

Dr. Babasaheb Ambedkar Technological University, Lonere,  
Raigad

Proposed Syllabus for Bachelor of Architecture

First Year Architecture

From July 2017

## PREAMBLE

The academic council of **Dr.Babasaheb Ambedkar Technological University** aims at bridging the gap between the **Industry and the Institute** by framing a syllabus on the **Guidelines of Council of Architecture, India** and fine tuning the same with respect to the requirements of the building industry at the international and national level.

The students emerging out of the graduate level should be sound enough to proceed to masters in any part of the world and in any specific subject of his Masters on one hand and be suitable enough to support any good architectural practising office across the globe or alternatively has a platform to take off his own Professional Practice.

**The Education is desired to be oriented to equip students with modern skills and techniques of designing structures and detail them further with precise constructional details, use of most suitable materials, examine the sustainability attributes and further specify the process of implementation with the value addition of conservation of energy flavoured with modern architectural concepts giving justice to the various spaces (within and around the built form),they are meant to perform.**

The architectural institutes shall also educate the students on their **responsibility as a professional**, to create designs that shall adhere to all **the local regulations and laws of the land** and should provide **updated knowledge of procedures** to be followed from work commencement to completion.

The graduate course(B.Arch) shall be of Ten semesters(stage I & stage II) and the detailed subject wise pattern enclosed along with this preamble shall be strictly adhered to. The Council of Architecture stipulates that maximum students in each class be 40 only and sections may be added for additional intakes.

The libraries shall be equipped with internet facility with a computer lab to provide students networking opportunities with other Institutes/Universities across the world. Facebook /Twitter/Blogs/any other social media tool shall be used to create data that may be required time and again as student/faculty flow year on year.

The Institution shall encourage exchange programs of faculty and students with other Universities in India and abroad to help develop them and their valuable suggestions can be discussed and debated during BOS meetings to modify/amend syllabus or exam pattern if required.

**Emphasis shall be given to live site visits, interactions with the client's promoters, contractors and also approving authorities and project managers to get feedback on drawings, details, specifications, selection of materials, techniques of constructions.**

The institutes are expected to conduct **seminars on newer technologies and materials** by inviting players from the market/industry and faculty and the students should take it further through **interactive workshops**. The institutes shall also encourage students to attend conference and conventions of architectural organizations within India and Abroad.

The Institute shall guide students to leading architectural offices within and outside the Country for the internship course at stage I and shall conduct interactive feedback workshops for exchange of ideas and experience of the building industry and professional office working. The subject of Professional Practice shall be constantly updated based on changing trends and their expectation from professional architect's .Inviting leading architects to share on the above subject within the institute may help imbibing confidence within out-going graduates.

The BATU syllabus is composed by team of experts after thorough examination and comparative analysis of syllabi of colleges of architecture in India and intends to further modify or amend that may be required by the foreign universities offering BATU their accreditation in order to respond to rapidly changing industry, society and environment, national and international economic dimensions.

The Above architectural technology benchmark statement shall/may reflect these changes in the context of the building Industry, including the need to produce graduates that are employable yet adaptable, agile and flexible to respond to future challenges and changes.

### List of Abbreviations

Sr.No.	Acronym	Full form
1	TH	Theory
2	SWT	Sessional Work with Assessment
3	SV	Sessional Work with Viva
4	L	Theory Lecture
5	S	Studio
6	IA	Internal Assessment
7	MSE	Mid Semester Exam
8	ESE	End Semester Exam

## First Year Bachelor of Architecture

### Semester -1

		Marking Scheme				Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MSE	ESE
AR1010001	Architectural Design Studio-1	100		0	2	2	0	20	20	60
AR1010011	Architectural Design Studio-1			200	5	0	10	80	0	120
AR1010002	Basic Design and Visual Arts-1			100	2	0	4	40	0	60
AR1010003	Architectural Drawing and Graphics-1 (Manual)	100		0	2	1	2	20	20	60
AR1010013	Architectural Drawing and Graphics-1 (Manual)			150	2	0	4	60	0	90
AR1010004	Building Construction Technology and Materials-1	100		0	2	2	0	20	20	60
AR1010014	Building Construction Technology and Materials-1			150	2	0	4	60	0	90
AR1010005	Environmental Science-1 (Focus on Built Form )	100	0		1	1	0	20	20	60
AR1010015	Environmental Science-1 (Focus on Built Form )		50		1	1	0	20	0	30
AR1010006	History of Architecture-1	100	0		1	1	0	20	20	60
AR1010016	History of Architecture-1		50		1	1	0	20	0	30
AR1010007	Model Making Workshop-1 (Basic)		100		1	0	2	40	0	60
AR1010008	Personality Development			100	1	0	2	40	0	60
AR1010009	Elective (Any 1)									
AR1010019	Cultural influences on Architectural Design			100	1	0	2	40	0	60
AR1010029	Art in Public Spaces			100	1	0	2	40	0	60
	<b>Total</b>	<b>500</b>	<b>200</b>	<b>800</b>	<b>24</b>	<b>9</b>	<b>30</b>			

## First Year Bachelor of Architecture

### Semester -2

		Marking Scheme				Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MSE	ESE
AR1020001	Architectural Design Studio-2 (Residential Project)	100		0	2	2	0	20	20	60
AR1020011	Architectural Design Studio-2 (Residential Project)			200	5	0	10	80	0	120
AR1020002	Basic Design and Visual Arts-2			100	2	0	4	40	0	60
AR1020003	Architectural Drawing and Graphics-2 (Manual)	100		0	2	1	2	20	20	60
AR1020013	Architectural Drawing and Graphics-2 (Manual)			150	2	0	6	60	0	90
AR1020004	Building Construction Technology and Materials-2	100		0	2	2	0	20	20	60
AR1020014	Building Construction Technology and Materials-2			150	2	0	4	60	0	90
AR1020005	Environmental Science-2 (Focus on Environmental Impact)	100			1	1	0	20	20	60
AR1020015	Environmental Science-2 (Focus on Environmental Impact)		50		1	1	0	20	0	30
AR1020006	History of Architecture-2	100	0		1	1	0	20	20	60
AR1020016	History of Architecture-2		50		1	1	0	20	0	30
AR1020007	Model Making Workshop-2 (Civil Work)		100		1	0	2	40	0	60
AR1020008	Critical Appreciation of Design-1			100	1	0	2	40	0	60
AR1020009	Elective (Any 1)									
AR1020019	Photography-1 (Basic)			100	1	0	2	40	0	60
AR1020029	Art in Architecture and Landscape			100	1	0	2	40	0	60
	<b>Total</b>	<b>500</b>	<b>200</b>	<b>800</b>	<b>24</b>	<b>9</b>	<b>32</b>			

## Second Year Bachelor of Architecture

### Semester -3

		Marking Scheme				Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MSE	ESE
AR2030001	Architectural Design Studio-3 (Institutional Project)	100		0	2	2	0	20	20	60
AR2030011	Architectural Design Studio-3 (Institutional Project)			200	5	0	10	80	0	120
AR2030002	Architectural Drawing and Graphics-3 (Computer Based)	100		0	2	1	2	20	20	60
AR2030012	Architectural Drawing and Graphics-3 (Computer Based)			150	2	0	4	60	0	90
AR2030003	Building Construction Technology and Materials-3	100		0	2	0	4	20	20	60
AR2030013	Building Construction Technology and Materials-3			150	2	2	0	60	0	90
AR2030004	Theory of Structures -1	100			2	1	2	20	20	60
AR2030005	Building Services-1 (Plumbing and Sanitation, Fire Fighting)	100	0		1	1	0	20	20	60
AR2030015	Building Services-1 (Plumbing and Sanitation, Fire Fighting)		50		1	1	0	20	0	30
AR2030006	Contemporary Architecture	100	0		1	1	0	20	20	60
AR2030016	Contemporary Architecture		50		1	0	2	20	0	30
AR2030007	Model Making Workshop-3 (Carpentry)		100		1		2	40	0	60
AR2030008	Critical Appreciation of Design-2			100	1	0	2	40	0	60
AR2030009	Elective (Any1)									
AR2030019	Photography-2 (Advance)			100	1	0	2	40	0	60
AR2030029	Streetscapes			100	1	0	2	40	0	60
	<b>Total</b>	<b>600</b>	<b>200</b>	<b>700</b>	<b>24</b>	<b>9</b>	<b>30</b>			

## Second Year Bachelor of Architecture

### Semester -4

		Marking Scheme			Credits	Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV		L	S	IA	MSE	ESE
AR2040001	Architectural Design Studio-4 (Commercial Project)	100		0	2	2	0	20	20	60
AR2040011	Architectural Design Studio-4 (Commercial Project)			200	5	0	10	80	0	120
AR2040002	Architectural Drawing and Graphics-4 (Computer Based)	100		0	2	1	2	20	20	60
AR2040012	Architectural Drawing and Graphics-4 (Computer Based)			150	2	0	4	60	0	90
AR2040003	Building Construction Technology and Materials-4	100		0	2	0	4	20	20	60
AR2040013	Building Construction Technology and Materials-4			150	2	2	0	60	0	90
AR2040004	Theory of Structures -2	100			1	1	0	20	20	60
AR2040014	Theory of Structures -2		50		1	0	2	20	0	30
AR2040005	Building Services-2 ( Electrical,Ventilation , Acoustics, BMS, Vertical Transport)	100	0		1	1				
AR2040015	Building Services-2 ( Electrical, Ventilation , Acoustics, BMS, Vertical Transport)		50		1	1	0	20	0	30
AR2040006	Emerging World Architecture	100	0		2	1	2	20	20	60
AR2040007	Model Making Workshop-4 (Building Services)		100		1	0	2	40	0	60
AR2040008	Geographic Information System			100	1	0	2	40	0	60
AR2040009	Elective (Any 1)									
AR2040019	Architectural Journalism			100	1	0	2	40	0	60
AR2040029	Advance computing			100	1	0	2	40	0	60
	<b>Total</b>	<b>600</b>	<b>200</b>	<b>700</b>	<b>24</b>	<b>9</b>	<b>30</b>			

### Third Year Bachelor of Architecture



**Semester -5**

		Marking Scheme				Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MSE	ESE
AR3050001	Architectural Design Studio-5 (Multi tenement residential Structure)	200		0	2	2	0	40	40	120
AR3050011	Architectural Design Studio-5 (Multi tenement residential Structure)			200	5	0	10	80	0	120
AR3050002	Working Drawing-1			100	4	2	4	20	0	60
AR3050003	Building Construction Technology and Materials-5	100		0	2	1	2	40	20	60
AR3050013	Building Construction Technology and Materials-5			150	2	0	4	30	0	90
AR3050004	Theory of Structures -3	100			1	1	0	40	20	60
AR3050014	Theory of Structures -3		50		1	0	2	20	0	30
AR3050005	Interior Architecture			100	1	1	0	40	0	60
AR3050006	Surveying and Levelling	100	0		1	1	0	20	20	60
AR3050016	Surveying and Levelling		50		1	0	2	20	0	30
AR3050007	Landscape Architecture	100			1	1	0	20	20	60
AR3050007	Landscape Architecture		50		1	0	2	20	0	30
AR3050008	Large Span Structures-1			100	1	0	2	40	0	60
AR3050009	Advance Construction Techniques-1			100	1	0	2	40	0	60
	<b>Total</b>	<b>600</b>	<b>150</b>	<b>750</b>	<b>24</b>	<b>9</b>	<b>30</b>			

### Third Year Bachelor of Architecture

#### Semester -6

		Marking Scheme				Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MSE	ESE
AR3060001	Architectural Design Studio-6 (Landscape Architecture)	200			2	2	0	40	40	120
AR3060011	Architectural Design Studio-6 (Landscape Architecture)			200	5	0	10	80	0	120
AR3060002	Working Drawing-2			100	4	2	4	20	0	60
AR3060003	Building Construction Technology and Materials-6	100			2	1	2	40	20	60
AR3060013	Building Construction Technology and Materials-6			150	2	0	4	30	0	90
AR3060004	Theory of Structures -4	100			1	1	0	40	20	60
AR3060014	Theory of Structures -4		50		1	0	2	20	0	30
AR3060005	Technical Communication			100	1	1	0	40	0	60
AR3060006	Quantity Surveying and Estimation-1	100			1	1	0	20	20	60
AR3060016	Quantity Surveying and Estimation-1		50		1	0	2	20	0	30
AR3060007	Specification Writing	100			1	1	0	20	20	60
AR3060017	Specification Writing		50		1	0	2	20	0	30
AR3060008	Large Span Structures-2			100	1	0	2	40	0	60
AR3060009	Advance Construction Techniques-2			100	1	0	2	40	0	60
	<b>Total</b>	<b>600</b>	<b>150</b>	<b>750</b>	<b>24</b>	<b>9</b>	<b>30</b>			

## Fourth Year Bachelor of Architecture

### Semester -7

		Marking Scheme				Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MSE	ESE
AR4070001	Architectural Design Studio-7 (High Rise Structure)	200			2	2	0	40	40	120
AR4070011	Architectural Design Studio-7 (High Rise Structure)			200	5	0	10	80	0	120
AR4070002	Building Construction Technology and Materials-7	100			4	2	4	0	20	0
AR4070002	Building Construction Technology and Materials-7			200	2	1	2	0	0	0
AR4070003	Quantity Surveying and Estimation-2	100			2	0	4	0	20	0
AR4070003	Quantity Surveying and Estimation-2		50		1	1	0	0	0	0
AR4070004	Theory of Structures -5	100			1	0	2	0	0	0
AR4070014	Theory of Structures -5		50		1	1	0	0	0	0
AR4070005	Urban Planning	100			2	1	2	20	20	60
AR4070006	Contract Management and Tendering Process	100			1	0	2	0	0	0
AR4070007	Sustainable Architecture	100	0		1	1	0	20	20	60
AR4070008	Professional and Legal Aspects of Architectural Practice			100	1	0	2	40	0	60
AR4070009	Building Bye Laws and Statutory Approval For Projects			100	1	0	2	40	0	60
	<b>Total</b>	<b>800</b>	<b>100</b>	<b>600</b>	<b>24</b>	<b>9</b>	<b>30</b>			

### Fourth Year Bachelor of Architecture

#### Semester -8

		Marking Scheme				Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MSE	ESE
AR4080001	Practical Training			1500	24	0	48	300	0	900
	Modern Trends in Architectural Practice									
	Case Study ( 3 important projects in the City of Training)									
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>1500</b>	<b>24</b>	<b>0</b>	<b>48</b>			

### Fifth Year Bachelor of Architecture

#### Semester -9

		Marking Scheme				Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MSE	ESE
AR5090001	Practical Training			1200	22	0	44	240	0	720
AR5090002	Thesis (Synopsis and Case Study)			300	2	0	4	60	0	180
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>1500</b>	<b>24</b>	<b>0</b>	<b>48</b>			

## Fifth Year Bachelor of Architecture

### Semester -10

		Marking Scheme				Teaching Scheme		Evaluation Scheme		
Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MSE	ESE
AR5100001	Architectural Design Thesis			1300	20	7	26	260	0	780
AR5100002	Project Management			100	2	1	2	20	0	60
AR5100003	Special Structures			100	2	1	2	20	0	60
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>1500</b>	<b>24</b>	<b>9</b>	<b>30</b>			

Dr. Babasaheb Ambedkar Technological University, Lonere,  
Raigad

**BACHELOR OF ARCHITECTURE**

**FIRST YEAR**

**SYLLABUS 2017**

## First Year Bachelor of Architecture

### Semester -1

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010001	Architectural Design Studio-1	100			2	2	0	20	20	60
AR1010011	Architectural Design Studio-1			200	5	0	10	80	0	120

### Course Objective

To introduce the student the fundamentals of architectural design.

To initiate creative thinking and its relationship with activity spaces.

To apply principles of Basic Design and Visual Arts to Architectural Design

To act as an interface between Basic design-1, Workshop-1 and Architectural Design Studio-1

### Course Outcome

To understand human scale and proportion

Apply human scale and proportion in design

### Course Content

#### Module-1

Anthropometry

Scale and Proportion

Measured drawing of Human Activity space - Case Study -Living Room, Bedroom, Kitchen, Toilet

#### Module -2

Iterative Design Process

Activities and their relation with space

Principles of Architectural Planning

Co -relation between form, function and structure

#### Module -3

Design of elements of furniture using Anthropometric data from Module -1

#### Module-4

Design of Interactive spaces such as Living room, Courtyard, Bus Stop, Atrium, Community spaces and similar areas.

### Studio Exercises

Exercises in order to experiment basic proportions, body relations and spatial concepts.

Layout of furniture based on anthropometrics. Anthropometrics for physically challenged persons. Exercises in order to experiment basic proportions, body relations and spatial concepts. Designing of basic building components (like kitchens, bedrooms, toilets etc.)

Design exercise on threshold conditions and small-scale domestic space. Students will learn skills in problem solving, visualization, oral, and graphic communication. Field trips to relevant architectural sites.

### Mode of Examination

Theory Paper in the form of Time Problem of duration 4 hours and Sessional Work with Viva

### Reference Books

1. Ching, F.D.K.; Architecture Form, Space and Order, Van Nostrand Reinhold Staff, New York, 1996.

2. Rudofsky, Bernard; Architecture without Architects, University of New Mexico Press, New Mexico

3. Rasmussen, Steen Eiler; Experiencing Architecture, The MIT Press, Cambridge, Massachusetts, 1977.

4. Watson, Donald / Crosbie, Michael J.; Time Savers Standards for Architectural Design, Mc Graw Hill, New York,

2005

5. Chiara, Joseph De / Crosbie, Michael J.; Time Savers Standards for Building Type, McGraw Professional Publishing, New York, 1973.

6. Harris, Charles W. / Dines, Nicholas T.; Time Savers Standards for Landscape Architecture, Mc Graw Hill, USA, 1998

7. Chiara, Joseph De / Panero, Julius / Zelink Martin; Time Savers Standards for Interior design and Space Planning, Mc Graw Hill, New York, 2001

8. Gideon, Siegfried; Space, time & Architecture, Harvard University Press



## First Year Bachelor of Architecture

### Semester -1

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010002	Basic Design and Visual Arts-1			100	2	0	4	40	0	60

### Course Objective

To familiarize the student with visual grammar, methods of visual composition and various mediums

To develop skills in manual presentation techniques,

To act as an interface between Basic design-1, Workshop-1 and Architectural Design Studio-1

### Course Outcome

Develop principles of 2 dimensional and 3 dimensional composition

Develop manual presentation techniques

Use of colours in design

### Course Content

#### Module -1

Relationship of Surface, Form, Masses.

Relationship of Point, Line, Motion, Light, Shade.

#### Module -2

Colour Theory

Explore the use of colour in design in context to emotional quotient and context

#### Module -3

Fundamental principles of design

Balance, Harmony, Rhythm, Contrast, Symmetry, Scale, proportions, colours, tones, textures etc

#### Module -4

Sketching

Sketching using Pencil (Black and White) and Colour Pencil

### Studio Exercises

Suitable exercises on all the Modules mentioned above (Min 5 on each module on A2 Size)

### Mode of Examination

Sessional Work with Viva.

### Reference Books

1. Ching Francis D. K., Form Space and Order.
2. Ching Francis D. K., A Visual Dictionary of Architecture.
3. John R. Mather -Climatology: Fundamentals and Application.
4. Christopher Alexander- Pattern Language
5. Robert Sommer. -Design Awareness.
6. C.M. Deasy -Design for Human Affairs.

7. Pierre Von Meiss -Elements of Architecture from form to place.
8. Yatin Pandya- Elements of Space Making.
9. Paul Lassau – Graphic Thinking for Architects and Planners.
10. Peter Pearce, Structure in Nature – Strategy for Design.
11. Peter Streens, Patterns in Nature.
12. Anthony Antoniadis - Poetics in Architecture: Theory of design
14. Am heim Rudolf, Visual Thinking.
15. John R. Mather -Climatology: Fundamentals and Application.15
16. Maxwell Fry And Jane Drew -Tropical Architecture.
17. Paul Lassau - Graphic thinking for Architects and planners.
18. Jonathan A. Hale -Building Ideas. An introduction to Architectural Theory.

## First Year Bachelor of Architecture

### Semester -1

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010003	Architectural Drawing and Graphics-1 (Manual)	100			2	1	2	20	20	60
AR1010013	Architectural Drawing and Graphics-1 (Manual)			150	2	0	4	60	0	90

### Course Objective

To introduce and familiarize students with drafting tools and accessories and provide basic knowledge and skill to draft a drawing manually.

Developing drafting skills through different types of lines, their intensity and interpretation. Also understanding the scale of drawing, dimensioning, lettering techniques and layout of sheets.

Visualizing and drawing geometric forms in different positions using orthographic projections and sciography will help the student to understand and develop drawings for various design proposals.

### Course Outcome

To recognize and select drawing tools and techniques for drafting basic drawing.

To identify a type of line, intensity, thickness, text to draw a shape. .

To implement a scale, dimension for a layout of sheet or drawing.

To demonstrate a line, plane or solid into drawing using orthographic projections.

To integrate the 2 dimensional drawings and 3 dimension form using development of surfaces.

To formulate the 2 dimension into 3 dimension drawing using metric projection.

### Course Content

#### Module -1

Introduction

Drawing instruments and its uses

Sheet layout

Lines, lettering , scales and dimensioning

Geometric Shapes

Drawing of basic geometric shapes

Drawing of complex geometric shapes

#### Module -2

Orthographic Projections

Concept, Principle and Methods of Projections

Orthographic Projections of Point, Line and Plane

Projections of Solids in different positions

Application of Projection for preparing architectural drawings

Application of Sciography in 2 dimensional drawings with rendering techniques

#### Module -3

Sections of solids and its application to building drawings

Introduction of section of solids with simple forms

Concept and methods of drawing section of solids

Application of sections for simple building drawings

Section of complex form or structures

#### **Module - 4**

Development of Surfaces

Introduction to development of surfaces and its uses

Methods of development of surfaces

Development of lateral surfaces of simple solids as cube, cone, pyramids and prism.

Development of complex solids, when two or more simple solids are joined together.

#### **Studio Exercises**

Suitable exercises on all the Modules mentioned above

#### **Mode of Examination**

Theory Paper with 3 hour duration.

Sessional Work with Viva.

#### **Reference Books**

1. Ching Francis D.K.: Architectural Graphics

2. Kelsey W. E.: Geometrical & Building Drawing

3. Leslie Martin: Architectural graphics

4. B. James: Essential of Drafting

5. H. Joseph and Morris: Practical plane and solid geometry

6. Gill Robert: Rendering with pen and ink

7. Burden Ernest: Architectural Delineation.

8. Burden Ernest: Architectural Delineation. Gill, Robert W.; Manual of Rendering with Pen and Ink, Thames and Hudson, London,1997.

9. JaxThemier, B.W., "How to Paint and Draw", Thames and Hudson, 1985.

## First Year Bachelor of Architecture

### Semester -1

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010004	Building Construction Technology and Materials-1	100			2	2	0	20	20	60
AR1010014	Building Construction Technology and Materials-1			150	2	0	4	60	0	90

### Course Objective

To familiarize students with building elements of superstructure and foundations, materials and construction techniques

Introduction to elementary building construction methods and their applications

To understand the execution process of each building element

### Course Outcome

To define basic building elements.

To recognize the various types of masonry and foundation made up of suitable materials.

To be aware of the properties and applications of various materials.

To understand the construction of openings in various types of masonry.

Distinguish between various types of structures.

### Course Content

#### Module -1

Introduction to materials used in civil construction.

Bricks, Sand, Aggregate, Lime, Cement, Water, Stone and reinforcement Steel

Properties of materials and Quality tests of materials

#### Module -2

Introduction to various elements of building from foundation to roof.

#### Module -3

Building Envelope

Brick Masonry- All types of Bonds

Stone Masonry-All types

Composite Masonry- All types

Right angles in all types of masonry, T-Junctions and Corbelling

#### Module -4

Arches

Various types of Arches

Lintels

Constructing openings in Walls as mentioned in Module -2

#### Module -5

Introduction to Types of structures- Load Bearing Structure and Frame Structure

Introduction to Types of Foundations- Shallow and Deep foundations

Types of Soil

Shallow foundations-Isolated, Combined and Raft foundations and Spread Foundations

### Studio Exercises

Suitable exercises on all the Modules mentioned above

**Mode of Examination**

Theory Paper with 3 hour duration.

Sessional Work with Viva.

**Reference Books**

1. 'Elements of Structure' by Morgan.
2. 'Structure in Architecture' by Salvadori.
3. 'Building Construction' by Mackay W. B., Vol. 1 – 4.
4. 'Building Construction' by Barry, Vol. 1 – 5.
5. 'Construction Technology' by Chudley, Vol. 1 – 6.
6. 'Building construction Illustrated' by Ching Francis D. K.
7. 'Elementary Building Construction' by Michell.
8. 'Structure and Fabric' by Everet
9. 'Engineering Materials' by Chaudhary.
10. 'Building Construction Materials' by M. V. Naik.
11. 'Civil Engineers' Handbook' by Khanna
12. 'Vastu Rachan' by Y. S. Sane.
13. National Building Code and I.S.I. Specifications
14. 'Materials and Finishes' by Everet.
15. 'A to Z Building Materials in Architecture' by Hornbostle.
16. 'Elements of Structure' by Morgan
17. Engg. Materials – K.S.Rangwala.
18. Engg. Materials – B.K. Agarwal
19. Building Materials – S.K. Duggal.
20. Building Construction – Sushil Kumar.
21. Building Construction – Bindra Arora.

## First Year Bachelor of Architecture

### Semester -1

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010005	Environmental Science-1 (Focus on Built Form )	100	0		1	1	0	20	20	60
AR1010015	Environmental Science-1 (Focus on Built Form )		50		1	1	0	20	0	30

### Course Objective

To obtain knowledge required for understanding the influence of climate on architecture.

To familiarize students with the design and settings for buildings for daylight and factors that influence temperature.

The students are exposed to the various design strategies for building in different types of climatic zones.

To be dealt with reference to Architectural Design Studio

### Course Outcome

List the different elements of climate

Classify the factors of comfort

Infer the impact of climatic forces on built structures

Examine through mathematical formulae the thermal comforts levels of built form

Assess the effects of site, sun and wind in building response

Design of shelters in different climatic conditions.

### Course Content

#### Module -1

Introduction

Climate and Weather

Elements of Climate

Classification of tropical climates

Climate balanced Architecture

#### Module -2

Bio-Climatic Approach

Human Comfort- definitions and concepts

Thermal Comfort Factors

Bioclimatic Requirements

Relation of climatic elements to comfort

The Bio-Climatic Chart

#### Module - 3

Environment And Building Forms

Impact of External forces on Building

Reading of Psychometric chart and its applicability.

Building configuration and climate response.

#### Module - 4

Site & Building Design

Site Selection, Site Planning

Building Orientation and Placement

Effect of Landscaping

**Module - 5**

Sun & Building Design

Basic Principles of Heat Transfer

Numerical based on heat transfer in buildings

Day lighting & Solar Control

Thermal Insulation

**Module - 6**

Wind & Building Design

Wind effect and Air Flow Pattern

Ventilation Techniques

Air movement around the buildings

Stack Effect and Thermally induced air currents

**Module - 7**

Architectural Application

Shelter for warm-humid climates

Shelter for hot-dry climates

Shelter for composite climate

Shelter for cold –cloudy and cold- sunny climates.

Application of software in climate responsive design

**Studio Exercises**

Suitable exercises on all the Modules mentioned above

Suitable Case studies to be conducted

**Mode of Examination**

Theory Paper of 3 hour duration

**Reference Books**

1.An Introduction To Building Physics by Narashimhan

2.Manual Of Tropical Housing And Building – Part I – Climatic Design by O.H. Koenigsberger

3.Housing Climate & Comfort by M.Evans

4.Man, Climate And Architecture, Applied Science, Banking Essex by B. Givoni

5.Climatic Design by Donald Watson



## First Year Bachelor of Architecture

### Semester -1

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010006	History of Architecture-1	100	0		1	1	0	20	20	60
AR1010016	History of Architecture-1		50		1	1	0	20	0	30

### Course Objective

To introduce student to architectural development with reference to time, space and people

To introduce students to the historical architecture of various civilisations before 1 century.

### Course Outcome

To recognize importance of architecture and design through time and across cultures

Identify different styles of historic architecture.

Identify prominent / important historic buildings by their components / style of design

Describe prominent / important historic buildings

Analyse the contributing factors for the design development of different styles.

Compare and Contrast various styles on the basis of the contributing factors responsible for their development

Design buildings in the historic architectural styles

### Course Content

#### Module -1

Introduction to Ancient Civilizations their social systems and culture

Egypt, Mesopotamia, Indian sub-continent, China, Mediterranean region

Greek Architecture

Roman Architecture

Early Christian and Byzantine Architecture

Romanesque Architecture

Gothic Architecture

#### Module -2

Mesopotamian Civilization

Salient features of Ziggurats and their development – White Temple, Ziggurat of Ur, Urnammu and Khorsabad

Generic Temple Layout - Temple Oval and Khafaje

Palace Complex/Citadel of Khorsabad, Nebuchadnezzar's Babylon, Persepolis

#### Module -3

Egyptian Civilization

Salient features of important buildings

Temples & temple complexes - Cult Temple and Mortuary Temple

Mastaba – development and typical components

Pyramids – Complex of Zoser, Pyramid of Cheops and Cephren, Standard mortuary complex layout of pyramids

#### Module -4

Greek Architecture

Classical Order – Doric, Ionic, Corinthian

Salient features of important buildings

Temple types on basis of column layout – case example of Acropolis, Athens

Discussion of Hellenic Temple (Parthenon, Athens) versus Hellenistic Temple (Athena Polias, Priene)

Public Buildings and Square – Agora, Stoa, Prytaneum, Bouleuterion, Tholos, Gymnasium, Theatre

**Module -5**

Roman Architecture

Introduction to Roman civilization, their social systems and cultures

Contribution in new materials and new construction/structural systems, eg, Pozzolana, Cementae, Stone Blocks, Stone Masonry, Arch, Vault, Dome

Salient features of important buildings

Forums of Rome

Pantheon

Aqueduct

Colosseum

Bath of Caracalla

Basilica of Trajan

**Module -6**

Early Christian & Romanesque Architecture

Introduction to society and culture of 400 -1150 AD in Europe

Early Christian Architecture

Development of Early Christian Church from Roman Basilica

Salient building – St. Peter's Basilica

Romanesque Architecture

Development of Romanesque architecture from Early Christian architecture

**Module -7**

Byzantine Architecture

Contribution of Byzantine architecture in the development of structural system – dome construction over square plan,

Adoption of Greek cross in church layout

Use of mosaic and mural in interior

Salient buildings – Santa Sophia, Istanbul; St. Mark's Cathedral, Venice

**Module -8**

Gothic Architecture

Introduction to society and culture of 1150 – 1350 AD in Europe

Development of Gothic church and its new elements

Pointed Arch window

Different arch types – lancet, equilateral, depressed

Trefoil arch

Cluster column and intersecting vault roof

Clerestory window and triforium

Flying buttress

Glazed window, stone and metal trellis, flamboyant window, rose window

Entrance of church

Salient features of important buildings

Cathedrals of St. Dennis

Cathedrals of Chartres

Cathedrals of Notre Dame (Paris)

Cathedrals of Reims

**Module -9**

Basic Introduction to Renaissance Architecture and its Classical Revivalism, Neo-Classicism

Introduction to society and culture of 1400 -1800 AD

Division of Renaissance architecture into Early, Mature and Late periods

Contribution in structural system, e.g., ribbed dome, lantern dome

Revival of classical orders and principles – Neo-Classicism

**Studio Exercises**

Suitable exercises on all the Modules mentioned above

**Mode of Examination**

Theory Paper with 3 hour duration.

Sessional Work with Assessment.

**Reference Books**

History Of Architecture by Sir Bannister Fletcher

The Story Of Architecture by Patrick Nuttgens

Space, Time And Architecture by Siegfried Gideon

## First Year Bachelor of Architecture

### Semester -1

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010007	Model Making Workshop-1 (Basic)		100		1	0	2	40	0	60

### Course Objective

To familiarise students with different types of materials and manufacturing techniques for creating art forms/ models.

To introduce use different kinds of tools and machinery for production of design models.

To act as an interface between Basic design-1, Building Construction and Materials-1 and Architectural Design Studio-1

### Course Outcome

To become aware about the usage of various materials for production of art work.

To apply different mediums and machine tools for production various types of art work.

To create art forms with different mediums.

### Course Content

#### Module -1

Introduction to various materials for model making

Materials like paper, thermocol, clay, ceramic, plastic sheet, sheet metal, wood etc

#### Module -2

Selection of material for model making

Understanding the Applicability of Scale and Proportion through models

#### Module -3

Implementing the geometric shapes

Implementing the solid shapes

#### Module - 4

Introduction to various tools for model making

Application of tools, suitability and safety precautions

### Studio Exercises

Models to be created for Basic design-1, Building Construction and Materials-1, History of Architecture-1 and Architectural Design Studio-1

### Mode of Examination

No Theory paper

Sessional Work with Assessment.

### Reference Books

1. John Taylor, Model Building for Architects and Engineers.

2. Rolf Janke, Architectural Models. Sandeep Singh, Beginning Google Sketch up.

## First Year Bachelor of Architecture

### Semester -1

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010008	Personality Development			100	1	0	2	40	0	60

### Course Objective

- To create awareness about effective personality and imbibe in the student the need for professional self-presentation
- To imbibe the values of responsible professional
- To instil the importance of body language, sharing of thoughts and communication

### Course Outcome

- Gain confidence in making public presentations.
- To analyse and express individual opinions and views.
- To present oneself professionally in the industry.
- To express ideas and views through oral and written mediums.
- To initiate thinking process.
- Identifies the important aspects on verbal communication.
- Compares differences in intents within communication.
- Interprets the verbal and non-verbal communications.
- Able to revise judgments and change behaviour in light of new evidence.

### Course Content

#### Module -1

- English- as a medium of expression.
- Essay writing, Articles to be written in English on current topics

#### Module -2

- Body Language - as a mode of communication
- Study of Body language, facial expression, inferences from body language.

#### Module -3

- Public Speaking/Debate - as a mode of promotion of ideas
- Public speaking / debate to be conducted on current issues. Each student to speak in public so as to gain confidence in speaking as well as to loose stage fright.

#### Module -4

- Group discussion- as a mode of exchange of ideas
- Group discussion sessions to be organised in group of 5 students. Any suitable topic to be discussed. Preferably the group should be heterogeneous consisting of students and teachers or students from senior classes.

### Studio Exercises

- Assignments related to above mentioned modules. Minimum 10-15 assignments in the form of essays, articles and workshops

### Mode of Examination

- No Theory Paper
- Sessional Work with Viva

### Reference Books

1: Steve Jobs, by Walter Isaacson

2: I can Win, Shiv Khera

3: Alchemist, Paulo Coelho

4: Books on Soft Skills

5: Books on Body Language

6: Autobiographies, Magazines on current issues, English Grammar

**First Year Bachelor of Architecture**

**Semester -1**

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010019	Cultural influences on Architectural Design			100	1	0	2	40	0	60

### Course Objective

To appraise about architecture and its relationship to its historical, political, social, economic, technological contexts

To Interpret the aesthetics related to more general systems of ordering within a particular society or group

To recognize architecture to be approached as a cultural practice.

To gain understanding of society, culture and civilization

### Course Outcome

To recognize importance of architecture and design through time and across cultures.

To comprehend what have been the major issues in the development of architectural design in socio- cultural context.

To appraise about architecture and its relationship to its historical, political, social, economic, technological contexts.

To Interpret the aesthetics related to more general systems of ordering within a particular society or group

### Course Content

#### Module -1

Culture

Introduction to Sociology and its relationship to architecture

Different theories about culture and social identity with reference to architecture

Socio-economic systems, Political systems

Forms of social organization

#### Module -2

Architectural Traditions

Cosmological models and architectural form

Articulation of people and built environments

#### Module -3

Classical architecture

Vernacular architecture

#### Module -4

Society and Civilisation

Socio-economic its relationship to architecture

Political systems and its relationship to architecture

Social and cultural aspects of building practices

### Studio Exercises

Suitable exercises on all the Modules mentioned above

### Mode of Examination

No Theory Paper

Sessional Work with Viva

### Reference Books

Conformity and Conflict: Readings in Cultural Anthropology by McCurdy, David W., Dianna Shandy, and James Spradley, eds.

Case examples of research on cultural anthropology

House, Form and Culture by Amos Rapoport

Case studies of various examples from India

Case studies of various examples on social and cultural issues relating to architectural history in India and world.

Architecture in Cultural Change: Essays in Built Form and Culture Research by David G. (ed). Saile (Author)



## First Year Bachelor of Architecture

### Semester -1

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1010029	Art in Public Spaces			100	1	0	2	40	0	60

#### Course Objective

To understand reference and relevance of Art in Public Spaces.

To create awareness about Public spaces and their aesthetics.

#### Course Outcome

To analyse the Public Space in relation to Art.

Design Public Space.

To use Art as medium of expression in Public Space.

#### Course Content

##### Module -1

Evolution , Necessity of art in Public Spaces

Use of Public Space

##### Module -2

Types of art in public places

Murals, Sculptures, Paintings, Statues etc

##### Module -3

Usable art in Public Space

Furniture, Water Bodies, Landscape

##### Module -4

Concepts of Public Art and aesthetics

City Squares, City Gardens, Water fronts, Large gathering spaces

#### Studio Exercises

Assignments related to above mentioned modules. Minimum 10-15 assignments in the form of workshops and Case Study.

#### Mode of Examination

No Theory Paper

Sessional Work with Viva

#### Reference Books

1: Art, Space and the City, Malcom Miles

2: The uses of Art in Public Space, Edited by Julia Lassau and Quentin Stevens

3: Public Art by the Book, Edited by Barbara Goldstein

4: Urban Interventions- Personal projects in Public Spaces, Edited by Robert Klanten, S.Khmann and M.Hubner

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020001	Architectural Design Studio-2 (Residential Project)	100		0	2	2	0	20	20	60
AR1020011	Architectural Design Studio-2 (Residential Project)			200	5	0	10	80	0	120

### Course Objective

To introduce the student the fundamentals of architectural design.

To initiate creative thinking and its relationship with activity spaces.

To apply principles of Basic Design and Visual Arts to Architectural Design

To act as an interface between Basic design-1, Workshop-1 and Architectural Design Studio-1

### Course Outcome

The application of the architectural design process for small scale projects of human habitat.

To transform the human behavioural needs into architectural program requirements.

To compose the architectural spaces in a design project

To communicate architectural drawings with the help of various mediums

### Course Content

#### Module-1

Analysis of User / Client living / behavioural profile

Questionnaire to extract client requirements

Case study

#### Module -2

Identify user requirements of space

Deriving the requirements of the space

Transform the behavioural requirements into space form

#### Module -3

Design and Planning of Space

Distribution of the human activity spaces along the context considering the context as visual

Analyse the relationship among the spaces

Verbal presentation on planning of built environment with different mediums

#### Module-4

Detail design

Application of building materials with colour and texture in detail design

#### Studio Exercises

Design of Ground +1 Bungalow / Farm house approx 150 sq.m.

Design of Ground +1 residence approx. 50 sq.m. in congested area.

#### Mode of Examination

Theory Paper with 4 hour duration.

Sessional Work with Viva.

#### Reference Books

1. Ching, F.D.K.; Architecture Form, Space and Order, Van Nostrand Reinhold Staff, New York, 1996.

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

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020002	Basic Design and Visual Arts-2			100	2	0	4	40	0	60

### Course Objective

To familiarize the student with visual grammar, methods of visual composition and various mediums

To develop skills in manual presentation techniques,

To create awareness about choice of materials with reference to textures

To create awareness about use of forms

To act as an interface between Basic design-1, Workshop-1 and Architectural Design Studio-1

### Course Outcome

Create 2D and 3D Compositions.

Create presentations using various mediums and techniques.

Create Sculptures with reference to forms and spaces in Architectural Design.

### Course Content

#### Module -1

2D Compositions

3D Compositions

#### Module -2

Sculpture

Study of solids & voids to evolve sculptural forms & spaces

#### Module -3

Textures

Study of various textures and their use in architectural design

#### Module -4

Sketching

Sketching using Pen, Watercolour and any other suitable medium

Free Hand presentations and rendering techniques

### Studio Exercises

Suitable exercises on all the Modules mentioned above (Min 5 on each module on A2 Size)

### Mode of Examination

No Theory Paper

Sessional Work with Viva.

### Reference Books

1. Ching Francis D. K., Form Space and Order.

2. Ching Francis D. K., A Visual Dictionary of Architecture.

3. John R. Mather -Climatology: Fundamentals and Application.

4. Christopher Alexander- Pattern Language

5. Robert Sommer. -Design Awareness.

6. C.M. Deasy -Design for Human Affairs.

7. Pierre Von Meiss -Elements of Architecture from form to place.

8. Yatin Pandya- Elements of Space Making.
9. Paul Lassau – Graphic Thinking for Architects and Planners.
10. Peter Pearce, Structure in Nature – Strategy for Design.
11. Peter Streens, Patterns in Nature.
12. Anthony Antoniadis - Poetics in Architecture: Theory of design
14. Am heim Rudolf, Visual Thinking.
15. John R. Mather -Climatology: Fundamentals and Application.15
16. Maxwell Fry And Jane Drew -Tropical Architecture.
17. Paul Lassau - Graphic thinking for Architects and planners.
18. Jonathan A. Hale -Building Ideas. An introduction to Architectural Theory.

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020003	Architectural Drawing and Graphics-2 (Manual)	100		0	2	1	2	20	20	60
AR1020013	Architectural Drawing and Graphics-2 (Manual)			150	2	0	6	60	0	90

### Course Objective

Students will be introduced to a variety of tools and techniques for visual expression with emphasis on manual drawing.

To develop essential manual skills such as proficiency in drawing, largely used as primary mode of communication of ideas in architectural design.

### Course Outcome

Recognize the need to combine the use of manual drawing tools and techniques for drafting and freehand drawing for architectural design communication.

Apply the projected drawing method of exterior and interior perspective.

Construct one and two point perspective drawings from floor plans and elevations.

Produce by Drawing/sketching 3- Dimensional Architectural drawings using and freehand techniques.

Demonstrate an understanding of furniture, people and accessories in one and two point projected perspective drawing.

Construct conceptual and presentation drawings as a design presentation tool for various purposes.

### Course Content

#### Module -1

3D representation of Solids

Isometric views

Axonometric Views

Oblique Views

#### Module -2

Basics of Perspective Drawing

Anatomy of perspective: Station point, Eye level, Cone of vision, Picture plane, Horizon line, Ground line, Vanishing points

Types of perspectives : One point, Two point, Three point

#### Module -3

Perspectives for Building Exteriors

2 point perspectives of building exterior

3 point perspectives of building exterior

Perspectives of Interior space

Preparation of perspectives using Diagonal Method, Grid Method, approximate method

#### Module - 4

Rendering Techniques for perspectives

Rendering using various mediums such as Pen and Ink, Water colour, Poster Colour, Pencil Colour, Crayons

### Studio Exercises

Suitable exercises on all the Modules mentioned above

**Mode of Examination**

Theory Paper of 3 hour duration

Sessional Work with Viva

**Reference Books**

1. Ching Francis D.K.: Architectural Graphics

2. Kelsey W. E.: Geometrical & Building Drawing

3. Leslie Martin: Architectural graphics

4. B. James: Essential of Drafting

5. H. Joseph and Morris: Practical plane and solid geometry

6. Gill Robert: Rendering with pen and ink

7. Burden Ernest: Architectural Delineation.

8. Burden Ernest: Architectural Delineation. Gill, Robert W.; Manual of Rendering with Pen and Ink, Thames and Hudson, London,1997.

9. JaxThemier, B.W., "How to Paint and Draw", Thames and Hudson, 1985.

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020004	Building Construction Technology and Materials-2	100		0	2	2	0	20	20	60
AR1020014	Building Construction Technology and Materials-2			150	2	0	4	60	0	90

#### Course Objective

To introduce the construction methodology of structures

To understand various types of structures

To understand the execution process of each building element

#### Course Outcome

To develop understanding about complex foundations and the constructions techniques involved

Understand various construction materials.

Recognise various building envelop systems and their application

#### Course Content

##### Module -1

Introduction to materials used in civil construction.

Concrete, Mortar, Structural Steel, Mild Steel, Glass, Aluminium, PVC, u-PVC

Properties of materials and Quality tests of materials

##### Module -2

Building Envelope

Cavity Walls

Precast partition walls

Internal partition walls in Gypsum

##### Module -3

External Wall Section

Construction details of external brick wall section

##### Module -4

Construction of Load Bearing Structure- Foundation and Super structure

Ground Floor Structure in Load Bearing

##### Module - 5

Deep Foundations

Construction of Grillage foundations, Piles foundations, Caisson foundations

Equipment for Deep foundations

#### Studio Exercises

Suitable exercises on all the Modules mentioned above

#### Mode of Examination

Theory Paper of 3 hour duration

Sessional Work with Viva

#### Reference Books



1. 'Elements of Structure' by Morgan.
2. 'Structure in Architecture' by Salvadori.
3. 'Building Construction' by Mackay W. B., Vol. 1 – 4.
4. 'Building Construction' by Barry, Vol. 1 – 5.
5. 'Construction Technology' by Chudley, Vol. 1 – 6.
6. 'Building construction Illustrated' by Ching Francis D. K.
7. 'Elementary Building Construction' by Michell.
8. 'Structure and Fabric' by Everet
9. 'Engineering Materials' by Chaudhary.
10. 'Building Construction Materials' by M. V. Naik.
11. 'Civil Engineers' Handbook' by Khanna
12. 'Vastu Rachan' by Y. S. Sane.
13. National Building Code and I.S.I. Specifications
14. 'Materials and Finishes' by Everet.
15. 'A to Z Building Materials in Architecture' by Hornbostle.
16. 'Elements of Structure' by Morgan
17. ENGG. MATERIALS – K.S. RANGWALA.
18. ENGG. MATERIALS – B.K. AGARWAL
19. BUILDING. MATERIALS – S.K. DUGGAL.
20. BUILDING CONSTRUCTION – SUSHIL KUMAR.
21. BUILDING CONSTRUCTION – BINDRA ARORA.

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020005	Environmental Science-2 (Focus on Environmental Impact)	100			1	1	0	20	20	60
AR1020015	Environmental Science-2 (Focus on Environmental Impact)		50		1	1	0	20	0	30

#### Course Objective

To provide fundamental knowledge about natural and built environment.

To introduce the students to fundamental concepts to understand environmental processes

An attempt to have a detailed understanding of India's natural environment and the threats to them

#### Course Outcome

To make the students aware about the scientific knowledge and current debates on the environment at three nested scales, including their interlink ages – Global, Regional and Local.

To enable the students to understand cause-and-effect relationships between various human, natural and climatic factors that impinges upon ecological systems and their linkages.

To familiarize students with global & national environmental issues, the scale of impacts, important conventions, laws and policies in the field of biodiversity, and environmental protection.

To integrate with higher level studios that have complex briefs, including environmental and ecological concerns.

#### Course Content

##### Module -1

Fundamentals of Environment & Ecology

Environment definition, Environmental Segments, Concepts of Ecosystem: Fundamentals of Ecology and Ecosystem, Components of ecosystem, definition of Ecology, ecosystem processes in a site, Organisms and the Environment, Habitat and Niche, Environmental Factors, Ecological Adaptations, Population, Biotic Community and Succession

Introduction, types, characteristic features, structure and function of different ecosystems: Forest, Grassland, Desert and Aquatic ecosystem

Effects of human activities on environment: Agriculture, Housing, Industry, Mining and Transportation activities

Cite the known threats to India's & the World's Biological Diversity

##### Module -2

India's Bio-geographic regions

List India's Biological Diversity in relation to the physio-geographic regions

Identification of Principal Bio-geographic Zones of India and their description

List of Eco-regions of India –Floristic and Physiographic (eg. IMI0301 etc.)

Distinguish Between Floristic differences in an eco-region say Narmada Valley Dry Deciduous Forest, say Topical Moist Deciduous Forest (Pachmarhi)

Evaluate the importance of biological diversity to all Life – Interconnections between Biological diversity and Human life – sustenance

##### Module -3

Environmental Degradation and Human Impacts

Analyse Global Climate Change & impacts – with respect to your rural/urban community (Increased risk/vulnerabilities)

Analyse the impacts of environmental degradation on traditional communities by abstracting from published reports. Write an essay on the theme

##### Module -4

Applications of Ecological Methods and Techniques in Architecture

Develop a Site Plan for Wildlife, Landscape and environmental conservation

Develop a Master Plan for Wildlife, Landscape and environmental conservation

**Module - 5**

Techniques and Details

Rain water harvesting (contour bunds, wells, bunds, etc.)

Techniques of waste water management (house level, bio swales etc.)

Ecological planting (planting for wildlife, land improvement etc.)

**Module - 6**

Environmental Movements

Environment movements in world and in India (Chipko movement etc)

Environmental activists and their contribution (water conservation movements)

**Studio Exercises**

Suitable exercises on all the Modules mentioned above

Suitable Case studies to be conducted

Illustrated Lectures, Texts, Case Studies and examples

**Mode of Examination**

Theory Paper of 3 hour duration

Sessional Work with Assessment

**Reference Books**

1: Rio Declaration on Environment and Development

2: Environmental Impact Assessment – A guide to best professional practices, Charles H.Eccleston

3: Hand book of Environmental Impact Assessment, Judith Petts

4: Illustrated Lectures, Films, and Introduction of Texts on Environmental Science and Human Ecology

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020006	History of Architecture-2	100	0		1	1	0	20	20	60
AR1020016	History of Architecture-2		50		1	1	0	20	0	30

### Course Objective

To provide analytical tool to students to overview the historical evolution of designing and construction technique.  
To understand the expanse of styles spread across the time period from the Vedic era to the nineteenth century

### Course Outcome

Identify different styles of historic architecture.  
Identify prominent / important historic buildings by their components / style of design.  
Describe prominent / important historic buildings  
Analyse the contributing factors for the design development of different styles  
Compare and Contrast various styles on the basis of the contributing factors responsible for their development  
Design buildings in the historic architectural styles.

### Course Content

#### Module -1

Vedic Architecture

Introduction to vedic era, society and culture, later vedic era:, janapadas, rise of mahajanapadas, Magadha  
Architectural treaties and writings : Vedas, Upanishads, Brahmanas, Aranyakas, Mahabharata, Ramayana

Architectural features

Prominent Sites: Inamgaon in Maharashtra, Vajji in Bihar

Study of vedic panels of gateway No.2 Sanchi and Beirut

#### Module -2

Jainism and Buddhism

Introduction to new religion and ideas

Architectural treaties and writings : Digha Nikaya, Lotus sutra of Mahayana, angas and upangas

Architectural features: Sanghas and Viharas, temporary shelters

Prominent Sites Karli caves ,Maharashtra,Nalanda and Taxila

#### Module -3

Mauryan Empire

Introduction to Mauryan empire, life and culture, important rulers: Chandragupta Maurya, Bindusara, Ashoka, Post  
Maurayan empire Rulers Shungas, Kanvas, Indo Greeks, Shakas, Kushanas, Satvahanas, Sangam age, Cholas,  
Pandyas, Cheras, foreign rulers and trade through silk route, Architecture of Karnataka, Kalinga architecture, Dravidian  
architecture, Western Chalukya architecture, and Badami Chalukya Architecture

Architectural Treaties and Writings : Indika, Arthashastra, Buddhacharita, Sangam literature, Jatakas

Architectural features: stupas, rock edicts, pillar edicts,

Prominent Sites,Sanchi stupa,Rock edicts: Maski, Kaushambi, Jaugada, Dhauli etc,Pillar edicts:Lauriya,  
Rummindei,Rampurva etc Ancient towns: Gimar, Sarnath etc

#### Module -4

Gupta Empire

Introduction to Gupta empire, life and culture, important rulers, life and culture

Architectural Treaties and Writings : Meghduta, Raghuvamsha, Kumarsambhava, Abhijana shakuntala, Mudrarakshasa, Mrichchakatika, Amaroksha, Panchasiddhantika, Aryabhatiyam, Devichandraguptam

Architectural features: Ajanta caves, Iron pillar in Mehrauli, Bhitragan temple and Deogarh temple, Hindu and Buddhist temples at Sarnath

### Module -5

Harshavardhana Era

Introduction to new religion and ideas

Architectural Treaties and Writings : Harshacharita

Architectural features: Gandhara and Mathura school of art, temples, cave temples and shelters

Prominent Sites, Durga Temple Aihole, Ratha Temple Mahabalipuram, Kailashnath temple Kanchipuram, Virupaksha temple Pattadakal

### Module -6

Early Islamic Architecture

Introduction to Islamic culture worldwide; early Islamic architecture in India beginnings under the slave kings (cir. A.D. 1200 to 1290), The Sayyid (1414-51) and the Lodi (1451-1526) dynasties, Provincial styles (Bengal, Gujrat, Malwa, Deccan, Sasaram)

Architectural Treaties and Writings: al-Bīrūnī (d. 1048) - Kitāb fi Tahqīq ma li'l-Hind (Researches on India), Fazl, Abu'l (1877). Akbarnamah (Persian), Vol. 1. Asiatic Society, Calcutta. (Online book), Fazl, Abu'l (1879). Akbarnamah (Persian), Vol. 2. Asiatic Society, Calcutta, Akbar nama by Abul Fazl, Travel in the Mughal empire, Travels of Pietro Della Valle in India

Architectural features: Minars, minarets, towers and turrets, domes, The buildings of the Khalji dynasty, the Delhi or imperial style The Tughlaq dynasty (1320 to 1413), Lodhi, Sayyid

Prominent Sites: Tomb of Ghiyas ud din Tughlaq, three cities of Tughlaq, Khirki Masjid, Stepped well Bai Hari, Rauza, Sayed mosque Ahmedabad, Qutub complex, Jaunpur mosques, Jami masjid (1470), Atala masjid (1408), Cambay : jami masjid (1325), Ahmedabad: tin darwaza (c. 1425), Ahmedabad : jami masjid (1423), Bijapur : Ibrahim rauza (c. 1615)

### Module -7

Colonial Architecture

Colonial architecture, Indo Saracenic architecture, Indo gothic, French, Dutch and Portuguese architecture in India

Architectural Treaties and Writings

Architectural features

Prominent Sites, French colony Pondicherry, The Basilica of Bom Jesus (Good Jesus), Goa Portuguese, Old Amritsar : Golden Temple (1764 & after), Chhatrapati Shivaji terminus

### Studio Exercises

Suitable exercises on all the Modules mentioned above

### Mode of Examination

Theory Paper of 3 hour duration

Sessional Work with Assessment

### Reference Books

History Of Architecture by Sir Bannister Fletcher

The Story Of Architecture by Patrick Nuttgens

Space, Time And Architecture by Siegfried Gideon

Architecture Of Mughal India by Catherine Asher

Indian Architecture (Buddhist Hindu) Vol. 1 by P. Brown

Indian Architecture (Islamic Period) Vol. II by Percy Brown

A History Of Indian And Eastern Architecture by J. A. Fergusson

The Architecture Of India, Buddhist & Hindu by S. Grover

The Architecture Of India (Islamic) by S. Grover

Islamic Architecture, Form, Function and Meaning by Robert Hillenbrand

The Hindu Temple by George Michell,

Architecture Of the Islamic World by George Michell

Architecture Of World , India by Henry Sterlin

Architecture Of World, India ( Islamic ) by Henry Sterlin

The History Of Architecture In India by Christopher Tadgell

The tradition Of Indian Architecture Continuity, Controversy – Change since 1850 by G.H.R.Tillotson

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020007	Model Making Workshop-2 (Civil Work)		100		1	0	2	40	0	60

#### Course Objective

To familiarise students with different types of materials for civil works

To introduce use different kinds of tools and machinery civil works

To act as an interface between Basic Design and Visual Arts-1, Building Construction and Materials-1 and Architectural Design Studio-1

#### Course Outcome

Use tools and equipment for civil works.

To recognize the actual construction process of civil works.

#### Course Content

##### Module -1

Creating scale models for Basic Design using suitable material

##### Module -2

Creating Building elements using actual materials for construction

Students to construct scale models of construction of Building elements

##### Module -3

Understanding the tools used in construction industry.

Understanding application of the construction methodology

##### Module - 4

Analysis of Art work from history of Architecture using models

#### Studio Exercises

Models to be created for Basic design-2, Building Construction and Materials-2, History of Architecture-2 and Architectural Design Studio-2

Module -3 to be done in group of 5 students under the guidance of subject teacher

#### Mode of Examination

Sessional Work with assessment

#### Reference Books

All books for Basic Design, Building Construction and Materials, History of Architecture and Architectural Design Studio.

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020008	Critical Appreciation of Design-1			100	1	0	2	40	0	60

### Course Objective

To introduce medium of understanding art and architecture with criticism and critical appreciation as tools to study, understand and judge any piece of art or architecture.

To develop analytical skills in art appreciation.

To enable the students to understand that critics help viewers perceive, interpret and judge artworks.

### Course Outcome

Understanding philosophical aspects of art from a historical perspective.

The students will learn various art forms, genres and historical periods

The students will develop analytical skills in art appreciation.

The students will be sensitized to various artistic expressions.

### Course Content

#### Module -1

Basics of Critical Appreciation

Necessity of Critical Appreciation

Intent, Language, Content, References

#### Module -2

References of Critical appreciation in Art work, Films, Documentaries

#### Module -3

Elements of art and principles of art

Identify the elements of art and principles of art in a piece of artwork.

#### Module -4

Historical survey and analysis of the arts

Survey and comparative analysis of Indian high art.

Survey and comparative analysis of folk traditions of indigenous communities

Survey of contemporary art and influences

### Studio Exercises

Assignments related to above mentioned modules. Minimum 10-15 assignments in the form of workshops and Case Study.

### Mode of Examination

No Theory Paper

Sessional Work with Viva

### Reference Books

Ways Of Seeing by John Berger

Introduction To Indian Art by Ananda k Coomaraswamy

Understanding Art by Mittler Ragans



Looking at pictures- Purnell Library of knowledge

Architectural Criticism and Journalism : Global Perspectives by Mohammad al-Asad & Majd Musa

Image by Gavin Ambrose, Paul Harris

Writing about Architecture by Alexandra Lange

Visual Thinking by Rudolf Arnheim

Forty ways to think about architecture: Architectural history and theory today edited by Iain Borden, Murray Fraser and Barbara Pennes

**Magzines**

Domus, Architecture + design, Marg, Discover India, Heritage India, Architectural Record, Indian Architect and Builder

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020019	Photography-1 (Basic)			100	1	0	2	40	0	60

### Course Objective

To understand photography as a medium of expression

To understand photography in relation to architecture

### Course Outcome

Use of Photography with architectural projects.

Using photography as a tool of expression.

Create photographic effects.

### Course Content

#### Module -1

History of photography

#### Module -2

Different types of Cameras and lenses. Optical materials, Plastic/glass, lens coating, Types of lenses Normal / Standard, Wide angle, Fish Eye lenses, Zoom, Micro Lenses, Macro Lenses, Faults in lenses, aberrations, resolution, Flare and Ghost image.

#### Module -3

Art of photography and great photographers of the world

#### Module - 4

Effects

Effect of lighting, Effect of filters in Photographs

Lighting for form and shape, Lighting for texture, Lighting for Still Life, Lighting for a product, High Key lighting, Low Key Lighting, Night Photography.

### Studio Exercises

Assignments related to above mentioned modules. Minimum 10-15 assignments.

### Mode of Examination

No Theory Paper

Sessional Work with Viva

### Reference Books

1: The 35mm Handbook-Michael Freeman

2: Focal encyclopaedia of Photography, Focal press

3: Basic Photography, M.J.Langford, Focal press

4: Advanced Photography (Vol-1 and Vol -2), M.J.Langford, Focal press

5: Creative Colour Photography Techniques- Marshall Cavendish

6: Digital Photography in Available Light- Essential Skills, Mark Galer, Focal Press

7: The Art of Digital Photography, John Hedgecoe, DK Ltd, UK

8: Mastering Digital SLR Photography, David D.Bush, Thomson

9: Understanding Exposure, Bryan Peterson, Amphoto Books

10: Learning to see creatively, Bryan Peterson, Amphoto Books

11: The Art of Photography : An approach to Personal Expression, Rocky Nook

12: The Photographer's Eye, Michael Freeman, Focal Press

13: Architectural Photography, Adrian Schulz, Rocky Nook

14: The Beginners Photography Guide, DK

## First Year Bachelor of Architecture

### Semester -2

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR1020029	Art in Architecture and Landscape			100	1	0	2	40	0	60

#### Course Objective

To understand reference and relevance of Art in Architecture and Landscape

To create awareness about Art form that can be used in Architecture and Landscape

#### Course Outcome

Relate Art, Architecture and Landscape.

Use various art forms in architecture and landscape.

#### Course Content

##### Module -1

Role of Art in Architecture and Landscape

##### Module -2

Symbiotic relationship of art ,architecture and Landscape

Identify, evaluate the relationship

##### Module -3

Application of different art forms in architecture and Landscape

Use of Murals, Sculptures, Paintings, Statues etc.

##### Module - 4

Works of different artists and architects that reflect the inter relationship.

Study of various landmark structures with reference to us of Art work

#### Studio Exercises

Assignments related to above mentioned modules. Minimum 10-15 assignments in the form of workshops and Case Study.

#### Mode of Examination

No Theory Paper

Sessional Work with Viva

#### Reference Books

**BACHELOR OF ARCHITECTURE**

**SECOND YEAR**

**SYLLABUS 2017**

## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030001	Architectural Design Studio-3 (Institutional Project)	100		0	2	2	0	20	20	60
AR2030011	Architectural Design Studio-3 (Institutional Project)			200	5	0	10	80	0	120

### Course Objective

To understand context and elements of Built form in existing setting.

To foster understanding about land and landforms and the elements of built space. Experimentation with shapes and forms to evolve sensitivity to built volumes.

To focus on circulation and to reflect on creative approach drawn from data analysis and climatic conditions in physical setting.

To address spatial requirements from activities and known spaces to sites without formal bye laws.

The subject will be integrated with Visual Arts, Critical Appreciation, History, Building Technology and Materials, Climate Responsive Architecture, Water Supply and Sanitation and Structures.

The design process should result in form and function.

### Course Outcome

To apply the learning of the previous semesters.

To apply climate responsive techniques architectural design.

To implement barrier free design parameters in buildings

To use materials innovatively in design.

### Course Content

#### Module-1

Context and Physical Environment

The study of the context and elements of built and un- built spaces in an observable setting to develop the understanding of socio-cultural attributes of the physical environment, methods of construction emerging out of the way of life of the people in a given place including topographical and climatic survey.

#### Module -2

Climate responsive techniques

To apply climate responsive techniques.

#### Module -3

Horizontal and Vertical circulation

Concept of Circulation and modes of circulation in low rise structures.

Barrier free environment.

Special needs of Physically challenged persons.

Site analysis wrt to surroundings; zoning and activity distribution; Circulation and activity relationships through adjacencies, achieving performance integrity through functional adjacencies and elementary services of water and drainage.

#### Module-4

Materials

Innovative use of traditional materials available locally such as timber, bamboo, stone, brick

#### Studio Exercises

Design of 1 no Major and 1 no Minor Project

Major project to be Min Ground +1 structure with area 1000 to 1200 sq.m.

Minor project to be Min Ground Structure with area 500-700 sq.m.

Institutional building means Public Building, School, Health Care Center, Assembly Building, and similar types as mentioned in Building Bye laws

**Mode of Examination**

Theory Paper of 6 hour duration – Time Problem

Sessional Work with Viva

**Reference Books**

1. Ching, F.D.K.; Architecture Form, Space and Order, Van Nostrand Reinhold Staff, New York, 1996

2. Rudofsky, Bernard; Architecture without Architects, University of New Mexico Press, New Mexico.

3. Rasmussen, Steen Eiler; Experiencing Architecture, The MIT Press, Cambridge, Massachusetts, 1977

4. Watson, Donald / Crosbie, Michael J.; Time Savers Standards for Architectural Design, Mc Graw Hill, New York, 2005.

5. Chiara, Joseph De / Crosbie, Michael J.; Time Savers Standards for Building Type, Mc Graw Professional Publishing, New York, 1973

6. Harris, Charles W. / Dines, Nicholas T.; Time Savers Standards for Landscape Architecture, Mc Graw Hill, USA, 1998.

7. Chiara, Joseph De / Panero, Julius / Zelink Martin; Time Savers Standards for Interior Design and Space Planning, Mc Graw Hill, New York, 2001.

8. Gideon, Siegfried; Space, Time & Architecture, Harvard University Press

## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030002	Architectural Drawing and Graphics-3 (Computer Based)	100		0	2	1	2	20	20	60
AR2030012	Architectural Drawing and Graphics-3 (Computer Based)			150	2	0	4	60	0	90

#### Course Objective

To study Architectural drawing and graphics in continuation with the previous semesters.

To understand use of computers as tool for drawing

To understand architectural drawing in relation to use of software.

To understand presentation techniques using software

Focus on 2D Drawing

#### Course Outcome

Develop understanding of computer aided drafting.

Comprehends computer aided drafting and its parameter as tools and its application in architecture.

Evaluates CAD techniques for quicker methods and presentation skills.

Demonstrate the concepts of CAD drafting methods and techniques in 2D.

#### Course Content

##### Module-1

Basics of Computers

Introduction to use of computers in architecture

Computer operating systems.

##### Module -2

Computer aided drafting

Introduction and use of Computer aided drafting (CAD)

Use of CAD Base software's such as AutoCAD and similar software's

##### Module -3

2D Drawing using CAD software's

Orthographic projections, Development of surfaces, Solids as covered in ADG-1

##### Module-4

Drafting and Printing

Model space , Paper space, Parametric

Blocks, Attributes, Templates

Printing to the scale

#### Studio Exercises

Similar exercises from ADG-1 to be done using CAD software

#### Mode of Examination

Theory paper of 3 hour duration

Sessional work with Viva



**Reference Books**

1.Fundamentals Of Three-Dimensional Computer Graphics by Watt

2.Computer Aided Design guide For Architecture, Engineering And Construction by Aouad

3.Latest versions of AutoCAD

4. Architectural drawing: a visual compendium of types and methods; Rendow Yee; John Wiley and Sons, 2007

5. Architectural Graphics; Francis D. Ching; John Wiley and Sons, 2009

## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030003	Building Construction Technology and Materials-3	100			2	0	4	20	20	60
AR2030013	Building Construction Technology and Materials-3			150	2	2	0	60	0	90

### Course Objective

To introduce the construction methodology of Timber structures

To understand the execution process of each building element using Timber as primary material

### Course Outcome

Understand construction using timber as a material

### Course Content

#### Module -1

Introduction to materials used in civil construction.

Timber

Structure and timber trees, varieties of timber, defects in timber, decay of timber, Qualities of timber for construction, seasoning, storage and preservation of timber, properties and strength of manufactured products, veneers, plywood, block boards, fibreboard, etc.

Clay Products

Flooring and roofing tiles, their properties, manufacturing process, laying of tiles, etc.. Clay products like terra-cotta, earthenware, stoneware, porcelain, mud – its stabilization and uses, etc.

Waterproofing

Water proofing materials and systems for basement

Importance, stages, methods and techniques of waterproofing,

Chemicals in Construction (Admixtures, Sealants)

Paints and Surface finishes

Composition, properties and methods of application of different types of paints: Oil, synthetic enamels, acrylic and other plastic emulsions and formulations, interior and exterior grade paints. Natural and synthetic clear varnishes, French polish. Cement based paints

Plaster- Internal Plaster and External Plaster

Properties of above mentioned materials and Quality tests of materials

#### Module -2

Timber Construction

Joinery Details

Different types of joints in timber and their applications to understand the function of joints with respect to load condition. (Lengthening and widening joints, Lap joints, tongue and grooved joints, mortise and tenoned joints, Haunched tenon and mortise joints, dove tail joints, oblique tenon joints, etc.)

#### Module -3

Timber Construction

Timber Floors

Timber Staircase- Dog legged Staircase

Timber Roof

Timber Partitions

Temporary Structures work sheds, construction of compound fences, gates, grills in wood, steel etc.

#### **Module - 4**

Doors and Windows

Classification of doors; (a) panelled doors. (b) ledged and battened doors, (c) ledged, braced and battened doors, (d) framed, ledged, braced, and battened doors (e) flush doors

Timber windows; Casement window and its details

#### **Studio Exercises**

Suitable exercises on all the Modules mentioned above

Each module should include market surveys and construction site visits compulsorily.

#### **Mode of Examination**

Theory Paper of 3 hour duration

Sessional work with Viva

#### **Reference Books**

1. 'Elements of Structure' by Morgan.
2. 'Structure in Architecture' by Salvadori.
3. 'Building Construction' by Mackay W. B., Vol. 1 – 4.
4. 'Building Construction' by Barry, Vol. 1 – 5.
5. 'Construction Technology' by Chudley, Vol. 1 – 6.
6. 'Building construction Illustrated' by Ching Francis D. K.
7. 'Elementary Building Construction' by Michell.
8. 'Structure and Fabric' by Everet
9. 'Engineering Materials' by Chaudhary.
10. 'Building Construction Materials' by M. V. Naik.
11. 'Civil Engineers' Handbook' by Khanna
12. 'Vastu Rachan' by Y. S. Sane.
13. National Building Code and I.S.I. Specifications
14. 'Materials and Finishes' by Everet.
15. 'A to Z Building Materials in Architecture' by Hornbostle.
16. 'Elements of Structure' by Morgan
17. ENGG.MATERIALS – K.S.RANGWALA.
18. ENGG.MATERIALS – B.K.AGARWAL
19. BUILDING.MATERIALS – S.K.DUGGAL.
20. BUILDING CONSTRUCTION –SUSHIL KUMAR.
21. BUILDING CONSTRUCTION –BINDRA ARORA.
22. Allen, Edward., Fundamentals of Building Construction : Materials and Methods, John Wiley & Sons, New York, 1999.
23. Punamia B.C., Building Construction, Laxmi Publications (P) Ltd, New Delhi, 1993.
24. Published material from HUDCO, CBRI (Roorkee), Development Alternatives, etc

## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030004	Theory of Structures -1	100			2	1	2	20	20	60

### Course Objective

To Introduce Applied Mechanics as an important Subject for Architecture.

The course would enable students to understand various principles of strength of materials especially in the case of beams, columns and trusses

To Understand Different Systems of Forces and their Equilibrium and that a Building is a System of Forces in Equilibrium.

To Introduce and Understand Concepts of Support, Support Reactions, Beams, Loads, Bending and Shear.

### Course Outcome

Understand basis applied mechanics.

To calculate Shear Force and Bending Moment in structural members.

### Course Content

#### Module -1

Forces

Applied Mechanics, Statics and Dynamics. Importance of Study.

Forces, Definition, Effects, Different Systems, Principle of Transmissibility and Superimposition of Forces. Resolution and Composition of Forces.

Equilibrium of Concurrent Forces. Parallelogram, Polygonal & Triangular Law of Forces Lami's Theorem. Analytical and Graphical Solution of Forces. Resultant and Equilibrant of a System of Concurrent Forces

Equilibrium of Non Concurrent Forces. Varignon's Principle. Resultant of a system of noncurrent forces as in a beam.

#### Module -2

Centre of Gravity

Definition of Centre of Gravity and Centroid. C.G of Regular Shapes. Computing of C.G of complex Shapes limited to Standard Steel Sections like C, T, L, I and Compound Sections

#### Module -3

Moment of Inertia

Definition of Moment of Inertia and M.I of Standard Shapes. Parallel Axis Theorem, Perpendicular Axis Theorem, Radius of Gyration. Computing M.I of Complex Shapes Limited to C,T,L,I and Compound Sections using these Shapes

Supports and Loads

Supports, Definition, Reactions offered by Simple, Fixed, Hinged and Roller Support.

Statically Indeterminate and Determinate Structures and Degree of Indeterminacy. Beams classified as Simply Supported, Cantilever, Over Hanging, Propped Cantilever, Fixed and Continuous.

Loads Classified as U.D.L, Point Load & Varying Load.

Loads Classified as Dead, Live, Wind, Snow, Seismic. Introduction to Densities of Material and Calculation of Dead loads on a Beam from slab, Brick work above to act as U.D.L and from a abutting beam as a Point Load

Support Reactions. For Simply Supported Beams and Cantilevered Beams only. Loading limited to Point Loads and U.D.L only

#### Module - 4

### Shear Force and Bending Moment

Shear Force and S.F.Diagram & B.M.D and B.M.Diagram for :: Simple Support with an U.D.L., Simple Support with a Central Point Load, Simple Support with an eccentric point Load, Cantilever with a full U.D.L, Cantilever with a Point Load.

S.F.D and B.M.D of a Simple Supported Beam and Over Hanging Beams with U.D.L and Point Loads. Point of Zero Shear, Point Of Max S.F and B.M max. Point of Contra flexure

Relationship between S.F.D and B.M.D

### Studio Exercises

Suitable exercises on all the Modules mentioned above

### Mode of Examination

Theory Paper with 3 hour duration.

### Reference Books

1. Engineering mechanics by A. K. Tayal
2. Mechanics of structure Vol. I By Junnarkar.
3. Design of steel structures-Vazirani – Rathwani.
4. Design of steel structures- L.S. Negi.
5. R.C.C. Design – Khurmi, Punmia, Sushilkumar.
6. Elements of Structures – Morgan.
7. Structure in Architecture – Salvadon and Heller.
8. Structure Decisions – F. Rosenthal
9. Strength of Materials by Amol Dongre.
10. Engineering Mechanics – RK Bansal and Sanjay Bansal , Laxmi publications, New Delhi.
11. Engineering Mechanics - F.L. Singer, Harper Collins publications.
12. Khurmi, R.S.; Strength of Materials, S. Chand & Company, New Delhi, 2001.
13. Ramamrutham, S.; Strength of Materials, Dhanpat Rai Publication, New Delhi, 1998

## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030005	Building Services-1 (Plumbing and Sanitation, Fire Fighting)	100	0		1	1	0	20	20	60
AR2030015	Building Services-1 (Plumbing and Sanitation, Fire Fighting)		50		1	1	0	20	0	30

### Course Objective

To give architects an overview and introduction to Plumbing systems; and architectural considerations and their coordination with other services and architectural designs.

To introduce students to following Building Services in low, medium and high rise buildings and inculcate in them the integration of services in architectural design.

Knowledge of essential component of Fire fighting system systems at domestic level.

Skill to prepare design of Fire fighting system for buildings

### Course Outcome

Discuss the active and passive components of plumbing

Value the importance of building services

Develop understanding of water supply system at city levels

Design of water-sewer system in buildings (except hydraulics design calculation parts)

### Course Content

#### Module -1

Importance of Building Services

Importance of water supply and sewerage.

Historical overview of development of water/ sewerage systems

#### Module -2

Water Supply for Urban Area

Sources of water

Quality of water, impurities in water and its treatment.

Water demand calculations; norms and standards.

Water storage, overhead tank, and sump.

Water distribution system at city/ neighbourhood overview.

Water treatment plant

Types of water distribution networks

Water pipe materials, apparatus, joints, fixtures and valves.

Guidelines for laying of water mains, distribution.

Various control valves

#### Module -3

Domestic Water Supply

Principles of water supply in domestic buildings

Water supply in low-rise and multi-storeyed buildings.

Pipe materials, fixtures, joints, equipment's

Roof top water drainage

#### Module -4

Taps, faucets and other fittings

Bib taps (ordinary, Screw down , half turn , quarter turn using ceramic disks ) variations such as pillar taps , angle valves , shower roses etc.

Mixing units for wash-hand basins, kitchen sinks, shower units, baths etc. (Both of valve and diverter type and single lever type)

Flushing cisterns and flush valves.

#### **Module - 5**

Hot Water Supply System

Hot-cold water supply network and connections.

Systems of hot water supply using conventional and non-conventional energy sources.

Circulation systems i.e. ring system, up feed systems, drop system etc.]

Insulation of piping and safety devices.

#### **Module - 6**

Domestic Sewage System

Principles of domestic sewer systems norms and standards.

Types of pipe systems.

Types of traps, use and water seal.

Domestic sewer conveyance network.

Components of sewer conveyance network.

Basic terminology, Gully trap, inspection chamber, intercepting trap, man holes etc.

Calculation for Gradient and slope in sewage disposal.

Various sanitary fixtures and its connections.

Sewage disposal to septic tank, cess pool, soak pit.

Connection of house drainage to public sewer.

#### **Module - 7**

Rain Water and Storm Water Disposal System

Techniques to divide surface area for rain water disposal

Details of collection point/ Khurra

Conveyance network for waste / rain water.

Apparatus for conveyance of water, catch basin, gully traps, calculation for gradient/ slopes.

#### **Module - 8**

Fire Fighting System

Causes and spread of fire, Combustibility of materials and safety norms.

Passive Fire Protection Strategies

Active Fire Protection Systems. Fire Detection Systems, Alarm Systems, Fire Extinguishing Systems, Smoke Control

Designing Fire Escapes for Life Safety

Code Provisions

#### **Studio Exercises**

Suitable exercises on all the Modules mentioned above

Suitable Case studies to be conducted

Design of Domestic Water Supply and Sewage Network

Applications of knowledge water supply and sewage design

Preparation of drawings excluding hydraulic design

#### **Mode of Examination**

Theory Paper of 3 hour duration

Sessional Work with assessment

**Reference Books**

Plumbing Engineering by Dr. Subhash Patil

International Plumbing Code by Indian Code Council

Building Construction Illustrated by Dr. F.D.K Ching

Building Construction by Sushil Kumar

Building Construction by B.C Punmia

Building Construction by Rangwala

Building Construction by P.C Varghese



## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030006	Contemporary Architecture	100			1	1	0	20	20	60
AR2030016	Contemporary Architecture		50		1	0	2	20	0	30

### Course Objective

This subject outlines the metamorphosis of the technology-based and program-based architecture of occidental world since late 18th century in Europe, America and the rest of the world.

It analyses the design philosophies of individual 'master's of occidental architecture as well as that of groups or movements in the field of architecture and art in Europe and elsewhere.

In the process of analysis and narration of the development of architecture as we find it now globally, this subject showcases and discusses salient buildings standing as landmarks of design intervention in the timeline of building activity.

Design Connectivity – This lesson in the development of contemporary architecture is directly linked to the type of buildings the students are exposed to and they would be supposed to design in their future carrier. The materials of construction are also the commonplace ones. Hence, development of different contemporary styles of architecture would help students to use/apply them in their designs in all forthcoming semesters.

### Course Outcome

To identify different styles and schools of contemporary architecture.

To analyse the contributing factors for the design development of different styles.

To analyse the works of the famous master architects introduced to the student.

To evaluate the works of modern architecture that the student is coming across in every day's life

To design buildings in the contemporary architectural styles.

### Course Content

#### Module -1

Introduction, Advent of Steel, Glass and Ferro-Concrete

Late Renaissance and development of open spaces

Advent of Steel and Henry Labrouste

Great Exhibitions of 1851 and 1889 and their contributions

Gustave Eiffel

Development of Ferro concrete: Auguste Perret, Tony Garnier

#### Module -2

Development Of 'New Art & Architecture'

Art Nouveau movement and Victor Horta

H.P. Berlage, H. H. Richardson and 'True Construction'

Balloon Frame Structure and Plane Surfaces in America

#### Module -3

Chicago School & Organic Developments

Chicago School: Louis Sullivan

Organic Architecture: Frank Lloyd Wright

#### Module -4

Programmatic Functionalism

Walter Gropius and Bauhaus

Le Corbusier

**Module - 5**

Development of International Style

Mies van der Rohe

Philip Johnson

Louis I Kahn Thermal Insulation

**Module - 6**

20th Century World Architecture

Works of some master architects, like

Eero Saarinen

Alvar Aalto

Frank O. Gehry

M. Pei

Kenzo Tange

Oscar Niemeyer

Richard Neutra

Norman Foster

Antonio Gaudi

**Module - 7**

Indian Architecture Since Independence

Transformation of Indian architecture during colonial period – influences and effect

Works of some master architects from the post-independence period, like –

B. V. Doshi

Charles Correa

Raj Rewal

A. P. Kanvinde

Laurie Baker

**Studio Exercises**

Suitable exercises on all the Modules mentioned above

**Mode of Examination**

Theory Paper of 3 hour duration

Sessional Work with Assessment

**Reference Books**

1.Space, Time and Architecture by Siegfried Gideon

2.The Puzzle of Architecture by Robin Boyd

3.Modern Architecture by Kenneth Frampton

4.The Story of Architecture by Patrick Nuttgens

5.History of Architecture by Sir Bannister Fletcher

6.Architecture and Independence by John T. Lang, Madhavi Desai, Miki Desai

7.Library of Contemporary Architecture

## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030007	Model Making Workshop-3 (Carpentry)		100		1		2	40	0	60

### Course Objective

To familiarise students with different types of materials for Carpentry works

To introduce use different kinds of tools and machinery civil works, Carpentry Works

To act as an interface between Building Construction and Materials-3 and Architectural Design Studio-3

### Course Outcome

To use tools for carpentry.

Understand timber construction in practical way.

Use timber as a material.

### Course Content

#### Module -1

Creating Building elements using actual materials for construction

Students to construct scale models of construction of Building elements such as Timber roof, Timber staircase, Timber Partitions ,Doors, Windows etc

#### Module -2

Understanding the tools used in carpentry industry.

Understanding application of the construction methodology

#### Module - 3

Analysis of Art work from history of Architecture with special focus on Timber construction

Module -4

Site Visits

Case Studies

### Studio Exercises

Models to be created for Building Construction and Materials-3, Contemporary Architecture, History of Architecture -2 and Architectural Design Studio-3

Module -2 to be done in group of 5 students under the guidance of subject teacher

### Mode of Examination

Sessional Work with Assessment

### Reference Books

1.The complete book of drawing techniques, by Eugene Felder & Emmett Elvin

2.Paper Scissor Glue by Catherine Norman, Ryland Peters & Small

3.Color on Metal by Tim Mc Creight & Nicole Bsullak

4. Books for Building Construction technology and Materials

## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030008	Critical Appreciation of Design-2			100	1	0	2	40	0	60

### Course Objective

To introduce medium of understanding art and architecture with criticism and critical appreciation as tools to study, understand and judge any piece of art or architecture.

To develop analytical skills in art appreciation.

To enable the students to understand that critics help viewers perceive, interpret and judge artworks.

### Course Outcome

Instil a critical approach towards art and architecture.

Demonstrate skill in appreciation of art and architecture.

Develop skill in analysing art forms and architectural design.

### Course Content

#### Module -1

Philosophical Approach To Art Appreciation

Historical review of aesthetic theories and concepts

Study of seminal texts in aesthetic theoretical works

#### Module -2

Introduction to Architectural Criticism

Introduction and study of various Architectural Critics- Ada Louise Huxtable, Lewis Mumford, Paul Goldberger, etc

#### Module -3

Understanding different objectives of Architectural Criticism- activist, inform, instil action

#### Module -4

Art criticism

Describing an artwork, Analysing an artwork ,Interpreting an artwork, Judging an artwork

### Studio Exercises

Assignments related to above mentioned modules. Minimum 10-15 assignments in the form of workshops and Case Study.

### Mode of Examination

No Theory Paper

Sessional Work with Viva

### Reference Books

Understanding Art by Mittler Ragans

Looking at pictures- Purnell Library of knowledge

Architectural Criticism and Journalism : Global Perspectives by Mohammad al-Asad & Majd Musa

Image by Gavin Ambrose, Paul Harris

Writing about Architecture by Alexandra Lange

Visual Thinking by Rudolf Arnheim

Forty ways to think about architecture: Architectural history and theory today edited by Iain Borden, Murray Fraser and Barbara Pennes

### Magzines

Domus

Architecture + design

Marg

Discover India

Heritage India

Architectural Record

Indian Architect and Builder

Architectural Digest

## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030019	Photography-2 (Advance)			100	1	0	2	40	0	60

#### Course Objective

To represent architectural elements through photography

To understand photography in relation to architecture

#### Course Outcome

Use of Photography with architectural projects.

Use various modes of photography such as Still photography and Motion photography.

Documentation in digital format.

#### Course Content

##### Module -1

Digital photography-Still and Motion

##### Module -2

Film based photography

##### Module -3

Editing and Mixing of visuals

##### Module - 4

Documenting architectural work through photography,

#### Studio Exercises

Assignments related to above mentioned modules. Minimum 10-15 assignments.

#### Mode of Examination

No Theory Paper

Sessional Work with Viva

#### Reference Books

1: The 35mm Handbook-Michael Freeman

2: Focal encyclopaedia of Photography, Focal press

3: Basic Photography, M.J.Langford, Focal press

4: Advanced Photography (Vol-1 and Vol -2), M.J.Langford, Focal press

5: Creative Colour Photography Techniques- Marshall Cavendish

6: Digital Photography in Available Light- Essential Skills, Mark Galer, Focal Press

7: The Art of Digital Photography, John Hedgecoe, DK Ltd, UK

8: Mastering Digital SLR Photography, David D.Bush, Thomson

9: Understanding Exposure, Bryan Peterson, Amphoto Books

10: Learning to see creatively, Bryan Peterson, Amphoto Books

11: The Art of Photography : An approach to Personal Expression, Rocky Nook

12: The Photographer's Eye, Michael Freeman, Focal Press

13: Architectural Photography, Adrian Schulz, Rocky Nook

14: The Beginners Photography Guide, DK



## Second Year Bachelor of Architecture

### Semester -3

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2030029	Streetscapes			100	1	0	2	40	0	60

#### Course Objective

To understand the importance of Street scape in Architectural design and Urban design.

To introduce student to some parameters of Urban design with emphasis on streets and connectivity design.

#### Course Outcome

To design street scape for the project.

Use street as a Design feature.

#### Course Content

##### Module -1

Introduction to Street scape

Historical significance of street scape in India.

Need and importance of connectivity in Urban design.

Criteria for design of street- Width, Length, Population etc.

##### Module -2

Traffic and design linkages

Understanding modes of transport and its relation to the design of streets, roads, highways, expressways etc.

##### Module - 3

Street Vegetation

Landscape linkages

Facades and linkage between street vegetation, landscape and traffic.

##### Module - 4

Signage

Requirement of signage and its design.

#### Studio Exercises

Suitable exercises on all the Modules mentioned above

Case studies, Book studies of Streets in India and Abroad

#### Mode of Examination

No Theory Paper

Sessional Work with Viva

#### Reference Books

1: Urban Streetscape Design, Petra Funk

2: Urban Spaces : Plazas, Squares and Streetscapes, Chris van Uffelen



## Second Year Bachelor of Architecture

### Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040001	Architectural Design Studio-4 (Commercial Project)	100		0	2	2	0	20	20	60
AR2040011	Architectural Design Studio-4 (Commercial Project)			200	5	0	10	80	0	120

### Course Objective

To study design in continuation with the previous semesters.

To understand architectural and aesthetics in relation with architectural and functional aspects.

To understand Bye laws in strict application.

To understand site features and incorporate those in design.

### Course Outcome

To design complex architectural spaces.

To conduct Site analysis.

To formulate design proposal.

### Course Content

#### Module-1

Complex architectural spaces

Multiple layering of architectural space (without aid of mechanical means of vertical transport), its relationship with structure, technology and resultant built form; Concept of earthquake resilient structural systems for indigenous applications.

#### Module -2

Site analysis w.r.t to surroundings; zoning and activity distribution; Circulation and activity relationships through adjacencies, achieving performance integrity through functional adjacencies and elementary services of water and drainage.

#### Module -3

Structural system in Built Form

Introduction to Multi storeyed building design

#### Module-4

Design development and Design proposal

Relation to various functional aspects of the design problem: Use of bubble diagrams, flow diagrams, zoning of site, etc.

Conceptual Design and Final design proposal

Finalization of design proposals: schematic 2D/ 3D / single line/ conceptual level site plan, floor plan, elevations and sections should be finalized

### Studio Exercises

Design of 1 no Major and 1 no Minor Project

Major project to be Min Ground +5 structures with area 5000 to 8000 sq.m.

Minor project to be Min Ground +1 Structure with area 1000-1200 sq.m.

Focus on design of Commercial spaces such as Shopping complex, Office Complex, Malls, Hotels, Multiplex, etc. as defined in Building bye laws.

**Mode of Examination**

Theory Paper of 6 hour duration – Time Problem

Sessional Work with Viva

**Reference Books**

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

## Second Year Bachelor of Architecture

### Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040002	Architectural Drawing and Graphics-4 (Computer Based)	100		0	2	1	2	20	20	60
AR2040012	Architectural Drawing and Graphics-4 (Computer Based)			150	2	0	4	60	0	90

### Course Objective

To study Architectural drawing and graphics in continuation with the previous semesters.

To understand use of computers as tool for drawing

To understand architectural drawing in relation to use of software's.

To understand presentation techniques using software's

Focus on 3D Drawing

### Course Outcome

Demonstrate the concepts of CAD drafting methods and techniques in 2D and 3D through various architectural projects of progressive complexity.

Use computer as a tool to generate drawings and presentations.

### Course Content

#### Module-1

3D Software's

Introduction to 3D Software's

Importance and use of 3D Software's for presentation and Analysis of design

#### Module -2

Using 3D Software's

Generation of Models Using 3D in AutoCAD

Generation of models Using 3D in software's such as Google Sketch-up, 3D Max, or similar software's used in the industry

#### Module -3

Rendering and Printing

Application of Materials, textures, Surroundings, lighting etc to generate realistic model

#### Module-4

Editing and presentation software's

Using Photoshop, Corel Draw and similar software's for creating final output of the model

### Studio Exercises

Similar exercises from ADG-2 to be done using CAD software

### Mode of Examination

Theory Paper of 3 hour duration

Sessional Work with Viva

### Reference Books

1.Fundamentals Of Three-Dimensional Computer Graphics by Watt

2.Computer Aided Design guide For Architecture, Engineering And Construction by Aouad

3. Latest versions of AutoCAD, 3D Max, Google Sketch up, Photoshop, Corel Draw.

## Second Year Bachelor of Architecture

### Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040003	Building Construction Technology and Materials-4	100		0	2	0	4	20	20	60
AR2040013	Building Construction Technology and Materials-4			150	2	2	0	60	0	90

### Course Objective

- To introduce the construction methodology of Reinforced Cement Concrete (RCC) Structures
- To understand the execution process of each building element using RCC as primary material

### Course Outcome

- Understand materials and their use in construction.
- To comprehend RCC Structural system in construction.
- To comprehend the various modes of vertical circulation through live examples

### Course Content

#### Module -1

- Introduction to materials used in civil construction.
- Advance Concrete technology
- Types of Concrete
- Application of Concrete for various elements
- Cladding Materials
- Details of cladding of wall with stone, tiles, timber and steel framing
- Insulation Materials
- Materials for Sound Insulation, Thermal Insulation
- Properties of above mentioned materials and Quality tests of materials

#### Module -2

- Introduction to RCC elements like Columns, Beams and Slabs
- Reinforcement detailing of RCC building elements like columns, beams and slabs

#### Module -3

- RCC Staircase
- Types of Staircase- Dog-legged staircase, Open well staircase, Quarter Turn Staircase, Spiral, Circular, Folded Plate staircase
- Description of staircases, technical terminology involved, classification of staircases based on shape, material and its construction details.
- Reinforcement detailing of RCC Staircase of above mentioned staircase

#### Module -4

- Elevators
- Design criteria for provision of Elevators
- Details of construction
- Escalators, Travellators and Auto Walks
- Installation, working mechanism of Escalators, Travellators and Autowalks

### Studio Exercises

Suitable exercises on all the Modules mentioned above

Each module should include market surveys and construction site visits compulsorily.

### **Mode of Examination**

Theory Paper of 3 hour duration

Sessional Work with Viva

### **Reference Books**

1. 'Elements of Structure' by Morgan.
2. 'Structure in Architecture' by Salvadori.
3. 'Building Construction' by Mackay W. B., Vol. 1 – 4.
4. 'Building Construction' by Barry, Vol. 1 – 5.
5. 'Construction Technology' by Chudley, Vol. 1 – 6.
6. 'Building construction Illustrated' by Ching Francis D. K.
7. 'Elementary Building Construction' by Michell.
8. 'Structure and Fabric' by Everet
9. 'Engineering Materials' by Chaudhary.
10. 'Building Construction Materials' by M. V. Naik.
11. 'Civil Engineers' Handbook' by Khanna
12. 'Vastu Rachan' by Y. S. Sane.
13. National Building Code and I.S.I. Specifications
14. 'Materials and Finishes' by Everet.
15. 'A to Z Building Materials in Architecture' by Hornbostle.
16. 'Elements of Structure' by Morgan
17. ENGG. MATERIALS – K.S.RANGWALA.
18. ENGG. MATERIALS – B.K.AGARWAL
19. BUILDING MATERIALS – S.K.DUGGAL.
20. BUILDING CONSTRUCTION –SUSHIL KUMAR.
21. BUILDING CONSTRUCTION –BINDRA ARORA.

## Second Year Bachelor of Architecture

### Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040004	Theory of Structures -2	100			1	1	0	20	20	60
AR2040014	Theory of Structures -2		50		1	0	2	20	0	30

#### Course Objective

To Analyse the forces in a Frame.

To Study and analyse the stresses in various Building Elements like Columns and Beams.

To Study the deflection effect of loads on Beams.

To Study Combined Stresses on Eccentrically Loaded Columns and Apply the Same to the Design of Foundations of Load Bearing Walls.

#### Course Outcome

Understand Frame structure.

Understand Stresses in Frames and trusses.

Understand deflection in structural members.

#### Course Content

##### Module -1

Simple Stresses and Strains

Linear Stresses and Strains. Hooke's Law. Stress Strain Diagram for Various Materials. Lateral Strain, Poisson's Ratio, and. Elongation of Long Rods, Volumetric Strain, Bulk Modulus. Shear Stress. Modulus of Rigidity. Relationship between various Moduli. Composite Materials, Modulus Ratio and Equivalent Area e.g. R.C.C Column with Concrete and Steel.

Elastic, Plastic, Brittle and Ductile Materials. Yield Stress, Factor of Safety and Working or Permissible or Safe Stress.

##### Module -2

Spanning Members

Bending Stresses. Theory of Simple Bending. Assumptions, Flexural Formula, Stress Distribution across a Section and across the span of the Beam. Modulus of Resistance. Section Modulus and how M.R is proportional to square of depth.

Shear Stresses. Formula, Shear Stress Distribution across a Rectangular, Circular, T, C, L, I Section.

##### Module -3

Deflection

Deflection. Concept of Slope and Deflection. Double Integration Method and Derivation of Formula for a S.S Beam with Full U.D.L only. Formula for Deflection and Slope in the Standard cases (studied in Sem. I). Application in Problems. a. Propped Cantilever. Use Deflection to Find Reactions in this case of a Statically Indeterminate Structure.

##### Module -4

Combined Stresses

Compressive Members Subjected to Eccentric Loading. Stresses developed at four corners

Middle third Rule, Kernel of a Column. Application of Middle Third Rule in Foundations.

Application of the theory to Chimneys.

##### Module -5

Frames and Trusses.-1

Introduction of Trusses as a Building Element and Why Important.

Perfect and Imperfect Frames. Redundant Members.

Analytical Solutions. – Method of Joints, Method of Sections

### **Module - 6**

Frames and Trusses.-2

Graphical Solution of Frames

### **Studio Exercises**

Suitable exercises on all the Modules mentioned above

### **Mode of Examination**

Theory Paper of 3 hour duration

Sessional Work with Assessment

### **Reference Books**

1. Engineering mechanics by A. K. Tayal

2. Mechanics of structure Vol. I By Junnarkar.

3. Design of steel structures-Vazirani – Rathwani.

4. Design of steel structures- L.S. Negi.

5. R.C.C. Design – Khurmi, Punmia, Sushilkumar.

6. Elements of Structures – Morgan.

7. Structure in Architecture – Salvadon and Heller.

8. Structure Decisions – F. Rosenthal

9. Strength of Materials by Amol Dongre.

10. Engineering Mechanics – RK Bansal and Sanjay Bansal , Laxmi publications, New Delhi.

11. Engineering Mechanics - F.L. Singer, Harper Collins publications.

12. Khurmi, R.S.; Strength of Materials, S. Chand & Company, New Delhi, 2001.

13. Ramamrutham, S.; Strength of Materials, Dhanpat Rai Publication, New Delhi, 1998

14. Design of steel structures-Vazirani – Rathwani



## Second Year Bachelor of Architecture

### Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040005	Building Services-2 ( Electrical, Ventilation , Acoustics, BMS, Vertical Transport)	100			1	1	0	20	20	60
AR2040015	Building Services-2 ( Electrical, Ventilation , Acoustics, BMS, Vertical Transport)		50		1	1	0	20	0	30

### Course Objective

To understand various systems of Electrical services, Illumination, ventilation, acoustics, building management system and Elevators/Escalator services; and its design application for a small and large building.

An architect's role may range from designing services for a less complex structure to incorporating engineering solutions / designs provided by respective consultants in their design programme and to deliberate with them in order to provide best possible solution.

The subject will be taught is congruence with the Design studio and assignments for the subject will be linked to the design exercises to achieve higher level of learning and understanding the practical application of the same.

### Module -1

Importance of Building Services

Importance of Electrical, illumination and vertical transportation system

Historical overview of development of Electrical ,illumination and vertical transportation system.

### Module -2

Electrical Services

Basic principles of electricity

Electricity demand calculations; norms and standards

High side electrical system at site level - Transformers and switch gears – Layout of substations

Electrical distribution system at site level overview

Types of distribution networks at site level and building level.

Planning electrical wiring for building – Main and distribution boards

Types of wires, wiring systems and conduit

Fixing of electrical fixtures and switches

Materials, apparatus, joints, fixtures and breakers –Market survey

Low voltage supply (data and telephone)

### Module - 3

Illumination

Visual tasks – Factors affecting visual tasks

Modern theory of light and colour – Synthesis of light

Additive and subtractive synthesis of colour – Luminous flux – Candela – Solid angle illumination – Utilisation factor – Depreciation factor

Classification of lighting – Artificial light sources – Spectral energy distribution – Luminous efficiency – Colour temperature – Colour rendering.

Design of modern lighting – Lighting for stores, offices, schools, hospitals and house lighting. Elementary idea of special features required and minimum level of illumination required for physically handicapped and elderly in building types

### Module - 4

## Vertical Transportation System

Types of Elevators, Escalators and Auto-walks and their suppliers.

Factors guiding their placement and layout in a building envelope.

Designing Elevators – no. of elevators, capacity, elevator bank, etc.

Design and construction of pit, well and machine rooms for elevators and escalators.

Elevator, escalator and auto-walks design applications.

Exchange of Information.

Installation and commissioning

## Module - 5

### Fundamentals of Heating, Ventilation and Air Conditioning

Basic principles, laws and terminologies related to HVAC.

Psychometric chart and comfort zone.

Evaporative cooling systems of air conditioning.

Refrigerant Cycle (Vapour Compression System) and its reversal.

Components of Mechanical Vapour Compression Refrigeration Systems.

Natural and artificial ventilation

## Module - 6

### Types of Air Conditioning Systems

Window Air Conditioners

Split Air Conditioners

Packaged Air Conditioners

Direct Expansion Air Conditioning Systems

Central or All-water Air Conditioning Systems

Selection criteria, design / structural considerations and energy requirements for above mentioned air conditioning systems.

## Module - 7

### Emerging Trends in HVAC and other Miscellaneous Topics

Passive Heating and Cooling Systems

Energy Saving through Design, Operation and Maintenance

Emerging Technologies – VRV, VRF, Heat Recovery Systems, etc.

Developing Air Conditioning layouts for their current design exercise.

Coordination with other services, architectural and structural designs.

## Module - 8

### Introduction to Basics of Acoustics

Basic laws and terminologies related to Acoustics.

Sound Intensity and Sound Intensity Level. (Classroom exercise)

Sound Absorption, Transmission, Reflection, Diffusion and Diffraction.

Free field conditions and Inverse Square Law for noise reduction with distance.

Sound Absorbing Materials – descriptions and characteristics.

Reverberation Time and its importance for acoustical performance of an enclosure.

Sabin's Equation and its application for designing new auditoriums and correcting RT of existing ones. (Classroom exercise)

Acoustical defects in an auditorium and their remedies.

Acoustical design of auditorium and other acoustically sensitive enclosures meant for speech, music, lecture, etc

Properties of materials and their application for acoustical treatment, shape analysis for different enclosures.

Designing enclosures for variable RT's.

Sound Amplification Systems

## Module - 9

**Noise Isolation and Control**

Noise and its effects.

Types of noise and its transmission.

Sound Insulation and Transmission Loss

Speech privacy and noise control in specific situations.

Methods of Sound Insulation - control of mechanical noise and vibrations.

Codal Provisions

**Studio Exercises**

Suitable exercises on all the Modules mentioned above

Suitable Case studies to be conducted

Co-Ordination of Building Services

Co-ordination of building services with other service layouts, architectural layouts and structural layouts

Preparation of Co-ordination drawings.

**Mode of Examination**

Theory Paper of 3 hour duration

Sessional Work with Assessment

**Reference Books**

National Building Code 2016

Mechanical and Electrical Equipment for Buildings by Walter T. Grondzik, Alison G. Kwok, Benjamin Stein

Basic Refrigeration and Air Conditioning by A. Ananthanarayana.

Building Construction by Rangwala.

Architectural Acoustics by M. David Egan

## Second Year Bachelor of Architecture

### Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040006	Emerging World Architecture	100			2	1	2	20	20	60

### Course Objective

- To introduce the design aspects in the current building design.
- To study projects with reference to modern and current context of design
- To study use and applicability of advance building technology.
- To study use of modern materials as a mode of expression of architecture.
- To study current parameters in building design.
- To understand and refer to International concepts

### Course Outcome

- Understand current emerging modern building design.
- Relate to the current aspects of building functions.
- Relate to changes in the building design from International perspective.

### Course Content

#### Module -1

- Introduction to architectural design post 1960 to 2017
- Introduction to Modern infrastructure projects

#### Module -2

- Trans World Flight Centre, USA
- United States Air Force Academy Cadet Chapel, USA
- Cathedral of Brasilia, Oscar Niemeyer
- Seagram Building,

#### Module -3

- Walt Disney Concert Hall, USA
- Guggenheim Museum, Bilbao, Spain
- Petronas Tower, Malaysia
- Central Plaza, Hong Kong
- Bank of China Tower , Hong Kong

#### Module -4

- Beijing National Stadium, China
- Mumbai's Cybertecture Egg, Mumbai
- Kingdom Center, Riyadh
- CCTV Headquarters, Beijing, China
- National Center for Performing Arts, Beijing, China

#### Module -5

- Chhatrapati Shivaji International Airport, Mumbai
- Antilia, Mumbai
- One World Trade Center, New York
- Changi Airport , Singapore,
- Burj Al Arab, Dubai

### Studio Exercises

- Suitable exercises on all the Modules mentioned above

<b>Mode of Examination</b>
Theory Paper of 3 hour duration
<b>Reference Books</b>
Literature on the structures mentioned above

## Second Year Bachelor of Architecture

### Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040007	Model Making Workshop-4 (Building Services)		100		1	0	2	40	0	60

#### Course Objective

To familiarise students with different types of materials for Civil Works Carpentry works, Plumbing works as mentioned in Building Services -1

To introduce use different kinds of tools and machinery civil works

To act as an interface between, Building Construction and Materials-4 and Architectural Design Studio-4, Building Services-1 (Plumbing and Sanitation, Electrical, Fire Fighting)

#### Course Outcome

Use of tools for Plumbing

Understand concepts of plumbing

#### Course Content

##### Module -1

Creating Building elements using actual materials for construction

Students to construct scale models of construction of Plumbing Systems

##### Module -2

Understanding the tools used in Plumbing industry.

Understanding application of the construction methodology

##### Module - 3

Case study of materials and equipment required services mentioned in Building Services-1

Site Visits

#### Studio Exercises

Models to be created for Building Construction and Materials-4, Architectural Design Studio-3, Building Services -1

Module -2 to be done in group of 5 students under the guidance of subject teacher

#### Mode of Examination

Sessional Work with Assessment

#### Reference Books

1. The complete book of drawing techniques, by Eugene Felder & Emmett Elvin

2. Paper Scissor Glue by Catherine Norman, Ryland Peters & Small

3. Color on Metal by Tim Mc Creight & Nicole Bsullak

4: Books for Building Services.

## Second Year Bachelor of Architecture

## Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040008	Geographic Information System			100	1	0	2	40	0	60

### Course Objective

To create awareness about software system for environmental management.

### Course Outcome

To use GIS for environmental management

### Course Content

#### Module -1

Introduction to Geographic Information sciences

History, Domains for GIS, Definitions of GIS, Components of a GIS, Comparisons of various software, Hardware requirements, Digital cartography and conventional CAD.

#### Module -2

Data models and Data structure.

Conceptual models of real world, entities or fields, Vector data models, Tessellation of continuous fields, raster data models, Use of models- Cadastre, Utility networks, land cover, soil naps, Introduction to data structure, Vector data structure and Raster data structures. Hierarchical database Structure, Network data structure, Relational data structure, object oriented database structure.

#### Module -3

Introduction to data input, data capture methods.

Digitization, rasterisation, attributes or feature code inputting, verification and editing methods. Creation of continuous surfaces and simple analysis of Environmental problems. Mountainous environment land-use studies. Introduction to Remote sensing and Environmental mapping. Growth and change in land-use. Comparison of land uses of different periods.

#### Module -4

Exercises in database

Query, distance and context operators, Cost distance and least cost pathways, Boolean operations on maps, remote sensed data explorations, supervised and unsupervised classification and principal component analysis.

### Studio Exercises

Suitable exercises on all the Modules mentioned above

### Mode of Examination

No Theory Paper

Sessional Work with Viva

### Reference Books

GIS for Smart Cities, Vinod Kumar T.M, Copal Publications, Delhi.

## Second Year Bachelor of Architecture

### Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040019	Architectural Journalism			100	1	0	2	40	0	60

#### Course Objective

Architectural Journalism is gradually developing as a niche of writing about architecture and design

As architecture often represents the society we live in, it also calls for a narrator, the role of which is interestingly taken up by the Architectural Journalist and Critic

To expose the students to focused architectural writing within the parameters of journalism

To equip the students to communicate effectively emphasizing both on written and verbal communication

To expose the students to multimedia communication and various publications

#### Course Outcome

Expose the students to architectural journalism works of Architectural journalists in India as well as abroad.

Prepare report on architecture and related topics

Work as Architectural Journalist for print and digital media.

#### Course Content

##### Module -1

Introduction

Introduction to Architectural Journalism, the need for the subject

Introduction to Journalism

##### Module -2

Skills for Journalism

Reporting, Editing, Features and Editorial Writing, Scripting for Broadcast Journalism, Event Coverage.

##### Module - 3

Architectural Journalism

Architectural Piece to be a conglomeration of facts about a building and an architect along with the experience of the user

Detail review of Elements of Architecture

##### Module - 4

Structure of Architectural journals

Writing descriptive and analytical reports

Editing write ups, Photo journalism,

Books reviews, Page compositions, The public process. Electronic media.

#### Studio Exercises

Suitable exercises on all the Modules mentioned above

#### Mode of Examination

No Theory Paper

Sessional Work with Viva



**Reference Books**

1. Architectural Criticism and Journalism : Global Perspectives by Mohammad al-Asad & Majd Musa
2. Writing about Architecture by Alexandra Lange
3. Thinking Design by S. Balaram
4. Architectural Theory- An anthology from (1871-2005), edited by Harry Francis Mallgrave and Christina Contandriopoulos
5. Visual Thinking by Rudolf Arnheim
6. Forty ways to think about architecture: Architectural history and theory today edited by Iain Borden, Murray Fraser and Barbara Pennes

**Magzines**

- Domus
- Architecture + design
- Marg
- Discover India
- Heritage India
- Architectural Record
- Indian Architect and Builder
- Architectural Digest

## Second Year Bachelor of Architecture

### Semester -4

Subject Code	Subject	TH	STW	SV	Credits	L	S	IA	MS E	ESE
AR2040029	Advance computing			100	1	0	2	40	0	60

### Course Objective

The subject intends to introduce techniques for further refinement of computer generated graphics covered in Architectural Drawing and Graphics -3 and 4

This course also trains students for developing photorealistic modelling using popular software in the field of architecture

Advanced technologies and concepts using computers as an essential tool are also introduced such as Building Information Modelling

### Course Outcome

To recognize the need to combine the use of CAD tools and techniques for architectural design communication

To produce architectural drawings using CAD and illustration software programs

To demonstrate knowledge of relevant industry standards and their application in architectural drawings and documents

To construct conceptual and presentation renderings as a design presentation tool for various purposes

To evaluate which software or technique is most effective for a particular goal

### Course Content

#### Module -1

Image Editing Methods and Techniques

To edit and develop images in a raster format through adjustments in image clarity, quality and layers

Image and photo montage and its various methods and techniques

Image as a vector and editing of its vector properties and compatibility with line drawings

Processing of architectural renderings using image outputs from other software.

Adding entourage to images developed from 3-d modelling software.

#### Module -2

Walk through

To develop animation and photo realistic animations and short movies

#### Module -3

Visual Composition

Composition and presentation through different vector based and page setting tools

Combining photo editing, modelling and rendering and presentation methods to produce photo realistic brochures and documents

Development of concepts to real proposed scenarios through computer aided software's

#### Module -4

Building Information Modelling (BIM)

Importance of Building Information Modelling (BIM)

Using software's for Building Information modelling such as Revit, Archicad or similar industry software's.

### Studio Exercises

Suitable exercises on all the Modules mentioned above

<b>Mode of Examination</b>
No Theory Paper
Sessional Work with Viva
<b>Reference Books</b>
Computer Graphics & Animation by M.C. Trivedi (Jaico Publishing House; First edition, 22 January 2009)
Representational Techniques for Architecture (Basics Architecture) by Lorraine Farrelly Nicola Crowson, (Bloombury; 2nd Revised edition edition,18 Dec. 2014)