, incandescent lamp etc
- Artificial lighting: Lumens; lux; M.F; R.I.R. lighting level requirement for various functions.
- Type of luminaries – Decorative commercial, Industrial, outdoor- Methods of describing performance characteristics and performance efficiency.
- Artificial lighting strategies for interior lighting for various functions.
- Lighting strategies for exterior lighting-buildings, space.
- Introduction to Ecotect and Radiance software for lighting design.

**Unit - 2**

- Acoustical concepts- wave theory, sound power, sound intensity, decibels, sound power level, sound intensity level, sound pressure level, frequency bands concept of reflection, absorption, transmission.
- Absorption coefficient, NRC, sound absorbing materials,-fibrous, membrane, resonators, perforated facing, application techniques.
- Noise control by absorption, sound transmission, transmission loss, composite barriers, noise reduction between rooms, light construction.
- Reverberation time (RT), calculation of RT, sample problems, RT and noise criteria for spaces for speech and music.
- Acoustical design of enclosed spaces for speech and music, reflection analysis reflection/diffusion, echoes, flutter echo, foci.
- Acoustical design consideration in interior design and sound amplification system.

**Suggested Books/Readings:**

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

<b>Course Title</b>	:	<b>Elective - II</b>
<b>Year</b>	:	Second Year/ Term I and II
<b>Contact Hours</b>	per week :	L: 0 S: 4
	per year :	L: 0 S: 144
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>8</b>
<b>Max. No. of Electives offered per year</b>	:	6
<b>Minimum No. of students per course</b>	:	10

**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 2<sup>nd</sup> year can choose, subject to time table. The subjects would be based on the following suggested groups:

AP - 221:	The Arts & Design Disciplines (s) - II
AP - 222:	Urban Issues (s) - II
AP - 223:	Construction Technologies & Advance Sciences (s) - II
AP - 224:	Computers & Information Technology (s) - II
AP - 225:	Ecology and Sustainable Development (s) - II
AP - 226:	Advance Architectural Theories (s) – 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 – 221

**Course Title:** Art & Design Disciplines (s) - 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 – 222

**Course Title:** Urban Issues (s) - 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

**Course Code:** AP - 223

**Course Title:** Construction Technologies & Advance Sciences (s) - 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 - 224

**Course Title:** Computer and Information Technology (s) - II

**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

**Course Code:** AP – 225

**Course Title:** Ecology and Sustainable Development (s) - 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 CO<sub>2</sub> 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 - 226

**Course Title:** Advance Architectural Theories (s) – II

**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

<b>Course Code</b>	:	<b>AP-301</b>
<b>Course Title</b>	:	<b>Architectural Design - III</b>
<b>Year</b>	:	Third Year / Term I and II
<b>Contact Hours</b>	per week :	L: 0 S: 10
	per year :	L :0 S: 360
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>20</b>

**Objective:**

Architectural Design is seen as a central discipline of the B.Arch programme. The focus of this programme is to develop skills of design while engaging with pragmatic and speculative propositions about the making of the built environment. The studio is an arena where knowledge gained in the technologies, humanities and professional streams of the programme is synthesized into built environment solutions through the act of design with the exercise of the creative imagination of the designer.

The learning of Architectural Design is seen as a cumulative process with a spiral structure of development where it is used as a base for increasing the depth and breadth of knowledge and development of skills in the following year. The range of design exercises will therefore move progressively from exercises with a relatively limited scope and size of the individual component or small shelter toward the complexity and scale of city so that the student experiences the range of complexities that characterizes the Indian habitat.

**Study Tour:** A study tour will be conducted at least once in a year. The educational tasks of the trip will be assessed as part of the studio work of Architectural Design upto 15 days.

**Syllabus:**

**Term 1:** Design exercises to - test the role of design and innovation in contexts of social, economic and environmental stress; the potential of design action leveraging positive potentials of available material and social resources; understand the role of the designer within the complex and constraining social and legal and economic frameworks; learn methods of consultation with anonymous or unfamiliar clients, interpreting development, planning and other legal controls in spatial terms – say for slum resettling, slum up-gradation or emergency shelters.

**Term 2:** Design exercises to - learn design strategies for dense communities living in cosmopolitan urban areas; the making of the public realm; negotiate the basis of planning and development norms etc; respond to the imperatives of continuity and change in societal and cultural evolution; explore typologies of vertical and horizontal organization of spatial environmental systems; respond to environmental issues of collective scales – open space, water, energy, transport etc and incorporate technologies taking advantage of collective scales.

Note: Design exercises shall be devised by the course faculty acknowledging and building upon - the cultural and intellectual assets of the student, opportunities offered by local environments, theoretical and philosophical issues thought to be relevant, and the knowledge



gained by previous and parallel courses. The design work will be supplemented by research, discussion and lectures arranged during studio hours to assimilate a rich reference store of the culture of design. There may be several short and discreet exercises within an overall semester programme.

The design exercises and the studio programme for the semester, stating the learning outcomes and evaluation stages, shall be set well in advance in consultation with the course coordinator. The exercises may be designed in part requiring group work; however the intent shall be of developing and evaluating design capability for each individual student.

**Suggested Books/Readings:**

1. Rudofsky, B (1964) *Architecture without Architects: a short introduction to non-pedigreed architecture*. University of New Mexico Press, New Mexico.
2. Rasmussen, SE (1977) *Experiencing Architecture*. The MIT Press, Cambridge, Massachusetts.
3. Watson, D and Crosbie, MJ. (2005) *Time-Savers Standards for Architectural Design*. McGraw Hill, New York.
4. Chiara, JD and Crosbie, MJ (1973) *Time-Savers Standards for Building Type*. McGraw Professional Publishing, New York.
5. Chiara, JD Panero, J and Zelink, M (2001) *Time-Savers Standards for Interior design and Space Planning*. Mc Graw Hill, New York.
6. Gideon, S (1941) *Space, time & Architecture*. Harvard University Press, USA.

<b>Course Code</b>	:	<b>AP-302</b>
<b>Course Title</b>	:	<b>Building Construction and Material - III</b>
<b>Year</b>	:	Third Year / Term I and II
<b>Contact Hours</b>	per week :	L: 0 S: 6
	per year :	L :0 S: 216
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	12

**Objective:**

The basic objective for the student here is not only to understand basic principles of construction technology, but also be able to apply to her/his proposed architectural expressions. Attempt must be made to culminate the year with the learning of making self explanatory drawings which are also good in their logical technical content.

The Course has been envisaged as a spiral of knowledge through progressive complexity of instructions.

The Course outlined below gives a general direction to be taken in the fulfillment of the objectives and each institute may choose to select topics according to its chosen thrust / philosophy. The range of the topics mentioned leaves sufficient scope of freedom for the institute to exercise freedom in its detailed teaching programme. Thus, a breakup into term-wise course has been left to the individual teacher.

**Materials:**

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.

**Technology**

Understanding use of technology for components and elements of buildings with higher complexity including specialized construction processes and treatments.

**Syllabus:**

**Term - 1**

1. High Performance windows with blinds and shading system: in alternative materials-timber, plastics, aluminum.
2. Deep basement foundations, their waterproofing, drainage and finishing.
3. Dry walling and cladding systems with thermal performance standards: curtain glazing, stone/ metal/ timber cladding.
4. Integrated Service Core Details
5. Flooring and Roofing (ground and first floor): Advanced treatment for waterproofing, insulation, drainage, roof gardens.
6. Principles of insulating assemblies in walls, floors and roofs.
7. Expansions Joints; Seismic Joints

**Materials:**

**Aluminum:** Manufacture, Properties, Types of AL sections and usage

**Plastics** in construction industry

**Acoustic materials** Environmental impact evaluation of wall/roof assemblies and building components.

**Term - 2**

Comprehensive Working drawings of a previously designed project

**Suggested Books/Readings:**

1. Barry, R (1999) *Construction of Buildings*. East West Press Pvt. Ltd., New Delhi.
2. Mckay, WB (1988) *Building Construction (Vol. I, II, III & IV)*. Orient Longman, London.
3. Allen, E (1999) *Fundamentals of Building Construction: Materials and Methods*. John Weily & Sons, New York.
4. Punamia BC (1993) *Building Construction*, Laxmi Publications (P) Ltd, New Delhi.
5. Chudley, R (1988) *Building Construction Handbook*. Butterworth Heinemann, Oxford.

<b>Course Code</b>	:	<b>AP-303</b>
<b>Course Title</b>	:	<b>Theory of Architecture</b>
<b>Year</b>	:	Third Year / Term I and II
<b>Contact Hours</b>	per week :	L: 0 S: 2
	per year :	L :0 S: 72
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	4

**Objective:**

The objective of the (theory) course is to underline the significance of the 'faculty of thinking', present intimately within and around and over the practice of architecture throughout the ages in various incarnations in erecting and dismantling of ideas and beliefs.

It is to empower the students to enhance their faculties of observation, analysis (reading, research & criticism), discourse (informed dialogue) and communication (oral & written) through an identification and understanding of existing meta narratives, sub narratives and epistemological breaks prevalent in history / society from an architect's point of view.

The course tends to be deliberately oppositional and structural in nature to enable the students to learn to develop their own frameworks towards conceptualizing architecture.

Concerned faculty in a particular institution may either adopt a pre existing model or critically develop his/her own methodology for conducting the course based on the stated objective with a judicious mix of Lectures and Assignments, Seminars and Suitable Application Exercises as well identify necessary texts for reading that may be subject to a continuous revision and include selections from but may not be limited to the following.

**Syllabus:**

**Term - 1**

**Part A**

- What is a “theory” / “architectural” theory
- Relevance of architectural theory as a course in the study of architecture & in the practice of an architect.
- The many facets of the issues involved in the issue of “theory” and “practice” in the ‘real’ world and the ever changing role of the architect
- Difference & distinction from history – the epistemological nature vs the archaeological
- Basic Components of architectural design theory – Form, function, (dis)order, rhythm, symmetry, balance, texture etc. (as tools, not ideas)

**Part B**

- The various architectural theories and / or various Positions Adopted by Architects :
  - The architect and the ‘anticipation’ of the future
  - The architect as Artist &/or Poet
  - The architect as scientist & technologist

- Resultant Movements in architecture as against Architectural traditions (historicity at play)
- Classical / Early, High, Late Modern / Post Modern Works : analytical / archetypal (canonical) study to counterpoint the historicist forms (contextualized)
- Type / archetype / typology
- Indian Architectural theory

## Term - 2

### Part A

- What is Discourse / Architectural Discourse
- How does writing enable abstraction in architectural thought
- What is criticism and architectural criticism
- Representation in Language & Representation in Architecture as a system of SIGNS & SYMBOLS
- What is the role of writing in myth making

### Part B

- Contemporary Issues in Architectural / theories (*these may be augmented by issues which the particular institution finds relevant from the point of view which it wants to position itself by*)
  - Feminism
  - Globalization
  - Identity, manifestation of identity, identity crisis
  - regionalism
  - Sustainability
  - Conservation
- Social Concerns and Ethics which the contemporary architect would dialogue in a contemporary scenario
- Morality in architectural practice

### Suggested Books/Readings:

1. Foucault, M (2004) *The Order of Things: archaeology of the human sciences*. Routledge, New York.
2. Isaiah Berlin, I (1993) *The Hedgehog & the Fox: An Essay on Tolstoy's view of history*. Ivan R. Dee Inc. Chicago, USA.
3. Ching, FDK (1996) *Architecture Form, Space and Order*. Van Nostrand Reinhold Staff, New York.
4. Tafuri, M (1987) *The Sphere and the labyrinth: Avant-Gardes and Architecture from Piranesi to the 1970s*. (Introduction + Chapter 1). MIT Press, USA.
5. Johnson, PA (1994) *The Theory of Architecture: Concepts, Themes & Practices*, (Chapter 4 Part B, Positions Adopted by Architects), Van Nostrand Reinhold.
6. Jencks, C (1985) *Modern Movements in Architecture (Introduction – The Plurality of Approaches + Chapter 1, The six traditions: Politics & Architecture)*. Anchor Press, USA.
7. Colquhoun, A (1996) *Three Kinds of Historicism*. In Nesbitt, K. (ed.) *Theorizing a new agenda for architecture: an anthology of architectural theory 1965-1995*. Princeton Architectural Press, New York.
8. Rowe, C (1982) *The Mathematics of an Ideal Villa & Other Essays* MIT Press, 1982.

9. Ramanujam, AK (1989) Is there an Indian Way of Thinking? *Contributions to Indian sociology* (n.s.) 23, 1. SAGE Publications, New Delhi/Newbury Park/London.
10. Agrest, DI (1991) *Architecture from Without: Theoretical Framings for a Critical Practice*. MIT Press, USA.
11. Barthes, R (2009) *Mythologies* (Part II – Myth Today, chapters on the signifier & signified, semiotics), Vintage, UK.
12. Broadbent, G. Bunt, R & Jencks, C (1980) *Signs, Symbols & Architecture*. Wiley, UK.
13. Derrida, J (1978) *Writing and Difference*. University of Chicago Press, USA.
14. Foucault, M (1984) *The Foucault Reader, (Essay on Space, Knowledge, and Power)*.Ed. Paul Rabinow (ed.), Penguin Books, UK.
15. Eagleton, T (1990). *The ideology of the aesthetic*. Basil Blackwell. Cambridge, MA.
16. Harries, K (1996). *The ethical function of architecture..*, MIT Press. Cambridge, MA.
17. Wong, A & Collier, SJ (eds.) (2005). *Global assemblages: technology, politics, and ethics as anthropological problems*. Blackwell Publishing. Malden, MA.

Note: Will be decided by the faculty teaching the syllabus to maintain the “Contemporariness” & “relevance” of the unit.

<b>Course Code</b>	:	<b>AP-311</b>
<b>Course Title</b>	:	<b>Theory of Structures - III</b>
<b>Year</b>	:	Third Year / Term I and II
<b>Contact Hours</b>	per week :	L: 3 S: 0
	per year :	L :108 S: 0
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	8

**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**

**Introduction to Soil Mechanics and Foundation Engineering:**

Classification of Soils for Engineering purposes and their characteristics.

Soil Investigations : Concept, need, and methods of soil testing, Field and laboratory testing.

Plate load and Standard Penetration Tests, 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. (Detailed design calculations not required). 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.

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 - 2**

**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 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; Wind zones of India, Basic wind speeds and wind pressures for different wind zones. Calculation of wind loads for a simple building. Earth quake loads: Basic concepts, Causes of earthquakes, plate tectonics, earth quake 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.

### Unit - 3

#### Analysis of structures:

Deflections: causes, demerits of large deflections in beams and slabs, permissible limits of deflections, methods to control deflections. deflected shapes of beams under loading, calculations for deflections for simply supported and cantilever beams for simple cases of udl, and point loads. Fixed beams: Fixed end moments under udl and point loads, BMD and SFD for a Fixed beam under simple cases of udl and point loads. Sinking of supports; FEMs developed in fixed beam due to sinking of supports. Differential settlement of foundations, causes, prevention measures. Analysis of continuous beams and simple portals for vertical loads by method of Moment distribution ( Non sway and simple cases only). Analysis of Simple portal frames for horizontal loads by Portal Method. 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).

### Unit - 4

#### Introduction to Structural Systems Studies, Earthquake resistant design and Detailing of RCC Building frames:

Structural systems studies : functions of structural system in a building, Horizontal support systems ( Floor systems) and Vertical support systems( Columns and walls). Floor systems; various types: Following floor systems to be studied under the subheads: salient features and structural components, structural behavior an basic principles of structural design, preliminary sizing to fix up the system, merits, demerits applications and modern day use and applications. ( No detailed designs required).; Beam and Slab systems, Waffle slab systems, Flat slab and Flat Plate systems, Grid floors. High Rise buildings : Forces on a high rise building, Effects of horizontal loads in a high rise building. Shear walls ; functions, types, Frames acting Along with Shear walls. Principles and desirable features for planning and design of shear walls in a building. Design and detailing of continuous RCC beams and slabs : Concept of moment design and detailing of continuous beams using approximate design coefficients as per IS: 456 and Design aids SP: 16 and SP: 34. Simplified detailing of RCC continuous Beams and slabs as per SP 34. ( Design and detailing of equal span continuous beams upto three span under udl and equal panel continuous slabs to be illustrated to explain the principles of design and detailing. Complex cases with unequal spans/unequal loading not included) Earthquake Resistant Design of buildings : Introduction to Indian standards on Earthquake resistant design and construction of buildings viz IS:1893, IS: 13920 and IS: 4326). Desirable features in a building for good earthquake performance viz lightness, symmetrical layout and ductility. Ductility detailing of RCC building frames as per IS: 13920. Earthquake resistant design and construction of Masonry buildings as per IS: 4326. Modern trends in Earthquake resistant design; Base isolation and energy dissipation techniques. Study of performance of buildings during some recent earthquakes and lessons learnt (Example-Bhuj earthquake).

#### Suggested Books/Readings:

1. IS: 875 (Parts 1 to 5), IS: 1893. IS: 13920, IS: 4326, IS: 456, SP: 34.
2. Arya, AS (2009) *Masonry and Timber structures including earthquake resistant design*. New Chand and Brothers, Delhi.
3. Ramamurtham, S (2010) *Design of Reinforced Concrete Structures*. Dhanpat Rai Publishing Co. Pvt. Ltd, New Delhi.
4. Khurmi, RS (2011) *Theory of Structures*. S. Chand, Delhi.
5. Aggarwal, P & Shrikhande, M. (eds.) (2006) *Earthquake Resistant Design of structures*. Prentice Hall of India, India.



<b>Course Code</b>	:	<b>AP-312</b>
<b>Course Title</b>	:	<b>Energy Systems and Fire safety</b>
<b>Year</b>	:	Third Year / Term I
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L :36 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	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**

- Energy Systems and Installations: Sources and end uses of energy.
- Renewable and non-renewable resources
- Systems for electricity generation, wind power and hydel power generation, photovoltaic.
- 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.
- Electricity transmission.
- AC& DC
- Protection
- Transformer
- Wiring system (Batten /Conduit)
- Star/Delta connection
- Concept of Power factor.
- Distribution system (LT) and (HT)
- Earthing
- Grid Stations
- Planning Electric Sub-Station
- Safety Devices (Fuses,MCBS,ELCBS)
- Legislation and code of practice I.E. rules, National Electric code.
- Captive power generation (DG set) , UPS, Inverter.
- Lightning arrestors,
- Grid Stations
- Polyphase Circuit.

**Unit - 2**

- 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.

**Suggested Books/Readings:**

1. Anwani, ML (2002) *Basic Electric Engineering*. Dhanpat Rai and Co. (P) Ltd, Delhi.
2. Rao, RB (2002) *Electricity for Architects, Consultants, Builders*. 162/1Avvai Shanmugam Salai, Chennai.
3. Jensen, R (ed.) (1975) *Fire Protection for the Design Professional*. Cahners Books, USA.
4. Industrial Fire Hazard Hand Book.
5. BIS Codes.

<b>Course Code</b>	:	<b>AP-313</b>
<b>Course Title</b>	:	<b>History of Architecture-II</b>
<b>Year</b>	:	Third Year / Term I and II
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 72 S: 0
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	4

### **Objectives:**

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 in relation to other parts of the world.

### **Syllabus:**

#### **Unit - 1**

1. Late Mughal & Awadh and Rajasthan Jaipur (including Jaipur portfolio)
2. Colonial & Indo Sarcenic and Lutyens/ Baker/ New Delhi
3. Beginning of Modern Institutionalization of Architecture in India (Academic & Professional) J.J. School of Architecture, Indian Institute of Architecture, Nationalist Architecture (Sirish Chatterjee etc.) Developments
4. Post Independence influence of Modern Masters, Corbusier, and Kahn in India and Indian Modern Architects.
5. Habib Rehman, A.P. Kanvinde, Joseph Allen Stein, Charles Correa (Early Works), Balkrishna Doshi (Early Works) PWD's early works.

#### **Unit - 2**

1. Introduction to "Modernity" "Modernization" "Modernism", Culture, Territorial & Technical transformations that led to Advent of Modern Architecture Cultural Transformation
2. Neo Classicism, revolutionary visionary Architects Ledoux & Boullée, Schinkel
3. Technical Transformation, Industrial Revolution New Materials, Concrete, Iron & Steel and Glass. Engineers, Eiffel, Hennebique Auguste Perret, Malliart, Chicago School, Birth of Sky Skcraper Architects, Adler & Sullivan
4. Frank Lloyd Wright Organic Architecture, Prairie House Usonian House
5. Art & Crafts in England, William Morris, Structure Rationalism & influence of Viollet Le duc in France
6. Art Nouveau –Victor Horta, Hector Guimard Antonio Gaudi Responses to mechanization Otto Wagner, H.P. Berlage. & Art Deco in Europe & the USA.
7. Le-Corbusier & Esprit Nouveau
8. Cubism De Stijl & New Conception of Space
9. Bauhaus – Walter Gropius, Mies Van Der Rohe.

### Unit - 3

1. Colonial Development & Architecture in India and other countries.
2. Impact of Colonialism on Art, Architecture & Urbanism in India.
3. Territorial Transformations in Europe and the West Birth of New Cities and Urban Growth of cities in Europe and America. Demand for New Architecture.
4. Sant Elia's –Futurism
5. Later works of Frank Lloyd Wright and Le Corbusier.
6. Late Modernists: Louis Kahn, Aalvar Aalto, Aldo Van Eyk
7. Elementary Reference to Post- Modernism in the west, Works of Venturi, Rossi, Michel Graves Eisenman Tschumi etc. Contemporary works and trends abroad.

### Unit - 4

1. Regionalism in India / Search for Indian Ness. Raj Rewal, Late works of Doshi, Late works of Correa, Doshi, also Geoffrey Bawa,
2. Regionalism / Appropriate Technology and Sustainability Laurie Baker, Hudco and Building Centres, Lok Jumbish, Primary Education Programmes
3. Globalization and its impact on India,
4. Rise of Indian and Multi-National corporations and their architecture,
5. Advent of new building types – offices, malls, Cineplex, Super Deluxe Hotels, Satellite towns Gurgaon, New Bombay, NOIDA etc. (Architecture only).
6. Architecture by Real Estate Developers like DLF etc. Works of Indian Architects like Hafeez contractor and others and recent works of foreign architects IN India. Contemporary Individual Urban Residence in Delhi.

### Suggested Books/Readings:

1. Lang & Desai (1997). *Architecture and Independence- The Search for Identity – India 1880 to 1980*. Oxford University Press, India.
2. Frampton K (2007) *Modern Architecture: critical history*. 4<sup>th</sup> ed. Thames & Hudson, USA.
3. Jencks (1991). *The language of post-modern architecture*. Academy Editions, London.
4. Schulz CN (1980). *Meaning in Western Architecture*. Rizzoli, New York.
5. Correa, CM (1985) *The New Landscape by C M Correa*, Bombay Strand Books, India, 1985.
6. Bhatia, G (1994) *Punjabi Baroque and other Memories of Architecture*, Penguin Books, New Delhi.
7. Bhatia, G (1994) *Silent Spaces and other Stories of Architecture*. Penguin Books, New Delhi.
8. *Architecture of India* (1985) Electra Montier Publication on Festival of India in France.
9. Bhatt, V & Scriver, P (1990) *Contemporary Indian Architecture: After the Masters*, Ahmedabad.
10. Tillotson, GHR (2007) *Jaipur Nama: Tales from the Pink City*. Penguin Global, India.

<b>Course Code</b>	:	<b>AP-314</b>
<b>Course Title</b>	:	<b>Quantities, Specification, Estimation and Contract Management</b>
<b>Year</b>	:	Third Year / Term I and II
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 72 S: 0
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	4

**Objective:**

Teaching basic concepts of preparation of quantities and estimates measurement of building works, writing of specifications and preparation of Contract documents for small 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.
- 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 measured quantities.

**Unit - 2**

- Specifications: Definitions, importance, composition of specifications, Broad classification of specifications, 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.
- 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**

- 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.
- 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.

#### **Unit - 4**

- 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, form, N.I.T, examples, Global tender, sale, opening, Corporate statement, informal tenders.
- 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.

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

1. Dutta BN (1992) *Estimating and Costing in Civil Engineering*, UBS Publishers Distributors Ltd, New Delhi.

<b>Course Code</b>	:	<b>AP-315</b>
<b>Course Title</b>	:	<b>Building Services -IV (Mechanical Transport, BMS, Communication and HVAC)</b>
<b>Year</b>	:	Third Year / Term II
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 36 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	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).
- 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.
- 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.

**Unit - 2**

- 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
- Use of suitable software's like Ecotect and Climatic Consultant in design development
- Use of Radiance
- Introduction to energy performance and CFD software's.

**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 Air Conditioning: Analysis and Design*, Wiley.



<b>Course Title</b>	:	<b>Elective - III</b>
<b>Year</b>	:	Third Year / Term I and II
<b>Contact Hours</b>	per week	: L: 0 S: 4
	per year	: L: 0 S: 144
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>8</b>
<b>Max. No. of Electives offered per term</b>	:	6
<b>Minimum No. of students per course</b>	:	10

**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 3<sup>rd</sup> year can choose, subject to the time table. The subjects would be based on the following suggested groups:

AP - 321:	The Arts & Design Disciplines (s) - III
AP - 322:	Urban Issues (s) - III
AP - 323:	Construction Technologies & Advance Sciences (s) - III
AP - 324:	Computers & Information Technology (s) - III
AP - 325:	Ecology & Sustainable Development (s) - III
AP - 326:	Advance Architectural Theories (s) - III

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 – 321

**Course Title:** Art & Design Disciplines (s) - III

**Objective:**

To develop a genuine appreciation of the arts and enable students to see art works as the ultimate expression of human faith and integrity as well as creativity. Develop a WAY OF SEEING. Contextualizing Art and understanding it as a phenomenon of culture and of complex social, economic, political and religious influences. To develop skills for determining the meaning and value of external links (aesthetic relationships) of an art work and the internal links (structure) of the artistic text and also determining the sense and value of an art work in light of its social functioning and the final judgment on the art work. To analyze how artistic ideas are integrated with architecture, especially in traditional times.

**Syllabus:**

- The Fundamental of Art: Form, Ordering Principles, Content, Function of Art and Techniques.
- Value in Art: Deals with artistic thinking in its context leading to a set of codes determining the value of an artwork.
- Styles in Art: As the structure of art, like Realism, Naturalism, Expressionistic or Abstraction and so on. How styles in art are at times precursor to styles in architecture.
- Modes of Art: Existence of diverse branches of Art- from two dimensional art like painting to three dimensional art like sculpture to mixed media art like installations and further on to more ephemeral forms like video or digital art.

**Course Code:** AP – 322

**Course Title:** Urban Issues (s) - III

**Objective:**

The course focuses on urban planning practices followed in India for its growing cities. How planning theories are addressing to rapid urbanization, transformation and advanced technologies.

**Syllabus:**

Understanding the planning practices in India based on case studies which will explore important contemporary urban issues: dealing with expanding cities, dealing with poverty, informal settlements, affordable housing, 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.

**Course Code:** AP - 323

**Course Title:** Construction Technologies & Advance Sciences (s) - III

**Objective:**

The objective of course is to understand the process by which design intentions can be carried to buildable level. Program can be designed to comprehend the role of technology, structural systems, materials and building services in construction of buildings. The course in studios can be facilitated by on site demonstrations, surveys and study of existing situations.

**Syllabus:**

- Service core and integration of services in multi level buildings
- Large span structural systems and relevant detailing
- Use of technology in construction of subterranean structures

**Course Code:** AP - 324

**Course Title:** Computer and Information Technology (s) - III

**Objective:**

This course is design-based, that critically explores current advancements in design and thinking to postulate new forms of urbanism and architectural space.

**Syllabus:**

- develop an advanced professional capacity in digital design
- develop an understanding of the relationship of this capacity to other areas of digital animation and computer-generated representations of design
- enhance their knowledge of the theory and history of digital architecture
- instigate and conduct creative research in digital architecture at an advanced level

**Course Code:** AP – 325

**Course Title:** Ecology and Sustainable Development (s) - III

**Objective:**

To introduce established approaches of landscape design and its applications.

To discuss possible interfaces between landscape, ecology and urbanism

**Syllabus:**

- Significant historical and theoretical references of landscape design
- Principles of landscape design and site planning, Basic introduction to landscape engineering
- Networks and mediums of landscape; Ecological mapping and suitability analysis (in the line of Ian McHarg's methods)
- Issues of land in urban interventions; Introduction to landscape urbanism and its relationship with Infrastructure and culture; Political ecology; Case studies, methods and techniques of interventions in the 'Greenfield' and 'Brownfield' projects of the ecological issues, their impact and initiatives to address the same in the built environs.

**Course Code:** AP - 326

**Course Title:** Advance Architectural Theories (s) – III

**Objective:**

The course analyses the forces that have shaped contemporary architectural practice in the country, focusing on the period since Independence. The format for teaching this course will be guided/structured discussions on assigned readings.

**Syllabus:**

- Traditions of Indian Architecture: Transformation of the Indigenous
- Traditions of Indian Architecture: Transformation of the European
- Traditions of Indian Architecture: In Praise of Hybridity
- The Notion of Authenticity and the Principles of Conservation
- Contemporary Architecture and Conservation
- The pursuit of 'Indian' Identity: The Architecture of Delhi, 1947-97
- The Masters: The role of International Stars
- The Masters: The Indigenous Stars
- The Lingering Effects of Colonialism: Orientalism
- The Lingering Effects of Colonialism: The State as Middle-man

<b>Course Code</b>	:	<b>AP-401</b>
<b>Course Title</b>	:	<b>Architectural Design - IV</b>
<b>Year</b>	:	Fourth Year / Term I
<b>Contact Hours</b>	per week :	L: 0 S: 10
	per year :	L: 0 S: 180
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	10

**Objective:**

Architectural Design is seen as a central discipline of the B.Arch programme. The focus of this programme is to develop skills of design while engaging with pragmatic and speculative propositions about the making of the built environment. The studio is an arena where knowledge gained in the technologies, humanities and professional streams of the programme is synthesized into built environment solutions through the act of design with the exercise of the creative imagination of the designer.

The learning of Architectural Design is seen as a cumulative process with a spiral structure of development where it is used as a base for increasing the depth and breadth of knowledge and development of skills in the following year. The range of design exercises will therefore move progressively from exercises with a relatively limited scope and size of the individual component or small shelter toward the complexity and scale of city so that the student experiences the range of complexities that characterizes the Indian habitat.

The studio design exercises are intended to develop a student's subjective abilities in the appreciation and creation of architectural form and the crafting of built objects, to consciously deploy processes and methodologies of design in response to varied design tasks and to develop a capability in deploying established and innovative design strategies. The iterative process of designing will also be used to develop verbal and graphic communication skills using a range of techniques and tools for representation such as hand drawn drawings, computer graphics and scale models, for presentation of design ideas and solutions.

**Study Tour:** A study tour will be conducted at least once in a year. The educational tasks of the trip will be assessed as part of the studio work of Architectural Design upto 15 days.

**Syllabus:**

**Term - 1**

Design exercise to – establish, regenerate or extend urban structures and detail complex/multifunctional buildings and spatial systems within larger urban frameworks; understand the making of meaningful urban environments; explore principles and frameworks of spatial design & functional distribution; relating parts to wholes; organization of urban infrastructures – including landscape, transportation and pedestrian/non-motorized movement systems; response to climate and other environmental issues; create a culture of city space; translate the larger urban context to the level and detail of human scale.

Note: Design exercises shall be devised by the course faculty acknowledging and building upon - the cultural and intellectual assets of the student, opportunities offered by local environments, theoretical and philosophical issues thought to be relevant, and the knowledge gained by previous and parallel courses. The design work will be supplemented by research, discussion and lectures arranged during studio hours to assimilate a rich reference store of the culture of design. There may be several short and discreet exercises within an overall semester programme.

The design exercises and the studio programme for the semester, stating the learning outcomes and evaluation stages, shall be set well in advance in consultation with the course coordinator. The exercises may be designed in part requiring group work; however the intent shall be of developing and evaluating design capability for each individual student.

**Suggested Books/Readings:**

1. Broadbent G (1994) *Emerging Concepts in Urban Space Design*, Von Nastrand Reinhol, New York.
2. Lynch C (1980) *Image of the City*, M.I.T. Press, Cambridge, Mass.
3. Speriregen PD (1965) *Urban design: The Architecture of Towns and Cities*, McGraw Hill Book Company. New York.

<b>Course Code</b>	:	<b>AP-402</b>
<b>Course Title</b>	:	<b>Building Construction and Material - IV</b>
<b>Year</b>	:	Fourth Year / Term I
<b>Contact Hours</b>	per week :	L: 0 S: 6
	per year :	L: 0 S: 108
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	<b>6</b>

### **Objective:**

The objective for the student here is not only to understand basic principles of construction technology, but also be able to apply to her/his proposed architectural expressions. Attempt must be made to culminate the year with the learning of making self explanatory drawings which are also good in their logical technical content.

The Course has been envisaged as a spiral of knowledge through progressive complexity of instructions.

The Course outlined below gives a general direction to be taken in the fulfillment of the objectives and each institute may choose to select topics according to its chosen thrust / philosophy . The range of the topics mentioned leaves sufficient scope of freedom for the institute to exercise freedom in its detailed teaching programme. Thus, a breakup into term-wise course has been left to the individual teacher.

### **Syllabus:**

#### **Term -1**

Advanced Building Technology; Introduction to pre-stressing, prefabrication and systems building. Jointing, tolerances, and modular coordination. Mass production, transportation. Storage and handling of materials. Characteristics, performance and application of mechanized construction equipment. Systems for fast pace construction.

High Tech Building Systems: Introduction to Intelligent building systems and their areas of application in architecture; Role, Types and uses of Sensors, Actuators etc in contemporary practice.

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

1. Barry R (1999) *Construction of Buildings*, East West Press Pvt. Ltd., New Delhi.
2. McKay WB (1988) *Building Construction* (Vol. I, II, III & IV), Orient Longman, London, 1988.
3. Allen E (1999) *Fundamentals of Building Construction: Materials and Methods*, John Wiley & Sons, New York.
4. Punamia BC (1993) *Building Construction*, Laxmi Publications (P) Ltd, New Delhi.
5. Chudley R (1988) *Building Construction Handbook*, Butterworth Heinemann, Oxford.

<b>Course Code</b>	:	<b>AP-403</b>
<b>Course Title</b>	:	<b>Research Paper</b>
<b>Year</b>	:	Fourth Year / Term I
<b>Contact Hours</b>	per week	: L: 0 S: 8
	per year	: L: 0 S: 144
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	<b>8</b>

**Objective:**

The Research paper 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.

**Syllabus:**

Emphasis will be on academic rigour 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 by a Seminar 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 10,000 words.



<b>Course Code</b>	:	<b>AP-404</b>
<b>Course Title</b>	:	<b>Architectural Thesis</b>
<b>Year</b>	:	Fourth Year / Term II
<b>Contact Hours</b>	per week :	L: 0    S: 10
	per year :	L: 0    S: 180
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	28

**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.

To achieve the objective the student may take up an architectural design project or identify a research topic to be developed to a sufficient level to add to the understanding of design issues they were exposed to during the course of their study.

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, or a well-argued written document with necessary drawings and illustrations.

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.

<b>Course Code</b>	:	<b>AP-411</b>
<b>Course Title</b>	:	<b>Theory of Structures - IV</b>
<b>Year</b>	:	Fourth Year / Term I
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 36 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	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.)

**Unit - 1**

Large span systems 1: Characteristics of large span structural systems. Steel roof trusses as large span systems: Introduction to SP: 38: Design Handbook for Design of Structures with steel roof trusses.

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

Folded Plates: General understanding of folded plate, Different shapes of Examples of modern day use. Tensile Structures : Principles of tensile structures, understanding general structural behaviour of tension systems, calculating sag and cross sectional area of cables, cable suspended and cabled-stayed structure, examples of modern day use.

High Rise Buildings : High Rise: Principles of high rise structures, different structural systems for high rise buildings, Shear wall systems, Tube systems, advantages and disadvantages of each, analysis of multistory frame for wind load, examples of modern day use.

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, bending of cables, anchoring devices, losses in pre-stress force, 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**

Space Frames: General understanding of structure of space frame, space structures against plane structures, examples of modern day use.

High Rise: Principles of high rise structures, different structural systems for high rise buildings, advantages and disadvantages of each, analysis of multistory frame for wind load, examples of modern day use.

Tensile Structures: Principles of tensile structures, understanding general structural behaviour of tension systems, calculating sag and cross sectional area of cables, cable suspended and cabled-stayed structure, examples of modern day use. Introduction to Pre-stressing: Principles of Pre-stressing, Pre and Post tensioning, approximate calculations of pre-stressing force, examples of modern day use Prefab and Industrial structures.

**Suggested Books/Readings:**

1. Heller R & Mario S (1963) *Structures in Architecture: The Building of Buildings*, Prentice Hall Inc.
2. Krishnaraju N (2004) *Advanced RCC Design*, University Press Pvt. Ltd.
3. *Structural Systems for Tall Buildings; Council of Tall Buildings and Urban Habitat*; Mcgraw - Hill International Edition, 1995.

<b>Course Code</b>	:	<b>AP-412</b>
<b>Course Title</b>	:	<b>Town Planning</b>
<b>Year</b>	:	Fourth Year / Term I
<b>Contact Hours</b>	per week :	L: 2 S: 0
	per year :	L: 36 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	2

**Objective:**

The intention is to make architecture students aware of the problems of cities and how to address the various issues. 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**

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.

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.

**Unit – 2**

Detailed planning proposals for residential neighbourhoods.

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.

Urban traffic and transportation.

Planning Legislation: Review of the development of planning legislation in India  
Detailed understanding of the latest planning of housing acts.

**Suggested Books/Readings:**

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

<b>Course Code</b>	:	<b>AP-413</b>
<b>Course Title</b>	:	<b>Professional Practice-I</b>
<b>Year</b>	:	Fourth Year / Term II
<b>Contact Hours</b>	per week :	L: 4 S: 0
	per year :	L: 72 S: 0
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	4

**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.

- Relation ship with clients, consultants.
- 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
- Role of professional bodies and institutions - Indian Institute of Architecture.
- Influence of WTO and GKTTS
- 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
- Architectural Education and the Profession.
- Conditions of Engagements and Professional liability and indemnity.
- Architecture competitions and getting work.
- Negotiation and Arbitration. Indian Arbitration Act.

**Unit - 2**

- **Valuation:** the principle factors affecting the supply and demand for land and building;
- Principles governing the rates of interest for different types of property;
- Calculation of rental values-net income-virtual rent;
- Valuation for sale and purchase of freehold & leasehold properties; Rental method of valuation, valuation on land & building basis, valuation for mortgage, valuation for acquisition, valuation for taxation of properties
- Contemporary trends of valuation of property,
- Compensation & betterment levy, dilapidation & depreciation;
- Easement rights and natural rights, the nature of arbitration and awards.

**Suggested Books/Readings:**

1. Handbook of professional Documents published by the Council of Architecture (latest).
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.

<b>Course Title</b>	:	<b>Elective - IV</b>
<b>Year</b>	:	Fourth Year / Term I
<b>Contact Hours</b>	per week :	L: 0 S: 4
	per year :	L: 0 S: 72
<b>No of teaching weeks</b>	:	18
<b>Credit</b>	:	<b>4</b>
<b>Max. No. of Electives offered per year</b>	:	6
<b>Minimum No. of students per course</b>	:	10

**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 4<sup>th</sup>.year can choose, subject to the time table. The subjects would be based on the following suggested groups:

AP - 421:	The Arts & Design Disciplines (s) - IV
AP - 422:	Urban Issues (s) - IV
AP - 423:	Construction Technologies & Advance Sciences (s) - IV
AP - 424:	Computers & Information Technology (s) - IV
AP - 425:	Ecology & Sustainable Development (s) - IV
AP - 426:	Advance Architectural Theories (s) - IV

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 – 421

**Course Title:** Art & Design Disciplines (s) - IV

**Objective:**

To develop a comparative and analytical understanding of form, space, structure and order in context of oriental art and architecture, which is a multi-layered experience of material, texture and stylistic expression.

To enable decoding of the language of art and architecture of the oriental past and identify its continuity (of the oriental sensibilities) in the present. To develop mental skills which may help in deciphering the underlying structure of codes, which form the basis to the 'representation' of the ideas, which in turn lead to the genesis of a work of art or architecture.

**Syllabus:**

- Aesthetic Theories of the oriental past: Dramatagic texts like Natyasastra or Technical Texts like Chitrasutra. Philosophical texts like Tao Te Ching or Zen. Architectural Texts like Mansara.
- Aesthetic writings of recent times: Rabindranath Tagore, Abanindranath Tagore, Coomarswamy and K.G Subramanyam, Geeta Kapur and others.

**Course Code:** AP – 422

**Course Title:** Urban Issues (s) - IV

**Objective:**

To position the inter-relationship between the space, people and the society at the centre of urban discourse

To discuss nuances of urban politics and culture for possible understanding and reading of cities

**Syllabus:**

The course will be based on the reading of selected texts and reviews/seminars/presentations by the students (individually or in groups)/ surveys/ case studies on the following topics:

Study of urban spaces and society, notion of community, spatial division and differences in cities, urban morphology and urban components

Politics and the city, globalization and related urbanism, relevant notions of city reading and related applications

**Course Code:** AP - 423

**Course Title:** Construction Technologies & Advance Sciences (s) - IV

**Objective:**

The course is to expose the students to latest advancements in new materials and construction technologies. Teaching Program can be based on study of materials and new construction technologies applied in complex and modern building forms.

**Syllabus:**

Technology intensive systems, materials and services in modern buildings. Alternate details using new materials and technology that can/has replace(d) conventional constructional practices to enhance efficacy in construction or durability of buildings over its life.

**Course Code:** AP - 424

**Course Title:** Computer and Information Technology (s) - IV

**Objective:**

The course aims to provide a setting to fully explore the implications of the digital through a rigorous testing of the architectural form and the potential implicit to these types of software.

**Syllabus:**

- Undertake creative and technical responsibility for the development of a significant digital architectural project, including the formulation and presentation of the project
- develop improved collaborative skills by working as members of a design team
- Rethink the role of architecture in relation to advancements in culture, theory, technology and design.

**Course Code:** AP – 425

**Course Title:** Ecology and Sustainable Development (s) - IV

**Objective:**

The objective of this course is to introduce the energy use in buildings for air-conditioning, lighting and mechanical services. Basic introduction to building simulation methods and tools and obtaining simulated energy consumption under different end usages.

To introduce and evaluate Building Energy Codes (BECs) and how these codes enable energy conservation in air-conditioned buildings. Detailed building energy simulation models are also to be prepared.

**Syllabus:**

- Energy consumption in air- conditioned office buildings.
- Introduction to Building Energy Simulation Tools and their comparison.
- Modeling procedures for simple building layouts- offices/ hospitals/shopping malls.
- Use of climate data in simulation studies.
- Structure of BECs.
- Compliance criteria, methodology and implementation.
- Comparison of BECs of different countries.
- Detailed building models in simulation studies and code compliance.
- Parametric studies for energy conservation in air-conditioned buildings.

**Course Code:** AP - 426

**Course Title:** Advance Architectural Theories (s) – IV

**Objective:**

The objective of the course is to expose students to some of the new areas of research being undertaken on the architectural history of India.

**Syllabus:**

- The importance of Hegel and who writes history
- Colonial Authority: Its origins and persistence
- Archaeological Construction of “*Indian Architecture*”
- The “Indian Way of Seeing/Representing: Pre modern and Modern
- Indigenous Narrative Traditions
- Interpreting the Hindu Temple
- South of the Vindhyas: Challenging the mindset
- Reading the Vernacular Traditions
- Re-viewing historic Architecture
- Re-viewing the Indian City

<b>Course Code</b>	:	<b>AP-501</b>
<b>Course Title</b>	:	<b>Practical Training</b>
<b>Year</b>	:	Fifth Year / Term I and II
<b>Contact Hours</b>	per week :	L: 0 S: 28
	per year :	L: 0 S: 1008
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>56</b>

**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. The students shall maintain a weekly log of their work during their apprenticeship. This work is expected to include assistance in design, preparation of construction drawings and documents, visits to construction works and attendance of meetings with clients/ consultants etc. Participation in broader professional activities will be encouraged. The weekly log and a portfolio of work will be examined at the end of the year. During this period of apprenticeship the student will also undertake an on-line course of Professional Practice-II (Course Code AP-502) which will reinforce Practical Training.

<b>Course Code</b>	:	<b>AP-502</b>
<b>Course Title</b>	:	<b>Professional Practice-II (Online Course)</b>
<b>Year</b>	:	Fifth Year / Term I and II
<b>Contact Hours</b>	per week :	L: 4 S: 0
	per year :	L: 144 S: 0
<b>No of teaching weeks</b>	:	36
<b>Credit</b>	:	<b>8</b>

**Objective:**

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.

This will be an on-line course. Students will be required to read given material, survey office practices from their place of apprenticeship for Practical Training and submit assignment online.

**Syllabus:**

**Term - 1**

Architect & His Office, Responsibilities, Office Management, Project Co-ordination Clients, Consultant and Project Managers, Office Accounts and Billing.

**Term - 2**

Design Audit & Efficiency Studies, Analysis for Special Efficiency of Buildings.  
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.