SCHEME OF EXAMINATION AND SYLLABI

for

Bachelor of Architecture (B. Arch.)

Offered by
University School of Architecture and Planning
and affiliated institutes

w.e.f. Academic Session 2018-19

GURU GOBIND SINGH
INDRAPRASTHA
UNIVERSITY

Guru Gobind Singh Indraprastha University
Sector 16-C, New Delhi – 110078 [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, USAP has been conducting a five year B. Arch. Programme since then. In August 2009, USAP started B. Arch. Degree programme at the University campus. This is 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. Programme 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 10 semesters i.e. 5 years.

The Academic semester shall devoted to 16 weeks of instruction/ Teaching (including class test) work.

The Academic Calendar shall be notified by the University each year, before the start of academic year

The maximum period required for completion of the pragramme shall be n+2 i. e. 7 years.

A student shall have to earn all the credits specified in the Scheme of Teaching & Examination and syllabi.

Structure of B. Arch. Programme

The broad objective of the programme is to impart theoretical and practical knowledge to students to prepare them for a professional career in the field of architecture. The course at a broad level aspires to widen the horizon of students with exposure of related scenarios in the field of architecture to determine the directions of their further development. The theoretical knowledge gained by students in class rooms and research mode is integrated in applied mode in Studio exercises.

The programme is designed by following guidelines of Council of Architecture for its B. Arch. degree. This forms the criteria for registration of students with COA as architect on completion of B. Arch. course of the school.

The courses are divided into four main modes for imparting theoretical, practical and interest based education to students.

	Particulars	Credits (Per Semester)										Total
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
1	Practical/Studio Core Courses*	22	20	19	19	15	15	23	25		26	**184**
2	Theory core courses	8	10	11	11	12	12	4	2		4	**74**
3	Elective courses					3	3	3	3			**12**
4	Practical training									30		**30**
	Total Credits	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**300**

*1 Hour of Practical/studio = 1 credit

Core Courses

Core Courses represent the central learning of architectural education. Architecture is synthetic learning of various fields relating to humanities and scientific fields. Practical knowledge of the subjects is applied to projects which are resolved by students with faculty and these form the core of studios. Architectural Design, Building construction Arts and Drawing and communication along with other studio subjects are principally conducted in this way. Supplementary formal knowledge about technical aspects of building as well as abstract aspects of architectural thought draw upon other related disciplines of humanities are learned in a theoretical mode.

Elective Courses

Electives shall be offered by the institute to supplement additional coursework or to advance knowledge in architecture and allied fields beyond core subjects. The Elective courses also reflect diverse technical and cultural developments of current relevance. These provide valuable specialized expertise or knowledge with the faculty of the institution or in the city. The courses will be seminar or practical/studio courses.

Evaluation and Examination

The evaluation of students in a course shall have two components:

(i) Continuous evaluation by the teacher(s) of the course.
(ii) Evaluation through a Semester term end examination.

The guidelines for distribution of weightage for various components of evaluation shall be as below:

a. Theory Courses
   (i) Continuous evaluation by teacher(s) - 25%
   (ii) Semester term end examination - 75%

b. Practical / Studio Courses
   (i) Continuous evaluation by teacher(s) - 50%
   (ii) Semester term end examination - 50%

Conduct of Teacher's Continuous Evaluation:

1 Theory Courses: The teacher's continuous evaluations shall be based on the following:
   - One class tests –test shall be of 20 marks
   - Assignment/ Group Discussion/Viva Voce/ Additional Test/Quizzes etc. Shall be of 5 marks

2 Practical / Studio Course
   The teacher's continuous evaluation shall be based on performance in the course work through assignments of various nature including studies, exercises, presentations and reports etc. in the suitably spaced intervals.

Criteria for Passing Courses Marks

A student obtaining a minimum of 50% marks in aggregate in each Course including the Semester term end examination and Teacher's Continuous Evaluation shall be essential for passing the subject and earning its assigned credits. A candidate, who secures less than 50% of marks in a Course, shall be deemed to have failed in that Course. Appearing in each component of examination (Teacher's Continuous Evaluation as well as Semester term end examination) is mandatory to pass in a paper / course. Non appearance or being absent in any component shall mean that the student is fail in paper / course.

A student obtaining less than 50% of maximum marks (including Semester term end examination and Teacher's Continuous Evaluation) assigned to a Course and failing in the Course shall be allowed to reappear in the next examination held, subject to maximum permissible period of (n+2) Academic year.

The re-appearing students who secured less than 50% marks in the Teacher's Continuous Evaluation have the option to improve upon the class tests/assignments performances, in such cases the improved internal marks, if received from the School/Institution concerned, at least 5 days before the commencement of Re-Examination, shall be considered, otherwise the previous internal marks already obtained by the student shall be taken into account without any modification.

Students who are eligible to reappear in a semester examination shall have to apply to the Controller of Examinations through the School/ Institution concerned to be allowed to reappear in an examination and pay the fees prescribed by the University.

Promotion Policy to the Next Academic Year

Upon declaration of the results of the semesters of an academic year, a student failing in any course or courses aggregating more than 5 course credits shall not be eligible for promotion to the subsequent academic year.

A student who has failed in courses aggregating equal to or more than 6 credits shall be eligible to repeat the failed courses in the subsequent academic year. Such a student shall not be required to repeat any course that student has already completed successfully.

Examination

For the Studio / Practical examination of the courses, every student in each course shall be evaluated by 2 external examiners. The payment for each examiner shall be made as per the approved rates of the University.

Examinations for all theory courses shall be held at the end of semester. The question paper will be for maximum of 75 marks. The duration of examination shall be three hours for theory examination.

Ordinance 11 shall be applicable to the conduct of teaching and examination of this programme of study

First Semester (Year - 1)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-101	Architectural Design – I	6			96
AP-103	Building Construction – I	5			80
AP-105	Architectural Drawing -I	3			48
AP-107	Art and Architectural Graphics - I	3			48
AP-109	Workshop (NUES) – I	3			48
AP-111	Surveying and Leveling (NUES)	2			32
AP-121	Theory of Structure – I		2		32
AP-123	History of Architecture - I (Culture & Vernacular)		2		32
AP-125	Building Material Science – I		2		32
AP-127	Environmental Studies		2		32
	Total	**22**	**8**	**0**	**480**

Second Semester (Year - 1)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-102	Architectural Design – II	6			96
AP-104	Building Construction – II	5			80
AP-106	Architectural Drawing - II	3			48
AP-108	Art and Architectural Graphics - II	3			48
AP-110	Workshop (NUES)-II	3			48
AP-122	Theory of Structure-II		2		32
AP-124	History of Architecture-II		2		32
AP-126	Building Material Science-II		2		32
AP-128	Climatology		2		32
AP-130	Architecture and Writing		2		32
	Total	**20**	**10**	**0**	**480**

Note: Study tour/s up to 15 days duration will be conducted at least once in the first year. The educational task of the study tour will be assessed along with the studio work of Architectural Design.

Third Semester (Year - 2)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-201	Architectural Design – III	8			128
AP-203	Building Construction – III	5			80
AP-205	Architectural Drawing - III	3			48
AP-207	Art Appreciation and Architectural Graphics - I	3			48
AP-221	Theory of Structure – III		3		48
AP-223	History of Architecture – III		2		32
AP-225	Building Material Science – III		2		32
AP-227	Water Supply and Waste Management		2		32
AP-229	Sociology		2		32
	Total	**19**	**11**	**0**	**480**

Fourth Semester (Year - 2)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-202	Architectural Design – IV	8			128
AP-204	Building Construction – IV	5			80
AP-206	Architectural Drawing - III	3			48
AP-208	Art Appreciation and Architectural Graphics - I	3			48
AP-222	Theory of Structure – IV		3		48
AP-224	History of Architecture – IV		2		32
AP-226	Building Material Science – IV		2		32
AP-228	Lighting and Acoustics		2		32
AP-230	Psychology of Spatial Relationships		2		32
	Total	**19**	**11**	**0**	**480**

Note: Study tour/s up to 15 days duration will be conducted at least once in the Second year. The educational task of the study tour will be assessed along with the studio work of Architectural Design.

Fifth Semester (Year - 3)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-301	Architectural Design – V	10			160
AP-303	Building Construction – V	5			80
AP-321	Theory of Structure – V		4		64
AP-323	History of Architecture – V		2		32
AP-325	Building Material Science – V		2		32
AP-327	Energy and Fire Safety –I		2		32
AP-329	Quantity and Estimation		2		32
AP-341	Art & Design Disciplines – I			3	48
AP-343	Urban Issues – I			3	
AP-345	Advanced Construction Technologies- I			3	
AP-347	Ecology & Environmental Issues- I			3	
AP-349	Landscape Architecture - I			3	
AP-351	Visual Communication			3	
AP-353	Interior Design – I			3	
	Total	**15**	**12**	**3**	**480**

Sixth Semester (Year - 3)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-302	Architectural Design - VI	10			160
AP-304	Building Construction - VI (Working Drawing)	5			80
AP-322	Theory of Structure - VI		4		64
AP-324	Codes of Practice and Building Bye-laws		2		32
AP-326	HVAC & Security systems Access Control		2		32
AP-328	Energy and Buildings - II		2		32
AP-330	Specification and Contract Management		2		32
AP-342	Art & Design Disciplines - II			3	48
AP-344	Urban Issues - I			3	
AP-346	Advanced Construction Technologies- II			3	
AP-348	Ecology & Environmental Issues- II			3	
AP-350	Landscape Architecture - II			3	
AP-352	Computer and Information Technology - I			3	
AP-354	Interior Design - II			3	
	Total	**15**	**12**	**3**	**480**

Note: Study tour/s up to 15 days duration will be conducted at least once in the Third year. The educational task of the study tour will be assessed along with the studio work of Architectural Design.

Seventh Semester (Year - 4)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-401	Architectural Design - VII	12			192
AP-403	Building Construction - VII	5			80
AP-405	Seminar	6			96
AP-421	Theory of Structure - VII		2		32
AP-423	Town Planning-I		2		32
AP-441	Humanities, History, Theory and Philosophy - I			3	48
AP-443	Building Economics			3	
AP-445	Advanced Construction Technologies- III			3	
AP-447	Integrated Environmental Design			3	
AP-449	Contemporary Processes in Architecture			3	
AP-451	Computer and Information Technology - II			3	
AP-453	Advance Architectural Theories			3	
AP-455	Intelligent Buildings			3	
	Total	**23**	**4**	**3**	**480**

Eighth Semesters (Year - 4)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-402	Architectural Design - VIII	12			192
AP-404	Building Construction - VIII	5			80
AP-406	Dissertation / Research Paper	8			128
AP-422	Town Planning-II		2		32
AP-442	Humanities, History, Theory and Philosophy - II			3	48
AP-444	Housing and Urban Development			3	
AP-446	Earthquake Resistant Architecture			3	
AP-448	Universal Access Enabled Environment			3	
AP-450	Industrial Architecture			3	
AP-452	Advanced Computing			3	
AP-454	Architectural Conservation			3	
AP-456	Project Management			3	
	Total	**25**	**2**	**3**	**480**

Note: Study tour/s up to 15 days duration may be conducted at least once in the fourth year. The educational task of the study tour will be assessed along with the studio work of Architectural Design.

Ninth Semester (Year - 5)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-501	**Practical Training**	**30**			640*
	Total	**30**	**0**	**0**	**640**

* Practical Training should be 40 hours per week of 16 weeks

Tenth Semester (Year - 5)

Course Code	Course title	Credits			Total Hours per Semester
		Studio	Theory	Elective (Studio)	
AP-502	Architectural Thesis	26			416
AP-522	Professional Practice		4		64
	Total	**26**	**4**	**0**	**480**

Note:

1. Elective Course
   a) The elective courses offered in semesters, only one elective course has to be selected by each student per semester, subject to the time table.
   b) Minimum two elective courses to be offered by the institute
   c) The elective course shall be offered with a minimum 10 students per elective course

2. Total Number of credits in B. Arch. Programme = 300
3. Minimum Number of Credits to be earned for the award of B. Arch. Degree = 300

Bachelor of Architecture (B. Arch.) Syllabus

General objectives for Design Studios: Architectural Design is to be 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.

All other courses, while maintaining their individuality, shall contribute to Design.

Course Code		:	**AP-101**
Course Title		:	**Architectural Design - I**
Semester (Year)		:	First (Year -1)
Contact Hours	per week	:	L: 0 S: 6
	per semester	:	L: 0 S: 96
No. of teaching weeks		:	**16**
Credit		:	**6**

Objective:

To learn principles of Space Form relationship in Architecture and to develop understanding of immediate context and to learn representation of ideas through sketches drawings, and three dimensional models.

Syllabus:

- Exercises to develop understanding of basic aspects of building form and space.
- Exercises to develop understanding of built objects and space in relation to the human scale
- Exercises to develop understanding of built objects and space in relation to elements of nature.
- Design exercises to explore for small single and multi-cellular constructs as a response to minimal programs, immediate surrounding and environmental settings.

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. Harris, Charles W. / Dines, Nicholas T.; Time Savers Standards for Landscape Architecture, Mc Graw Hill, USA, 1998
6. Gideon, Siegfried; Space, time & Architecture, Harvard University Press
7. Robert Powell, "Tropical Asian House", Select Books, 1999

Course Code		:	**AP-103**
Course Title		:	**Building Construction - I**
Semester (Year)		:	First (Year -1)
Contact Hours	per week	:	L: 0 S: 5
	per semester	:	L: 0 S: 80
No. of teaching weeks		:	**16**
Credit		:	**5**

Objectives:

Learning the process and techniques of masonry construction and to learn to communicate information through drawings and models.

Syllabus:

- Walls and piers with bonding techniques for block masonry including foundations, e.g. for brick masonry -English, Flemish bonds etc.

- Openings in masonry walls using spanning and load bearing techniques of corbelling, arches and lintels, domes.

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 Wiely & Sons, New York, 1999
4. Punamia B.C., Building Construction, Laxmi Publications (P) Ltd, New Delhi, 1993
5. Chudley, R.; Building Construction Handbook, Butterworth Heinemann, Oxford, 1988
6. Arora, S.P., and Bindra, S.P., Text Book of Building Construction, Dhanpat Rai Publications, 2010
7. Ching, F.D.K., Building Construction Illustrated, Van Nostrand, Reinhold, 5th edition, 2014

Course Code		:	**AP-105**
Course Title		:	**Architectural Drawing - I**
Semester (Year)		:	First (Year -1)
Contact Hours	per week	:	L: 0 S: 3
	per semester	:	L: 0 S: 48
No. of teaching weeks		:	**16**
Credit		:	**3**

Objectives:

Learning drawings as a medium for expressing and representing ideas in architectural communication and developing visualization and conceptualization of objects through freehand sketches and drawings. Leaning importance of standard notations and practices in drawings,

Syllabus:

Architectural Drawing:

- Introduction to drafting tools and their uses, freehand drawing and lettering in varying heights.
- Instrument based drawing appropriate to architectural applications. Construction of basic regular and irregular shapes and patterns in two dimensional geometry.
- Need, principles systems and methods of orthographic projection of lines, planes and solids
- Development of surfaces of simple and hybrid solids.
- Sections of solids, Isometric, Axonometric views of various rectilinear and curvilinear 3-D objects.
- Introduction to architectural drawings-plans, elevations, sections, views, measured drawing of simple building components (simple furniture, sculpture, fountain, steps etc) and a small existing structure (kiosk, guard room Historical building or its part etc).

Suggested Books/Readings:

1. Gill, Robert W.; Manual of Rendering with Pen and Ink, Thames and Hudson, London, 1997
2. Agarwal, B. and Agarwal, C.M., Engineering Drawing, Tata McGraw-Hill.
3. Bhatt, N.D. and Panchal, V.M., Engineering Drawing, Charotar Publication.

Course Code		:	**AP-107**
Course Title		:	**Art and Architectural Graphic - I**
Semester (Year)		:	First (Year -1)
Contact Hours	per week	:	L: 0 S: 3
	per semester	:	L: 0 S: 48
No. of teaching weeks		:	**16**
Credit		:	**3**

Objectives:

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

Syllabus:

- Introduction to different lines and with pencils HB, B, 2B, 3B, 4B, 5B, 6B, charcoal pencil, etc.
- Rendering of different textures of building material in pencil
- Free hand still life sketching of composition of solids, cubes, cylinders etc. Study of light, shade and shadow.
- Free hand sketching in pencil of elements of scale like trees, shrubs, human, figures, vehicles etc.
- Color theory and color wheel. Colour – Properties of colour – Colour schemes – Types of colours -Application and visual effects of colour. Exercise involving Study of colour – Properties of paper, brush and other tools – Basic washes – 3D effects from still-life, nature and built environment using mono chromatic and multi colour.

Suggested Books/Readings:

1. Jax Themier, B.W., "How to Paint and Draw", Thames and Hudson, 1985.
2. Bhattacharya, B. and Bera, S.C., Engineering Graphics, I.K. International.

Course Code		:	**AP-109**	
Course Title		:	**Workshop (NUES) - I**	
Semester (Year)		:	First (Year -1)	
Contact Hours	per week	:	L: 0	S: 3
	per semester	:	L: 0	S: 48
No. of teaching weeks		:	**16**	
Credit		:	**3**	

Objectives:

Imparting basic skills necessary for making Architectural solid 3D models of objects in various scales and understating of good craftsmanship.

Syllabus:

- Preparation of models using materials like paper, wood, plastic and others
- Making of models as per design in various scales

Course Code		:	**AP-111**
Course Title		:	**Surveying and Leveling (NUES)**
Semester (Year)		:	First (Year -1)
Contact Hours	per week	:	L: 0 S: 2
	per semester	:	L: 0 S: 32
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

Familiarizing students with old and latest tools and equipments for land surveying. Interpretation and preparation of contour maps, setting out of building works and to undertake fieldworks.

Syllabus:

Introduction: Definition, classification, principles of surveying, Units of measurement, Scale, Signs convention, Surveying and Leveling Tools and equipment for land surveying
Chain Survey: Instruments used, Types of chain, Instruments for ranging, Setting out angles, Erecting perpendiculars, Selection of station, Methods of taking offset and Obstacles in chaining.
Plane Table Survey: Plane table and accessories, Methods of plane table survey, Radiation, Intersection, Traversing and resection
Compass Survey: The prismatic compass, Surveyor compass and its construction and uses, Reduced and whole circle bearing, Magnetic declination, Effect of local attraction.
Leveling & Contouring: Definition, Types of level, Booking and reduction of levels, Profile & cross section leveling, Errors in leveling. Characteristics of contours, Direct and indirect methods of contouring, Interpolation, Uses of contours, Calculation of area & volume.
Theodolite Survey: Study of instruments, Definition of different terms, Temporary adjustments, Uses, Measuring horizontal and vertical angles, Method of repetition, Extension of lines.
Total Station Familiarization
Interpretation and preparation of contour maps
Exercises in layout of buildings and checking the same at site.

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.

Course Code		:	**AP-121**
Course Title		:	**Theory of Structures -I**
Semester (Year)		:	First (Year -1)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

To understand the basic principles of structural mechanics so that it forms the basis for study of structural design.

Syllabus:

Unit-1

Introduction to Statics: Forces, Law of parallelogram of forces, Law of triangle of forces, Polygon Law of forces, Resolution of forces, Resultant of number of concurrent coplanar forces, Condition of equilibrium, Moment of force, Moment and arm of couple, Theorems on couples.

Unit-2

Simple Stresses and Strains Elasticity, Stress, Strain, Types of stresses, Elastic limit, Hook's law, Modulus of elasticity, Modulus of rigidity, Bulk modulus, Stresses in composite bars/section, Modular ratio, Equivalent area of a compound section. Primary or Linear strain, Poison's ratio, Shear stress, Principal stresses and strains (for simple cases), Mohr's circle.

Unit-3

Centre of Gravity & Moment of Inertia: Definition, Methods of finding out centre of gravity of simple figures, Centre of parallel forces. Definition, Important theorems, Calculation of moment of inertia of different shapes and its application, Moment of inertia of composite sections.

Unit-4

Shear Force and Bending Moments Beams shearing force and bending moment, Shear force and bending moment diagrams for cantilever and simply supported beam, and overhanging beam.

Stresses in Beams Simple beams bending, Section modulus, Moment of resistance, Shear stress in section of beam.
Explanation of above with simple models

Suggested Books/Readings:

1. Wilson Forest, “Structure the essence of Architecture” Prentice Hall (latest edition).
2. Nautiyal B. D., “Introduction to Structural Analysis”, B.H.U.
3. Punmia P. C., “Strength of Materials & Mechanics of Structures”.
4. Khurmi R. S., “Strength of Materials”.
5. Senol Utku, “Elementary Structural Analysis”.
6. Rama Armarutham S., “Strength of Materials”.

Course Code		:	**AP-123**
Course Title		:	**History of Architecture –I (Culture & Vernacular)**
Semester (Year)		:	First (Year -1)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

The course broadly focuses on architectural products of various times and places within a broad chronological band.
To inform about various determinants of culture and context of the place of study
To understand the role of culture, beliefs, myths, politics, economics, geography, materials and climate etc. in shaping architectural intent of buildings.

Syllabus:

Unit-1
Ancient river valley civilizations
Egyptian: Geographical features of Nile Valley, development of cultural and religious beliefs-evolution of funerary architecture from Mastabas to Pyramids. Prominent case examples at Saqqara, Medun, Cheops and Giza, architecture of Mortuary & Cult Temples with case examples of Luxor, Ammon and Karnak, rock cut examples Abu Simbel etc.

Unit-2
Mesopotamian : Landscape and geographical description of fertile crescent, study of stages of civilization from early city states to Sumerian, Babylonian, Assyrian and Persian with prominent examples of Ziggurats at Ur, Urnamu etc.; Palaces and/or cities of Ur, Babylon, Khorsabad

Indus: factors contributing to the development of settlements along Indus Valley its extents and links with other civilizations of time, prominent features of civilization

Town Planning, residential and public buildings with case examples of cities of Mohenjodaro, Harappa, Lothal.

Unit-3
Classical Civilizations:
Significant Markers: **INDIA - Early Iron Age Civilization***:* Wooden Architecture of Indian Origins: Forest Dwellings, Kutiya and Grama. Beginning of Buddhist and Jain Architecture; 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.

Unit-4

Greece - Early Iron Age Civilizations: Minoan, Myceanean and Classical Greek
Minoan and Mycenean: Palace at Knosos, the Lion Gate, the appearance of the Megaron.
Greek City states – Athens, Delphi, Sparta; Evolution of the Temple; the Orders; the Parthenon.

ROME - Structural and Engineering Achievements: the arch, Vault and the dome; Temples: Pantheon; Arenas: Colloseum; Therma: Caracalla; Aqueducts; the forum and the basilica

Suggested Books/Readings:

1. Tadgel, Christopher History of Architecture in India Paperback – 6 Jul 1994
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. Rapoport, Amos, Human Aspects of Urban Form, Pergammon Press, New York, 1977
5. Shukla, D.N.; Vastu Shastra, Munshiram Mohanlal, New Delhi, 1993
6. Alexander, Christopher; A Pattern Language, Oxford University Press, New York, 1977
7. Lynch, Kevin; The Image of the City, Joint Centre Publication, USA, 1960

Course Code		:	**AP-125**
Course Title		:	**Building Material Science - I**
Semester (Year)		:	First (Year -1)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

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

Syllabus

Unit-1
Introduction to basic building materials: Clay and Clay products: mud blocks, Earth stabilized blocks, Burnt Bricks, terracotta tiles, brick ballast and *surkhi*, flyash blocks, concrete blocks.

Unit-2
Stones: types of rocks, classification of stones, Indian stones, region wise, Building stones, their characteristics properties and usage. Slates

Unit-3
Lime its properties occurrence in nature, manufacture of lime, its usage in buildings. Mortars- its components, function and properties- mud, lime mortars
Concretes- in Lime - its components, mixing ratios and use in various parts of buildings

Unit-4
Bamboo and other natural materials: Bamboo as plant classification, species, geographical distribution, Anatomy of Bamboo, Properties, strength, processing, harvesting, working of Bamboo tools – Treatment and preservation of Bamboo and uses of Bamboo.

Suggested Books/Readings:

1. Varghese P.C., "Building Materials", Prentice Hall of India put Ltd New Delhi, 2005.
2. Dunkelberg (K), "Bambus – Bamboo, Bamboo as a Building Material", Karl Kramer Verlag Stuttgart, 2000.
3. Gernot Minke and Friedemann Mahlke "Building with straw: Design and Technology of a
4. Sustainable Architecture", Birkhauser, Publisher for Architecture Berlin, Bostan, 2005.
5. Duggal S.K., "Building materials", Oxford and IBH publishing Co, put, Ltd, New Delhi, 1997.
6. Spencke R. F. and Cook D.J., "Building Materials in Developing Countries", John Wiley and sons 1983.
7. Ghosh D.N. Materials of Construction , Tata McGraw-Hill1989

Course Code		:	**AP-127**
Course Title		:	**Environmental Studies**
Semester (Year)		:	First (Year -1)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

Ecology and ecosystems- elemental what constitutes the environment,

Environment and its degradation- issues their causes and alleviation understand what are precious resources in the environment, how to conserve these resources,

Application of environmental planning in architecture

The role of an architect in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio- diversity.

Syllabus:

Unit-1
Description of concept of environment and ecology-need for public awareness Interaction among ecological factors as related to water, land, air light and temperature.

Factors Responsible for Change-Global Warming and climate change-loss of bio diversity, deforestation and desertification

Unit-2
Ecosystem: Its Structure, Function and energy cycles in ecosystem.
Ecological succession, Ecosystem development, Climax concept

Interrelation between natural and built environment in urban and rural settlements Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people

Land and soils: formation of soils, its types, basic features and properties as related to built environment.

Water and precipitation: sources of water and their degradation, water cycle, Prevention and control of water pollution,– Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems Conservation & management, impact of manmade environment on water.

Unit-3

Air and air pollution: its causes and impact on human settlements.
Control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: disaster management: floods, earthquake, cyclone and landslides. Environment protection act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act.

Unit-4

From unsustainable to sustainable development – urban problems related to energy.
Water conservation, rain water harvesting, and watershed management. Resettlement and Rehabilitation of people; its problems and concerns

Suggested Books/Readings:

1. Baructa E, 2004, textbook of environments courses of UG, courses, UGC University Press, Joseph, Benny, 2005, Env. Studies Tata Macgowhill.
2. Sharma P.D., "Ecology and Environment", Rastogi Publications, Meerut, India.
3. Perlman, D. and Miclder, J., "Practical Ecology for Planners Developers and Citizens", Island Press.
4. Platt, R.H., "The Ecological City: Preserving and Restoring Urban Bio diversity", N.Y. Academy of Sciences.
5. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education, 2004.
6. Aruba Kashia and Kashia C.P., "Perspectives in Environmental Studies" New age International (P) Ltd., New Delhi, 2005.
7. Venugopala Rao P, "Principles of Environmental Science and Engineering" Prentice Hall of India Pvt. Ltd., New Delhi, 2006.
8. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.
9. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007
10. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005
11. Richard T. Wright, "Environmental Science" Prentice Hall of India Pvt. Ltd., New Delhi, 2007

SYLLABUS- SECOND SEMESTER
(in continuation with approved scheme of examination and syllabus of semester- 1)

for

Bachelor of Architecture (B. Arch.)

Offered by
University School of Architecture and Planning and affiliated institutes

w.e.f. Academic Session 2018-19

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

www.ipu.ac.in

Course Code		:	**AP-102**	
Course Title		:	**Architectural Design - II**	
Semester (Year)		:	Second (Year -1)	
Contact Hours	per week	:	L: 0	S: 6
	per semester	:	L: 0	S: 96
No. of teaching weeks		:	**16**	
Credit		:	**6**	

Objective:

To learn designing Small building addessing all fundamental factors at an elementary level.

Syllabus:
One Single/ Double Family House or equivalent

Exercises` before beginning of Design (To be Taught)

- Making of Functional Programming from requirements of human domestic activities. Space Allocation according to Program (2Weeks)
- Form options, Use of simple Material order and building components. (e.g.Door Window Etc, Structural Options. Basic Building services (2Weeks)

Design Exercise

- Design Problem (10 Weeks)
  Conceptualisation and Design Development

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. Harris, Charles W. / Dines, Nicholas T.; Time Savers Standards for Landscape Architecture, Mc Graw Hill, USA, 1998
6. Gideon, Siegfried; Space, time & Architecture, Harvard University Press
7. Robert Powell, "Tropical Asian House", Select Books, 1999

Course Code		:	**AP-104**
Course Title		:	**Building Construction - II**
Semester (Year)		:	Second (Year -1)
Contact Hours	per week	:	L: 0 S: 5
	per semester	:	L: 0 S: 80
No. of teaching weeks		:	**16**
Credit		:	**5**

Objectives:

Learning Construction of a double storey Masonry Building with more than one habitable spaces.

Syllabus:

- Brick Work in Super structure
- RCC/RB Roofing and Terracing of the designed space using conventional techniques of construction. Detailed sections: Built over brick work in superstructure.
- Simple Straight flight staircase in masonry connecting two levels. Detail drawings
- Flooring Details
- Wooden Door and Window Design and Joinery Details

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 Wiely & Sons, New York, 1999
4. Punamia B.C., Building Construction, Laxmi Publications (P) Ltd, New Delhi, 1993
5. Chudley, R.; Building Construction Handbook, Butterworth Heinemann, Oxford, 1988
6. Arora, S.P., and Bindra, S.P., Text Book of Building Construction, Dhanpat Rai Publications, 2010
7. Ching, F.D.K., Building Construction Illustrated, Van Nostrand, Reinhold, 5th edition, 2014

Course Code		:	**AP-106**	
Course Title		:	**Architectural Drawing - II**	
Semester (Year)		:	Second (Year -1)	
Contact Hours	per week	:	L: 0	S: 3
	per semester	:	L: 0	S: 48
No. of teaching weeks		:	**16**	
Credit		:	**3**	

Objectives:

To equip students in 3D visualization by drawings
To develop presentation skills by rendering and graphic representation
To introduce computer aided drafting tools

Syllabus:

Architectural Drawing:

Introduction to basic terminologies and types of perspective drawing. One point and two point perspective drawings.

Sciography in plan, elevations and 3-D view.

Introduction to CAD (Basic commands) setting up drawing environment. (Drawing simple structures/ shapes in 2D)

Learning basic 2D commands their function and application. Lines, line types, scale, text, hatching etc. Working on layers and colors.

Suggested Books/Readings:

1. Gill, Robert W.; Manual of Rendering with Pen and Ink, Thames and Hudson, London, 1997
2. Agarwal, B. and Agarwal, C.M., Engineering Drawing, Tata McGraw-Hill.
3. Bhatt, N.D. and Panchal, V.M., Engineering Drawing, Charotar Publication.

Course Code		:	**AP-108**
Course Title		:	**Art and Architectural Graphics - II**
Semester (Year)		:	Second (Year -1)
Contact Hours	per week	:	L: 0 S: 3
	per semester	:	L: 0 S: 48
No. of teaching weeks		:	**16**
Credit		:	**3**

Objectives:

To develop techniques of expression of Ideas related to Architecture - Form Space Environment People.

Syllabus:

- Outdoor sketching, sketches of buildings to understand scale and proportion, rhythm, harmony. Light and shadows in building elements, buildings and surroundings.
- Demonstration of use of various presentation mediums and techniques
- Posters Collages Murals
- Exercise involving Water color – Water soluble color pencil – Tempera – Acrylic – Water soluble oil color – Oil color – Pen and ink –Brush – Air brush – Mixed mediums – Study of multi color and 3D effects from nature and built environment.
- Expression of ideas with diagrams and ideograms

Different modes of rendering for architectural presentation Rendering techniques with different textures, tones and colors

Suggested Books/Readings:

1. Jax Themier, B.W., "How to Paint and Draw", Thames and Hudson, 1985.
2. Bhattacharya, B. and Bera, S.C., Engineering Graphics, I.K. International

Course Code		:	**AP-110**
Course Title		:	**Workshop (NUES) - II**
Semester (Year)		:	Second (Year -1)
Contact Hours	per week	:	L: 0 S: 3
	per semester	:	L: 0 S: 48
No. of teaching weeks		:	**16**
Credit		:	**3**

Objectives:

To know to use traditional tools and to have hands on experience with materials and construction.

Syllabus:

- Introduction to carpentry tools, safety rules and precautions.
- Demonstration in basic carpentry various types of joints in wood, boards, MDF etc.
- Difference in joining wood by nailing and screws.
- Sheet metal work, fabrication, welding and foundry

Course Code		:	**AP-122**
Course Title		:	**Theory of Structures -II**
Semester (Year)		:	Second (Year -1)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

To understand the basic principles and applications of structural design with Masonry and Timber.

Syllabus:

Unit-1
Masonry Structures: Introduction: Characteristics of load bearing masonry structures, their merits, scope and limitations, Classification of bricks and mortars according to strength. Allowable stresses in masonry; effects of slenderness ratio, area and shape factors on allowable stresses.
Masonry Arches, Masonry Vaults & Masonry Domes: Conceptual study as compression structures. (Without design calculations)

Unit-2
Design of Simple two storied 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

Unit-3
Stresses in Trusses: Introduction, Perfect frame, Deficient frame, Redundant frame, Type of supports and their reactions, Analysis of cantilever and simply supported trusses by Analytical method, Method of sections, Graphical method.
Torsional Stress in Circular shaft: Introduction, Torsion in shafts - Pure torsion, Theory of pure torsion, Torsional moment of resistance, Assumptions in the theory of pure torsion, polar modulus, Power transmitted by a shaft, Torsional rigidity.

Unit-4
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).
Explanation of above with simple models

Suggested Books/Readings:

1. Nautiyal B. D., “Introduction to Structural Analysis”, B.H.U.
2. Punmia P. C., “Strength of Materials & Mechanics of Structures”.
3. Khurmi R. S., “Strength of Materials”.
4. Senol Utku, “Elementary Structural Analysis”.
5. Rama Armarutham S., “Strength of Materials”.

Course Code		:	**AP-124**
Course Title		:	**History of Architecture –II**
Semester (Year)		:	Second (Year -1)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

To understand various building typologies and landscape emerging out of different ideologies and Cultural practices in historical periods in India. To understand, primarily, the Essential, Conceptual Typological \similarities in spite of stylistic variations.

Syllabus:

Unit-: Budhdhist
Architecture of Buddhist origin
Stupas Chaityas and Caves Viharas Monasteries
Focus:Sanchi Karli Ajanta Ellora Saarnath Bodhgaya,
Others brief Ref.

Unit-2: Hindu Temple Architecture
Shrines Temples Complexes
North & East India Focus Guptas Orissa Khajuraho
Pilgrimage Centres Ghats and Plalaces Focus Varanasi
South Indian Focus: Chalukyas, Cholas and Chalukyas Vjaynagar Madurai

Unit-3: Islamic Architecture in India
Mosque Madrasaus Tomb Garden Fort Palace
North India Khaljis, Tughlaqs, Lodhis
Early Mughal Sher Shah
South India Golcunda Bijapur etc.

Unit-4 :
Mughal Architecture
Akbar, Shahjahan
Jaipur Lucknow Focus: Forts Palace Religious Institutions
Traditional Courtyard Typology

Suggested Books/Readings:

1. Tadgel, Christopher History of Architecture in India Paperback – 6 Jul 1994
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. Shukla, D.N.; Vastu Shastra, Munshiram Mohanlal, New Delhi, 1993

Course Code		:	**AP-126**
Course Title		:	**Building Material Science - II**
Semester (Year)		:	Second(Year -1)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

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

Syllabus:

Unit-1
Timber & Hardware
Classification, Characteristics, Defects, seasoning, Preservation, market forms of timber, conversion of timber typical timber species in India
Door Window Hardware-Hinges, Handles, Knobs, Bolts, L-drops, Locks, Stoppers, Stays, Silencers, Chain guards, Closers, Catchers, Knockers etc. in various materials.

Unit-2
Ply woods, fiber boards, Veneers, Lamin Boards, Batten Boards

Unit-3
Paints for woodwork, - Classification, Constituents, Characteristics of good paints, covering power, Preparation, Application of paints for various surfaces, Defects in painting,
Polishing and varnishes for wood work varnishes-ingredients, Process of varnishing woodwork

Unit-4
Glass- its manufacture, properties, and types-sheet glass, float glass, tinted and colored patterned glass, tempered glass (heat and shock resistant glass), heat reflecting glasse, multi layered glass, laminated glass, wired glass, use of films on glass, Glass blocks, glass tiles, mirrors, and Glass wool.

Suggested Books/Readings:

1. Varghese P.C., “Building Materials”, Prentice Hall of India put Ltd New Delhi, 2005.
2. Gernot Minke and Friedemann Mahlke “Building with straw: Design and Technology of a
3. Sustainable Architecture”, Birkhauser, Publisher for Architecture Berlin, Bostan, 2005.
4. Duggal S.K., “Building materials”, Oxford and IBH publishing Co, put, Ltd, New Delhi, 1997.
5. Spencke R. F. and Cook D.J., “Building Materials in Developing Countries”, John Wiley and sons 1983.
6. Ghosh D.N. Materials of Construction , Tata McGraw-Hill1989

Course Code		:	**AP-128**
Course Title		:	**Climatology**
Semester (Year)		:	Second (Year -1)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

To acquaint the students with underlying parameters of Human Comfort in relation to built environment
To apprise students of climate and its impact on buildings
To equip the students with strategies and techniques to regulate the impact of climatic factors in buildings

Syllabus:

Unit-1: Introduction to Climate and Climatology
Climate and Architecture, Elements of climate - solar radiation, temperature, wind, humidity & precipitation and their measurement, Climate types:
Global Climatic Zones, Tropical climate, climatic zones of India, Macro and Micro Climate, Development of traditional/vernacular architecture in response to climate

Unit-2: Heat
Thermal Comfort, Heat exchange process of human body, thermal comfort indices, Psychometric charts. Effective Temperature and isopleths, CET, Adaptive comfort, operative temperature

Building heat exchange: Sol Air Temperature, Solar Gain Factor, methods of heat exchange in buildings, 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. To interpret climatic data for design to determine potential strategies for achieving thermal comfort by design of building envelope:

Unit-3: Light
Sun path diagrams: concept and interpretation, Understanding the solar position of a place, azimuth, altitude, solar incidence, using shadow angle protractor for designing shading devices.
Daylight: Natural light, day light factor, concept of glare and glare index, determination of daylight factor using graphical techniques. Principles of day lighting in buildings

Unit-4:Air
Ventilation and air movement: wind chart, wind rose, Assessment of natural ventilation, Movement of air in and around buildings, WWR, Sizing and positioning of opening in buildings, Stack effect.

Building orientation and its impact on admission/exclusion of sun, air and daylight in buildings

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
4. Givoni B, Mariclimate & Architecture

Course Code		:	**AP-130**
Course Title		:	**Architecture and Writing**
Semester (Year)		:	Second (Year -1)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objectives:

Learning about writing as an important aspect in architectural academics and practice. Develop skill of writing for architectural purpose

Syllabus:

Unit-1: Basic Concepts and objectives of writing
Procedure – to tell how something is done
Description – to tell what something is like
Report- to tell what a class of things is like
Explanation – to give reason to why a judgment is made

Descriptive and Analytical writing in architecture

Unit-2: Communication
Writing as a medium of representation of Ideas, independently, and along with other media like drawing sketching and photography.
Technical communication,
Professional and Business Communication

Unit-3: Journalism
Understanding the scope of writing for diverse audience or readers.
For printed for theoretical Journals and commercial magazines, news items and event coverage like Exhibitions, Seminars.
Project description, Reviews. Web Content development for web based publications.

Unit-4: Knowledge
Documentation of works of Architects, Organisations and Architecture, Biographies.
Critical Appraisals, Book Reviews. Project reviews.
Writing of History and Theoretical studies
Research writing. Dissertation writing.
Publication, Concept of Authorship Plagiarism Copyright.

Suggested Books/Readings:

1. Paul-Alan Johnson; The theory of Architecture, John Wiley & Sons. Inc., 1993
2. ARQ: Architectural Research Quarterly, Cambridge University Press
3. Journal of Indian Institute of Architects, White Falcon Publishing
4. Journals of Landscape, Brijender S. Dua, C-589, Vikas Puri

C167

B.ARCH SYLLABUS, THIRD SEMESTER-YEAR 2

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

C/166

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

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

Syllabus:

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

Exercises before beginning of Design
(To be Demonstrated and Taught)
2Weeks working out Program/requirements for multiple interconnected functions.
1Week Basic options of grouping and arrangements of blocks. Horizontal and vertical interconnections between buildings and outdoor spaces.
12Weeks Design Problem
Conceptualization and Design Development

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

Suggested Books/Readings:

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

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

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

C/167

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

Objective:

Learning the process and techniques of RCC Construction

Syllabus:

Foundation plan for single storey portion and basement with

RCC raft foundation,

Foundation details,

Waterproofing of basement

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

Suggested Books/Readings:

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

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4/165

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

Objective:

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

Syllabus:

Basic commands for 2-D AutoCAD
Understanding of Text, and dimension styles etc, supported with suitable exercise

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

Understanding complex commands like Pline, spline, x-refs, Attributes, Model space & Paper space etc.
At least one working plan, elevation and section should be completed.

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

Suggested Books/Readings:

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

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C/162

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

Objective:

To learn skills of communication to an external audience, in addition to, the task of communication within the design process.
Intention of this course is to learn different techniques of representation and presenting ideas seamlessly. Teaching and learning will be 'hands on' in a studio format.
Skills will be acquired through a series of structured studio exercises.

Syllabus:

Studio assignments/exercises will be based on the following:

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

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

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

Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

Unit-1

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

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

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

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

Unit-2

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

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

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

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

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

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

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

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

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Unit-3

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

Unit-4

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

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

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

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

Suggested Books/Readings:

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

C/154

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

Objective:

To recognize the most important broad Categories of pre industrial Architecture of Europe during Medieval Period and Renaissance.
To identify import of these European styles in India during colonial periods.

Syllabus:

European

Unit-1
Early Christian Romanesque Architecture Byzantine,
Focus: Gothic Architecture in Continental Europe and England.
Great Cathedrals - Notre Dame, Canterbury

Unit-2
Renaissance
Early Renaissance, St. Maria Del Fiore, Florence
Late Renaissance, Michelangelo, Palladio. St. Peters Rome
Baroque, St.Pauls London, Neo Classical.

Unit-3
European Architecture in Colonial India -I
Goa Portuguese French Pondicherry Focus Forts Church

Unit-4
European Architecture in Colonial India-II
Madras, Calcutta, Bombay
Cantonments Hill Stations
Focus: Port Fort Church, Institutions, Bungalows, Barracks.

Suggested Books/Readings:

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

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

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

Syllabus:

Unit- 1
Cement: Manufacture, Properties, Types, Mix and usage.

Unit- 2
Aggregates and Admixtures: Aggregates: material, function properties and usage. Types-Fine, coarse and cyclopean

Unit- 3
Plain Cement Concrete: Properties, Mixing, Curing and usage
Reinforced Cement Concrete: Reinforcement- Introduction to Types, sizes and placement in beams. columns, lintels, slabs, cover, etc; Properties, Mixing, Curing and usage
Ferro-cement and fiber reinforced concrete.

Unit- 4
Properties of waterproofing materials, Bituminous and traditional materials for damp proofing and waterproofing
Properties of Insulation materials, Traditional heat Insulation materials for roofs and super structure

Suggested Books/Readings:

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

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C/151

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

Objective:

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

Syllabus:

Unit - 1
Water availability and Sources of Water, Water source development; rain, ground water, water bodies, sea water.
Distribution of Water- regional, urban, local, building. Storage of water, pressure- gravity and pumps, supply systems, piping, metering.
Water demand: Requirements of various uses, standards,
Water Quality and Treatment: standards of water quality, water treatment methods: primary treatment, secondary treatment.

Unit - 2
Terminology used in sanitation and drainages.
Collection & Conveyance of Sewage. Sewage Disposal at Urban level.
Conventional & Non-conventional methods of sewage disposal, low cost techniques of sewage disposal: CBRI, Sulabh Sauchalaya, etc
Sewage characteristics-Grey and black water
Primary treatment of sewage. Standards for sewage treatment, disposal and recycling.
Secondary Treatment of Sewage Filters, Activated Sludge Process, Decentralised Waste-water treatment systems (DEWATS), Ecosan, grey water treatment.

Unit -3
Sewers: Construction & Materials. Manholes: Construction, materials, Types, invert levels, spacing etc., other sewer appurtenances.
Sewage disposal through Septic Tanks & Soak Pits: System, Viability conditions, Advantages & Disadvantages.
Storm Water: Factors affecting storm water drainage: calculation of run-off, retention period, surface and piped drainage.

Unit -4
Systems of water supply in buildings. Hot water supply systems in building.
Domestic plumbing fixtures and accessories.
Piping layouts and detail layout plan of drains, traps, & fixtures for sanitation & drainage of residential, commercial and multi-storey buildings.
Rain water harvesting

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Solid Waste Management: Definitions. /Garbage/ Refuse Collection. Types of waste; segregation, recycling, composting. Waste as resource.
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 McGrew Hill Publishing Company Ltd., New Delhi (1994).
4. Panchdhari, A.C., Water Supply and Sanitary Installations, Design Construction and Maintenance, Wiley Eastern Limited 1993.

C/155

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

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

Syllabus:

Unit-1
What is Sociology,
Relation between sociology and architecture,
Classical and modern sociology and architecture, through some examples,

Unit-2
Concept of society and its types – rural and urban
Social Institutions – family, educational institutions, religion
Social interaction – verbal and non-verbal

Unit-3
Sociology of space and built environment, sociology of artifacts
Requirement of space for various social activities
Utilization of space in rural and urban areas

Unit –4
Marx's relation between structure and superstructure
Social production of space
Political economy of space; space as a social product;
Social history of built environment; space and power;

Suggested Books/Readings:

1. Sachdeva DR, Intro to Sociology, Vidya Bhusham Kitab Mahal
2. Giddens, Anthony, Sociology, Polity Press, Cambridge (UK), 2006
3. Porteous, J.D.; Environment Behaviour: Plng and Everyday Urban Life Addison Wesley, 1977
4. Rapoport, Amos, Human Aspects of Urban Form, Pergammon Press, New York, 1977
5. Anthony D. King (ed.), Buildings and Society: Essays on the Social Development of the Built Environment, London 1980
6. Low, Setha , Smith, Neil Ed. The Politics of Public Space1st EditionRoutledge New York 2006

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B.ARCH SYLLABUS, FOURTH SEMESTER-YEAR 2

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C/153

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

Objective:

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

Syllabus:

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

Exercises before beginning of Design

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

12 Weeks Design Problem
Conceptualisation and Design Development
Notes. The context study may be done to understand the socio-cultural and environmental impacts of context
Design problems should focus on articulation of building fabric and spatial organisation with reference to context.

Suggested Books/Readings:

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

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C/152

Course Code		:	**AP-204**
Course Title		:	**Building Construction – IV**
Semester (Year)		:	Fourth (Year -2)
Contact Hours	per week	:	L: 0 S: 5
	per semester	:	L: 0 S: 80
No. of teaching weeks		:	**16**
Credit		:	**5**

Objective:

Learning Construction of Predominantly Steel Frame buildings.

Syllabus:

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

Draw a site plan with external development details.

Design and details of following

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

Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

Project: Visualize a building.
Explore the potential of lights and camera and use the same in the model created for the final submission.

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

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

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

Suggested Books/Readings:

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

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C/150

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

Objective:

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

Syllabus:

Studio assignments/excrcises will be based on the following:

Exploring different graphic techniques and mediums of representation.

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

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

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

Suggested Books/Readings:

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

C/149

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

Objective:

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

Syllabus:

Unit-1

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

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

Unit-2

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

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

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

Unit-3

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

Unit-4

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

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

Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

Unit-1
Introduction to "Modernity" "Modernization" "Modernism",
Cultural Technical & Territorial Transformations.(Kenneth Frampton)
Modern Architecture Industrial Revolution New Materials,
Concrete, Iron & Steel and Glass.
Crystal Palace England Eiffel Tower Paris

Unit-2
Neo Classical,
Chicago School
Art Nuevo Art Deco
Frank Lloyd Wright

Unit-3
Beux art Le Corbusier
Walter Gropius Mies Van Der Rohe
Japanese Kenzo Tange Tadao Ando

Unit-4
Post Modern
Venturi James Sterling etc.
Neo Rational Focus Aldo Rossi etc.
Late Modern Eisenman etc
Rem Koolhaas Zaha hadid etc.

Suggested Books/Readings:

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

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

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C/46

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

Objective:

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

Syllabus:

Unit- 1

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

Unit- 2

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

Unit- 3

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

Unit- 4

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

Suggested Books/Readings:

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

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C/145

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

Objective:

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

Syllabus:

Unit 1

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

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

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

Unit 2

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

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

Unit 3

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

Unit 4

Noise & Noise Control (Methods & strategies)
Absorption, Transmission
Transmission Loss
Sound Absorbing material & Application techniques (Wall, Ceiling floor)
Acoustical Design consideration for enclosed spaces – Auditorium, Music Rooms, Seminar hall, lecture hall etc.

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Suggested Books/Readings:

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

C/143

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

Objective:

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

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

Syllabus:

Unit 1
Household Studies; - Place identity, Place attachment
Ethno-archaeological Studies; (focus on civilization)
Social Organization and Dwelling Form: Privacy, Neighborhood space, crowding

Unit 2
Cultural organization and built environment
Concept of culture and its elements - material and non-material culture Material culture- buildings, artifacts, etc.
Non-material - Folkways, Norms, Mores, Values, Laws Culture as adaptive screen between environment and man
Cultural Identity, Cultural Diversity, Cultural relativism, Ethnocentrism, Cultural universals

Unit 3
Theory of proxemics
Social Symbolic Accounts; Structuralism;
Spatial perceptions arising out of basic human needs and learning processes

Unit 4
Metaphorical Approaches;
Theories of Ritual; (more focus on built form)
Phenomenological perspectives

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Suggested Books/Readings:

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

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B.ARCH SYLLABUS, FIFTH SEMESTER-YEAR 3

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

Objective:

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

Syllabus:

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

Exercises before beginning of Design
4 Weeks Detailed Study of few Examples
Study of relevant systems of spatial organization, services, structure and form.

Formal Typological Options.
(could be distributed as necessary)

12 Weeks Design Problem
Conceptualization and Design Development

Suggested Books/Readings:

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

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

Objective:

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

Integration of services.

Syllabus:

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

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

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

Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

Vertical and Horizontal Loading

Unit-1

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

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

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

Unit-2

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

Unit-3

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

Unit-4

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

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Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

Unit-1
Beginning of Modern Institutionalization of Architecture in India (Academic & Professional) J.J. School of Architecture, Indian Institute of Architecture PWD's early works

Unit-2
Import of Modernism in India
Corbusier, Chandigarh
Louis Kahn IIM

Unit-3
Habib Rehman, A.P. Kanvinde,
Charles Correa
Balkrishna Doshi
Joseph Allen Stein,
Case Studies of Selected Contemporary Indian Architects. (Internal Assessment)
Public Housing in Delhi DDA

Unit-4
Regionalism:
Focus: Examples Raj Rewal and others
Architecture and Alternative Technology Laurie Baker and Others
Globalisation: New Urban Architecture Corporate Organisations
Noida Gurgaon Delhi
Focus: Exmaples Hafeez Contractor, others
Architecture responding to issues of Conservation and Sustainability

Suggested Books/Readings:

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

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

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

Objective:

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

Syllabus:

Unit 1
Aluminum: Manufacture and its environmental impact, Properties, Types of AL sections and sheets and their usage in buildings

Unit 2
Plastic: plastic (monomers and polymers), Acrylics, Nylon, PVC, Bakelite, Polythene, poly-carbonate, poly ethylene, neoprene, EPDM rubber, glass fiber reinforced plastic in construction industry with its properties. Manufacturing process and its environmental impact

Unit 3
Acoustic materials
Properties of acoustic materials, various acoustic materials used in buildings for wall/roof assemblies and building components
Environmental impact evaluation of manufacture and use of acoustic materials

Unit 4
Water proofing materials
Properties of waterproofing materials, various types water proofing materials used in buildings for foundations, wall and roof assemblies- admixtures, additives, acrylics, sealants-poly-sulphides, adhesives and glues used in building industry.
Environmental impact evaluation of manufacture and use of water proofing materials

Suggested Books/Readings:

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

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

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Course Code		:	**AP-327**
Course Title		:	**Energy and Fire Safety-I**
Semester (Year)		:	Fifth (Year -3)
Contact Hours	per week	:	L: 2 S: 0
	per semester	:	L: 32 S: 0
No. of teaching weeks		:	**16**
Credit		:	**2**

Objective:

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

Syllabus:

Unit-1
Introduction of concepts, techniques and technologies related to use of electrical energy in habitation, elementary ideas of demand generation, distribution, and costs of electrical energy.

Unit-2
Electricity transmission.
AC& DC
Distribution system (LT) and (HT)
Earthing
Planning Electric Sub-Station
Safety Devices (Fuses,MCBS,ELCBS)
Captive power generation (DG set) , UPS, Inverter.
Lightning arrestors,

Unit-3
Triangle of fire, Materials to be used in construction, Staircases, Fire escape distances for different buildings, Fire spread in Buildings, Fire doors, Basements, Lifts, Electrical Sub-station, AHU Shut off, NBC Rules for fire.
Fire safety standards and requirements for various types of Buildings.
Fire alarm system and components, Hydrant System and Components, Pump house and location.
Wet riser system, down comer system and Sprinkler Systems for fire Fighting services.
Security System, Access Control System, Intruder detection and CCTV systems.

Unit-4
Lifts, Escalators and travelators- capacity speed and space standards for their use in buildings.

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Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

Unit- 1
Area calculations: Types of areas taken for estimation plinth areas, plot area, built up area. covered area etc.
Different types of estimates to be prepared. Preliminary estimates, detailed estimates etc.

Unit - 2
Methods of taking out quantities, width, length and depth calculations by long wall & center line methods. Units of different items, for quantity estimations.
Modes of measurement of works on site. Measurements methods of various items, deductions for opening etc. Addition of wastages to the measure

Unit - 3
Preparation of preliminary and detailed estimates working out estimates for a buildings whose plans, section and elevations are given.
Working out cost of construction based upon the plinth area rates, covered area rates etc.
Rate analysis of various items concrete, RCC brickwork etc. using the market rates CPWD (97) of materials and labor.
CPWD schedule of rates latest edition of 1997. Rates as given in schedule to be used as guidelines for making estimates.

Unit - 4
Use of computers for generating Bill of Quantities
Calculates the cost of the building based on the market rates and working out the rate per sq.mtr. area of the building.

Suggested Books/Readings:

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

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

Objective:

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

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

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

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Course Code : **AP-341**

Course Title : **Art and Design Disciplines-I**

Objective:

The course is to introduce and explore various modes of expression and communication of creative idea, other than architecture proper. This may include textual, graphic and performing mediums like films and theatre etc of various natures as complements to learning of architecture. The course also underlines the interconnections across various design oriented disciplines and explores the alternative modes of expression of the same idea.
The course would have short exercises and assignments for assimilation of skills and bringing together the knowledge learn to the drafting table. To think "out of the box" and to move away from various preconceived notions.

Syllabus:

To engage in personal inquiry, action and reflection on specific topics and issues
To focus on and demonstrate an understanding of the areas of interaction.
To reflect on learning and share knowledge, view and opinion. To develop the ability to appraise work and evaluate performance realistically, and using this evaluation to improve and adapt to their learning strategies.
To work in groups and to consider each others' strength and different points of view.
To develop communication skills of essay, creative writing, as well as other appropriate forms of expression to suite various context.
To build a higher though process cr3eqtively generation new ideas and considering issues from multiple viewpoints.
To transfer skills, including the ability to make connections across subjects and apply skills and knowledge in unfamiliar situations.

Course Code : **AP-343**

Course Title : **Urban Issues-I**

Objective:

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

Syllabus:

Teaching would be based on case studies which will explore important contemporary urban issues: dealing with expanding cities, dealing with poverty, informal settlements, conserving heritage, mixed land use, traffic and transport, urban services, urban regulation and management, urban form, and identity, concept of city in the arts, environmental sustainability etc.
The work may be undertaken individually or in groups. It will require observation, survey and research leading to strategic understanding/propositions in response to the case-studies.

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

Objective:

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

Syllabus:

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

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

Objective:

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

Syllabus:

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

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Course Code : **AP-349**

Course Title : **Landscape Architecture-I**

Objective:

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

Syllabus:

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

Horticulture: Plant classification and nomenclature, Trees, Shrubs, Ground cover, Indoor plants plant identification, Plants for terrace gardens and vertical gardens
Plant Material: A study of Indian vegetation, its characteristics and design aspects
Characteristics and Use of Plants
Characteristics of various types of plants and their suitability of landscaping, plant selection criteria. landscape design elements and principles.

Services related to landscape:
Plumbing
Electrical
Sewage management
Water supply

Elements of landscape architecture
Land
Water
Vegetation
Study and detailing of hard and soft landscape
Ecological and environmental aspects of landscape design Grading and Slopes

Course Code : **AP-351**

Course Title : **Visual Communication**

Objective:
To expand general understanding of the efficient use of various media and mixed media rendering so as to prepare students for the higher levels of design thinking communication
Exposure to various media and mixed media in art productions through practical projects.
To develop skill in still photography and video

Syllabus:

Advanced exposure in fine arts – pencil and charcoal sketching, mixed media rendering, water colour compositions and primary use of acrylic / oil colours; alternative media work such as glass painting, fabric painting; tile painting
Advanced aspects of visual cognition, psychological responses of humans; Art, design, architecture
Image manipulation using computer software for graphics animation tools-Photoshop and Flash
Study of essentials of still photography and the camera with its various functions such as aperture

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

Course Code : **AP-353**

Course Title : **Interior Design-I**

Objective:

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

Syllabus:

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

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

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

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

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B.ARCH SYLLABUS, SIXTH SEMESTER-YEAR 3

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

Objective:

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

Syllabus:

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

Exercises before beginning of Design
4 Weeks Detailed Study of few Examples
Study of Site planning, Movement Structure, functional distribution , services.
Site Analysis

12 Weeks Design Problem

Conceptualization and Design Development

Suggested Books/Readings:

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

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

Objective:

Working Drawing

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

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

Syllabus:

Comprehensive working drawings of a previously designed project.

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

Design details carrying forward their architectural design studio thought

Suggested Books/Readings:

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

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

Objective:
To understand Elementary of Structural Systems

Syllabus:

Unit-1
Analysis of Simple portal frames for horizontal loads by Portal Method

Unit-2
Structural systems studies: functions of structural system in building, horizontal support systems (Floor systems) and Vertical support systems (Columns and walls).
Floor systems; various types, Beam and Slab systems, Waffle slab systems, Flat slab and Flat Plate systems, Grid floors.

Unit-3
High Rise buildings: Principles of high rise structures Forces on a high rise building, Effects of horizontal loads in a high rise building. Shear walls system; functions, types, Frames acting Along with Shear walls, Tube systems, advantages and disadvantages of each.

Unit-4
Introduction to Computer Analysis of building frames. Merits of computer methods of analysis and design compared to manual methods.

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

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

Suggested Books/Readings:

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

C/120

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

Objective:

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

Syllabus:

Unit-1
Introduction to Building Bye-Laws What are building bye laws, the need of building bye laws Types of bye-laws, building control laws for elevation control, zoning bye laws, height controls etc.

Unit-2
National Building Codes and Services, types and importance of National Building codes Difference between NBC and building byelaws Bye laws related to fire safety, HVAC and services.

Unit-3
Delhi Building Bye-Laws and modified Building Bye-Laws Comprehensive study of Building Bye-laws relating to the strength and stability of structures, bye-laws relating to light and ventilation, sanitation and Buildings.

Unit-4
Implications of Development Controls
Role of Development Authorities and Municipal Corporations

Suggested Books/Readings:

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

C/119

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

Objective:

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

Syllabus:

Unit-1
Introduction to Air Conditioning, Sensible heat, Latent heat, Specific Humidity, Relative Humidity, Ton (TR). Comfort, Psychometrics, Adaptive comfort.
Refrigeration Cycle, Understanding Principles of Air-conditioning.
Heat Load Estimation, Understanding constituents of heat load calculations like wall, glass, roof, partition equipment, fresh air, lighting & occupants (Mathematical calculations are excluded).

Unit-2
Non-Ducted System (Window Units & Split Units), Construction details, installation practices & application.
Ducted systems (split units & package units), Construction details, installation practices & application
Direct expansion and chilled water systems. Types of compressors air-cooled & water cooled condensers, introduction to cooling tower air handling unit, fan coil unit, pumps, Hot water generator and chilled/ condenser water piping.

Unit-3
Brief introduction to variable air volume water volume and vapor absorption system.
Fresh Air, Sick building syndrome, Indoor air quality and importance of fresh air.
Application, Brief introduction to air conditioning system design in hotels, Hospital and commercial buildings. Integration of building design strategies with HVAC
Ventilation Systems, Basement ventilation, Car park ventilation, Toilet/pantry ventilation, Introduction to air-cooling system.
Site visit/ HVAC working/SHOP org. required to be shown to student

Unit-4
Building Automation Systems, Introduction: System architecture, sensors, controllers, energy management functions, (duty cycling, night cooling, time scheduling, optimum start/ stop, maximum demand limiting etc., Application, future trends.
Elevators, Introduction, passenger lift, goods lift, service lift, hospital lift, waiting time analysis and introduction of IS codes

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Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

Unit-1

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

Unit-2

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

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Unit-3

Solar Passive Heating

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

Unit-4

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

Suggested Books/Readings: .

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

C/115

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

Objective:

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

Syllabus:

Unit- 1
Specifications: Definitions, importance, composition of speces, Broad classification of speces, role in a contract document.
Open, restricted specification. Advance & disadvantages of each Standard, special master specification.
Nature, advantages & disadvantages of each.
Streamlined specification – Nature, advantages & disadvantages of each. Types of Technical Specification and provision of each. General provision of specification- Definitions abbreviations.

Unit - 2
Legal + public relations, prosecuting progress, measurement + payment. Specification writing - format style, principles of good specification, merits and demerits.
Scheduled and non-scheduled items, CPWD specification for carriage of materials, CPWD specification for mortars, CPWD specification for brick work, CPWD specification for concrete, CPWD specification for flush doors, CPWD specification for whitewash, distemper, CPWD specification for synthetic paint.

Unit - 3
Contract: Contractor – definition, essential's types of contracts: Types of contracts: Item rate, percentage rate, Advantage & disadvantages of each.
Types of contracts: Lump sum, labour, materials supply-nature advantages and disadvantages. Types of contractor- cost+ percentage, Cost + fixed fee, other types. Advantage & disadvantages.
Tender, forum, N.I.T, examples, Global tender, sale, opening, Corporative statement, informal tenders.

Unit - 4
Conditions of agreement and contract: Acceptance of tender, contract DOX, Earnest Money Security Money Retention Amount, other important conditions.
Duties of owner, Contractor & liabilities of each.
Duties of the Architect/ Engineer and his liabilities w.e.f. the contract.
Case studies of recent Arbitration in the Industry, Duties of Contractor & liabilities.

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Suggested Books/Readings:

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

C/113

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

Objective:

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

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

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

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

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Course Code	:	**AP-342**
Course Title	:	**Art & Design Discipline-II**

Objective:

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

Syllabus:

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

Course Code	:	**AP-344**
Course Title	:	**Urban Issues-II**

Objective:

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

Syllabus:

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

C/III

Course Code	:	**AP-346**
Course Title	:	**Advance Construction Technologies-II**

Objective:

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

Syllabus:

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

Course Code	:	**AP-348**
Course Title	:	**Ecology & Environmental Issues-II**

Objective:

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

Syllabus:

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

Course Code	:	**AP-350**
Course Title	:	**Landscape Architecture-II**
Semester (Year)	:	Sixth (Year -3)

Objective:

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

Syllabus:

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

Europe
Renaissance; Garden design of the modern world

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

Landscape Design
Landscape design for various building types, landscaping parks and roads, rock gardens,
Formal and informal landscape design,
Water and man-made elements in landscape, garden furniture and embellishments
Unit-4 Landscaping of Functional Areas
Urban open spaces and principle of urban landscape; Street landscaping, landscape design for Water front areas and functional areas in urban centers; interior and terrace and vertical gardens

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

Suggested Books/Readings:

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

Course Code : **AP-352**

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

Objective:

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

Syllabus:

Theory of programming language, with elementary exercises
Principles of parametric generation of form, exercises in two dimensional form generation using first order parameters
Exercises in parametric generation of form using second order parameters

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Course Code : **AP-354**

Course Title : **Interior Design -II**

Objective:

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

Syllabus:

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

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

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

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B.ARCH SYLLABUS, SEVENTH SEMESTER-YEAR 4

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

Objective:

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

Syllabus:

Mass housing or Residential sectors and enclaves.

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

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

Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

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

Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

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

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

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

Objective:

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

Syllabus:

Unit-1

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

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

Unit-2

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

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

Unit-3

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

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

Unit-4

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

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

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

Suggested Books/Readings:

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

C/102

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

Objective:

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

Syllabus:

Unit-1
Introduction: Elements of Human Settlements – human beings and settlements – nature shells&.Net work – their functions and Linkages – Anatomy & classification of Human settlements – Locational, Resource based Population size & Occupational structure.

Unit-2
Forms of human settlements: Structure and form of Human settlements – Linear, non-linear and circular -- Combinations –reasons for development – advantages and disadvantages – case studies – factors influencing the growth and decay of human settlements.

Unit-3
Planning concepts: Planning concepts and their relevance to Indian Planning practice in respect of Ebenezer Howard –Garden city concepts and contents – Patrick Geddes – Conservative surgery – case study – C.A.Perry – Neighborhood concept Le Corbusier -- concept and case studies

Unit-4
Planning Problems: Identification of planning problems of land-use distribution and change, communication system, overcrowding, slums, sporadic growth and conurbation.

Regional Planning: Concept of regional planning, types of regions, locational factors of settlements etc.
A critical review of regional theories.

Suggested Books/Readings:

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

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

Objective:

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

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

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

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

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Course Code : **AP-441**

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

Objective:

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

Syllabus:

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

Course Code : **AP-443**

Course Title : **Building Economics**

Objective:

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

Syllabus:

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

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

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

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

value, Purpose of valuation, wealth tax, capital gain, etc, methods of valuation, land and building method, rent capitalization method, belting method, etc.

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

Objective:

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

Syllabus:

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

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

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

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

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

Objective:

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

Syllabus:

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

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

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

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

EIA: Definition and need, Role of EIA in design and decision making process, methods, advantages and limitation.
Environmental impact of building materials
Eco friendly building materials, their composition, production and recycling, physical properties

Course Code : **AP-449**

Course Title : **Contemporary Processes in Architecture**

Objective:

To investigate various theories of media and its influence on the perception of space
To study the various aspects of Digital Architecture and its exploration through emerging phenomena that relies on abstraction of ideas.
To study the works of contemporary architects who have illustrated the influence of the digital media in evolving architecture. This is to be presented as Seminars.

Syllabus:

Introduction
Investigation of contemporary theories of media and their influence on the perception of space and architecture
Technology and Art – Technology and Architecture – Technology as Rhetoric – Digital Technology and Architecture

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

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

Geometries and Surfaces
Fractal Geometry – Shape Grammar - Hyper Surface - Liquid Architecture – Responsive Architecture

Seminar
Students would make presentation on the ideas and works of the following architects. The proposal must be discussed with course faculty prior to presentation. Greg Lynn, Reiser + Umemotto, Lars Spuybroek
/ NOX Architects, UN studio, Diller Scofidio, Dominique Perrault, Decoi, Marcos Novak, Foreign Office
Architects, Asymptote, Herzog and de Meuron, Neil Denari

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C/97

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

Objective:

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

Syllabus:

Introduction to GIS and Remote sensing

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

Parametric design
Advanced graphic software's

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

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

Objective:

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

Syllabus:

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

C/96

Course Code : **AP-455**

Course Title : **Intelligent Buildings**

Objective:

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

Syllabus:

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

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

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C/95

B.ARCH SYLLABUS, EIGHT SEMESTER -YEAR 4

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C/94

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

Objective:

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

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

Exercises before beginning of Design
2-4 Weeks Significance of Public Domain.
Elements of Physical Urban Structure Morphology and Typologies. Urban Service Networks.

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

Suggested Books/Readings:

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

C/93

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

Objective:

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

Syllabus:

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

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

Suggested Books/Readings:

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

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C/92

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

Objective:

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

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

Syllabus:

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

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

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C/91

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

Objective:

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

Syllabus:

Unit-1

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

Unit-2

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

Unit-3

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

Unit-4

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

Suggested Books/Readings:

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

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C/90

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

Objective:

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

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

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

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

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

Objective:

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

Syllabus:

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

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

Objective:

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

Syllabus:

Introduction to housing and housing issues
Indian context
Housing and its importance in Architecture and its relationship with neighbourhood and city planning

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

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

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

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

Suggested Books/Readings:

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

Course Code	:	**AP-446**
Course Title	:	**Earthquake Resistant Architecture**

Objective:

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

Syllabus:

Fundamentals of earthquakes

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

Site planning, performance of ground and buildings

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

Seismic design codes and building configuration

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

Various types of construction details

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

Suggested Books/Readings:

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

Course Code	:	**AP-448**
Course Title	:	**Universal Access Enabled Environment**
Semester (Year)	:	Eighth (Year-4)

Objective:

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

Objectives of subject are

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

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

To explain the different types of disability

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

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

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

national and international level work that has been done.
Cover different aspect of Human – Environment Interaction system and techniques of way finding for creation of a psycho – physiologically responsive environment.

Syllabus:

Importance and need for Barrier Free Design; Defining Barrier and dimensions of Barrier - physical, psychological and social; Types of Disability; Approaches towards Disability: Medical Model and Social Model; Universal Design principles and aspects; Study of Human-Environment Interaction system;
Development of Barrier Free initiatives taken across the globe; Norms and Standards for Barrier Free Design; anthropometrics; Access Audits; approach and methodology; Simulation Exercise; Best Practice in Barrier Free Design; Design Consideration for Internal and External Environment - site planning, parking, approach to plinth levels, corridors, entrance and exit, windows, stairways, lifts, toilets, signage, guiding and warning systems, floor materials. Design elements outside the building – accessing footpath from road and public facilities, signage;
Constitutional and Statutory provisions to implement Barrier Free Design; Barrier Free transportation; Barrier Free Tourism;
Access Audit- case study and giving design solution to an existing environment

Suggested Books/Readings:

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

Course Code : **AP-450**

Course Title : **Industrial Architecture**

Objective:

To highlight the importance and need for Designed Industrial environment for improved working and effective use of machineries to enhance the production levels.
To create awareness among students regarding psychology of workers highlighting the fact that good working environment can enhance the productivity and quality of products.

Syllabus:
A brief introduction to history of Industrial Architecture
Role of Architects in the design of modern Industrial Buildings
Planning process and considerations in the development of master plan including site selection and site layout, need of Environmental impact assessment in project feasibility reports.
Industrial design requirements
Design for Loading / unloading area.
Design considerations in development of industrial buildings considering:
Production and flow diagrams, need for flexibility and compliance of design;
Structural system suitability and the criterion for adopting it in design;

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

Suggested Books/Readings:

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

Course Code : **AP-452**

Course Title : **Advanced Computing**

Objective:

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

Syllabus:

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

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C/84

Course Code	:	**AP-454**
Course Title	:	**Architectural Conservation**

Objective:

The field of Architectural Practice is intensely interdisciplinary in nature and the aspects of Heritage Conservation or Historic Precinct is one of the inseparable components to be taken into consideration, hence it is most inevitable to include the aspects of Heritage Conservation in the Architectural Pedagogy. The Discourse at the graduate level though should be focused on optimum Sensitization of the students on the above aspects of both Tangible and Intangible Heritage.
To introduce the various issues and practices of Conservation
To familiarize the students with the status of conservation in India and the various agencies involved in the field of conservation worldwide and their policies.
To outline the status of conservation practice in the country and the various guidelines for the preservation, conservation and restoration of buildings
To inform the students about the character and issues in our heritage towns through case studies

Syllabus:

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

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

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

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

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Conservation Planning

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

Suggested Books/Readings:

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

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

Objective:

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

Syllabus:

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

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

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

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

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

Suggested Books/Readings:

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

C/81

B.ARCH SYLLABUS, NINTH SEMESTER-YEAR 5

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C/88

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

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

Objective:

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

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

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

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

Requirements:

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

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The students would be evaluated based on the following criteria:

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

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B.ARCH SYLLABUS, TENTH SEMESTER-YEAR 5

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

Objective:

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

Syllabus:

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

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

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

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

Objective:

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

Syllabus:

Unit-1
Understanding who is a professional and why architecture is considered a profession.
The architects Act 1972. Process of Registration.
Rules, Regulations and guidelines of council of Architecture. Code of professional practice, Fees, Agreements and contracts, categories of membership, election procedure and code of conduct

Unit-2
Role of professional bodies and institutions - Indian Institute of Architecture.
Economic reality of practicing the profession in India.
Scale of charges – responsibilities of architect, copy-rights, scale of charges, variation of charges, mode of payment, termination of services.

Unit-3
Conditions of Engagements and Professional liability and indemnity.
Architecture competitions and getting work. Negotiation and Arbitration. Indian Arbitration Act.

Unit-4
Architect's office and organizational structure, responsibilities, office management, project coordination between client, consultant and project managers, office accounts and billing. Office automation, information, storage and retrieval.

Suggested Books/Readings:

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

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