

SCHEME OF EXAMINATION AND SYLLABI

for

Bachelor of Architecture (B. Arch.)

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

w.e.f. Academic Session 2018-19



**Guru Gobind Singh Indraprastha University
Sector 16-C, New Delhi – 110078 [India]
www.ipu.ac.in**

University School of Architecture and Planning (USAP)

The University School of Architecture and Planning (USAP) of the Guru Gobind Singh Indraprastha University (GGSIPIU) 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 programme 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
		1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	
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	

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	

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	

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	

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. Learning 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, Mycenaean and Classical Greek

Minoan and Mycenaean: Palace at Knossos, 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 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-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 Milder, 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 addressing 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:- Buddhist

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 Palaces Focus Varanasi
South Indian Focus: Chalukyas, Cholas and Chalukyas Vjajnagar Madurai

Unit-3: Islamic Architecture in India

Mosque Madrasaus Tomb Garden Fort Palace
North India Khaljis, Tughlaqs, Lodhis
Early Mughal Sher Shah
South India Golconda 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 Sustainable Architecture”, Birkhauser, Publisher for Architecture Berlin, Bostan, 2005.
3. Duggal S.K., “Building materials”, Oxford and IBH publishing Co, put, Ltd, New Delhi, 1997.
4. Spencke R. F. and Cook D.J., “Building Materials in Developing Countries”, John Wiley and sons 1983.
5. 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, McGraw Hill, USA, 1998
4. Givoni B, Microclimate & 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