Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2022
'B^{++}' Grade (CGPA 2.96)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM STRUCTURE

2021 PATTERN

Syllabus: Bachelor of Architecture

Name of the Course: B.Arch. First year – Sem. I & II

(Syllabus to be implemented from June 2023)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty of Science and Technology

Choice Based Credit System structure of First Year B.Arch with effect from (w.e.f) - 2021-22

As per Council of Architecture ,New Delhi (COA) Guidelines based on National Education Policy (NEP)

Scheme Of Teaching and Examination Of B.Architecture First year - Semester I

Subject Code	Subject category	Subject Title	Teaching scheme in periods 60 minutes/ L/P/S			Examination Scheme										
							Theory				Practical/Viva-voce				Total	credits
			lectures per week	practical/ studio per week	Total periods /week	paper duration in hours	ISE		ESE		ICA		ESE			
			L	P/S	T		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
								50%		45%		50%		45%		
21 AR1-01	PC	Architectural Design- I	1	7	8	_	_	_	_	_	100	50	150	67	250	*8*
21 AR1-02	BS & AE	Building Construction and Material-I	1	5	6	4	_	_	100	45	50	25	100	45	250	*6*
21 AR1-03	BS & AE	Theory of Structure -I	2	_	2	3	30	15	70	31	_	_	_	_	100	*2*
21 AR1-04	PC	Human Settlement Planning	2	_	2	3	30	15	70	31	_	_	_	_	100	*2*
21 AR1-05	PC	Architectural Graphics and Drawing -I	1	3	4	_	_	_	_	_	100	50	_	_	100	*4*
21 AR1-06	PC	Basic Design and Visual Arts -I	_	3	3	_	_	_	_	_	100	50	_	_	100	*3*
21 AR1-07	PC	Workshop-I	_	3	3	_	_	_	_	_	50	25	_	_	50	*3*
21 AR1-08	EC/PAEC	Elective -I **A.Architectural Vocabulary** B. Communication Skills C. Arts and Art Forms	_	2	2	_	_	_	_	_	50	25	_	_	50	*2*
		Grand Total			30		60		240		450		250		**1000**	***30***

Abbreviations: **L**- Lectures, **P**- Practicals , **S**- Studios , **ISE**- In Semester Exam., **ESE** - End Semester exam , **ICA**- Internal Continuous Assessment

Subject Categories : PC - Professional Core Courses ,BS & AE - Building Sciences and Applied Engineering , PE - Professional Elective , PAEC- Arofessional Ability Enhancement Courses , SEC - Skill Enhancement courses

Number of subjects / Head - 08	Number of Theory Examination - 03	Number of Oral Examination - 02

	EACH LECTURE / PRACTICAL /STUDIOS ARE OF 60 MINUTES DURATION.
Note :	**1. Theory exam - ISE -Internal Tests - marks to be awarded by conducting Minimum Two Test by the subject teacher ,ESE - University Theory examination**
	2. Oral exam - Prograsive marks (ICA) to be awarded by the subject teacher . Oral/ viva - voce examination (ESE - Oral) shall be conducted by one internal and two external examiner appointed by the university .

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty of Science and Technology

Choice Based Credit System structure of First Year B.Arch with effect from(w.e.f). 2021-22

As per Council of Architecture ,New Delhi (COA) Guidelines based on National Education Policy (NEP)

B.Arch. First year - Semester II

Subject Code	subject category	Subject Title	Teaching scheme in periods per 60 minutes/ lecture			Examination Scheme										
						Theory					Practical/Viva-voce				Total	credits
			lectures per week	practical/ studio per week	Total periods /week	paper duration in hours	ISE		ESE		ICA		ESE			
			L	P/S	T		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
								50%		45%		50%		45%		
21 AR2-01	PC	Architectural Design- II	1	7	8	_	_	_	_	_	100	50	150	67	250	*8*
21 AR2-02	BS & AE	Building Construction and Material-II	1	5	6	4	_	_	100	45	50	25	100	45	250	6
21 AR2-03	BS & AE	Theory of Structure -II	2	_	2	3	30	15	70	31	_	_	_	_	100	2
21 AR2-04	PC	History of Architecture -I	2	_	2	3	30	15	70	31	_	_	_	_	100	2
21 AR2-05	PC	Architectural Graphics and Drawing -II	1	3	4	3	30	15	70	31			_	_	100	4
21 AR2-06	PC	Basic Design and Visual Arts -II	_	3	3	_	_	_	_	_	100	50	_	_	100	3
21 AR2-07	PC	Workshop-II	_	3	3	_	_	_	_	_	50	25	_	_	50	3
21 AR2-08	EC/PAEC	Elective-II : **A. Furniture Design** B. Creative Writing C. Mud Architecture	_	2	2	_	_	_	_	_	50	25	_	_	50	2
		Grand Total	_	_	30	_	90	_	310	_	350	_	250	_	**1000**	***30***
		Democracy, Election & Good Governance	As Per PAH solapur university Guidelines													

Abbreviations: **L**- Lectures, **P**- Practicals , **S**- Studios , **ISE**- In Semester Exam., **ESE** - End Semester exam , **ICA**- Internal Continuous Assessment

Subject Categories : PC - Professional Core Courses ,BS & AE - Building Sciences and Applied Engineering , PE - Professional Elective , PAEC- Arofessional Ability Enhancement Courses , SEC - Skill Enhancement courses

Number of subjects / Head - 08	Number of Theory Examination - 04	Number of Oral Examination - 02

EACH LECTURE / PRACTICAL /STUDIOS ARE OF 60 MINUTES DURATION .

Note :

1. Theory exam - ISE -Internal Tests - marks to be awarded by conducting Minimum Two Test by the subject teacher , ESE - University Theory examination
2. Oral exam - Prograsive marks (ICA) to be awarded by the subject teacher . Oral/ viva - voce examination (ESE - Oral) shall be conducted by one internal and two external examiner appointed by the university

Pass percentage shall not be less than 50% in aggregate of the total marks of the year .

Grade and Grade Point Average:

A grade assigned to each head based upon marks obtained by the student in examination of the course.

CONVERSION OF MARKS INTO GRADES SGPA				
Sr.No.	***Range of Marks***	***Grade***	***Grade Point***	***Description of Performance***
1	*80 onwards*	*O*	*10*	*EXCELLENT /OUTSTANDING*
2	*70-79*	*A+*	*9*	*VERY GOOD*
3	*60-69*	*A*	*8*	*GOOD*
4	*55-59*	*B+*	*7*	*FAIR*
5	*50-54*	*B*	*6*	*ABOVE AVERAGE*
6	*45-49*	*C+*	*5*	*AVERAGE*
7	*<45*	*F*	*0*	*FAIL*
8		*DR*		*DROPPED OUT*

CONVERSION OF AVERAGE GRADE POINTS INTO GRADES		
Sr.No.	***SGPA/CGPA***	***Grade***
1	*9.5-10*	*O*
2	*8.5-9.49*	*A+*
3	*7.5-8.49*	*A*
4	*6.5-7.49*	*B+*
5	*5.5-6.49*	*B*
6	*4.5-5.49*	*C+*
7	*<4.49*	*F*

Computation of SGPA and CGPA

1) The University adopts absolute grading system wherein the marks are converted to grades, and every semester result will be declared with semester grade point average (SGPA) and Cumulative Grade Point Average (CGPA). The CGPA will be calculated for every semester, except for the first semester.
2) The grading system with the letter grades and the assigned range of marks under absolute grading system are as given below:

Computation of SGPA and CGPA

A) The following expressions shall be used to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) respectively:

$$SGPA = \frac{\sum CourseCredits \times GradePointsforalltheCoursesinthatSemester}{\sum CourseCreditsforalltheCoursesinthatSemester}$$

$$CGPA = \frac{\sum CourseCredits \times GradePointsforallCoursesexcludingthosewithFgradesuntilthatSemester}{\sum CourseCreditsforallCoursesexcludingthosewithFgradesuntilthatsemester}$$

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the grade cards.

Illustration for Computation of SGPA and CGPA

Sem. I

	(a) SGPA and CGPA Calculations: An Illustrative Example for one academic year						
Semester (Odd:I,Even:II)	**Course Number**	**Credits**	**Marks scored**	**Grade Points**	**Grade**	**Credit points**	**SGPA**
	1	**2**	**3**	**4**	**5**	**(2x4) 6 (2x4)**	**7**
SEM.I	**21 AR1-01**	**8**	**45**	**0**	**F**	**8X0 =0**	**SGPA = 132/30 = 4.40**
SEM.I	**21 AR1-02**	**6**	**48**	**5**	**C+**	**6x5 = 30**	
SEM.I	**21 AR1-03**	**2**	**50**	**6**	**B**	**2x6 = 12**	
SEM.I	**21 AR1-04**	**2**	**50**	**6**	**B**	**2x6=12**	
SEM.I	**21 AR1-05**	**4**	**50**	**6**	**B**	**4x6=24**	
SEM.I	**21 AR1-06**	**3**	**64**	**8**	**A**	**3x8 = 24**	
SEM.I	**21 AR1-07**	**3**	**53**	**6**	**B**	**3x6 = 18**	
SEM.I	**21 AR1-08**	**2**	**54**	**6**	**B**	**2x6 = 12**	**SGPA = 4.40**
		30 (*22)				**132**	

(22*): Total credits of the semester excluding the credits of the courses under F grade. Considered for

the calculation of CGPA of the two consecutive semesters under consideration.

Sem.II

	(a) SGPA and CGPA Calculations: An Illustrative Example for one academic year						
Semester (Odd:I,Even:II)	**Course Number**	**Credits**	**Marks scored**	**Grade Points**	**Grade**	**Credit points**	**SGPA**
	1	**2**	**3**	**4**	**5**	**(2x4) 6 (2x4)**	**7**
SEM.II	**21 AR2-01**	**8**	**43**	**0**	**F**	**8X0 =0**	**SGPA = 139/30 = 4.63**
SEM.II	**21 AR2-02**	**6**	**50**	**6**	**B**	**6x6 = 36**	
SEM.II	**21 AR2-03**	**2**	**54**	**6**	**B**	**2x6 = 12**	
SEM.II	**21 AR2-04**	**2**	**84**	**10**	**O**	**2x10=20**	
SEM.II	**21 AR2-05**	**4**	**50**	**6**	**B**	**4x6=24**	
SEM.II	**21 AR2-06**	**3**	**51**	**6**	**B**	**3x6= 18**	
SEM.II	**21 AR2-07**	**3**	**49**	**5**	**C+**	**3x5 = 15**	
SEM.II	**21 AR2-08**	**2**	**55**	**7**	**B+**	**2x7 = 14**	**SGPA= 4.64**
		30 (*22)				**139**	

(22*): Total credits of the semester excluding the credits of the courses under F grade. Considered for the calculation of CGPA of the two consecutive semesters under consideration.

CGPA = 132 + 139 (TOTAL SGPA SEM.I + SEM.II) / 22+22 (EARNEDCREDITS) = 6.15

CGPA = 6.15

If the Student secures letter grades as detailed below after reappearance to SEE, then the SGPA and CGPA shall be calculated as indicated below.

Sem. I

	(a) SGPA and CGPA Calculations: An Illustrative Example for one academic year						
Semester (Odd:I,Even:II)	**Course Number**	**Credits**	**Marks scored**	**Grade Points**	**Grade**	**Credit points**	**SGPA**
	1	**2**	**3**	**4**	**5**	**(2x4) 6 (2x4)**	**7**
SEM.I	**21 AR1-01**	**8**	**50**	**6**	**B**	**8X6 =48**	**SGPA = 132+48/30 = 6.00**
		30				**148**	**SGPA = 6.00**

Sem.II

	(a) SGPA and CGPA Calculations: An Illustrative Example for one academic year						
Semester (Odd:I,Even:II)	**Course Number**	**Credits**	**Marks scored**	**Grade Points**	**Grade**	**Credit points**	**SGPA**
	1	**2**	**3**	**4**	**5**	**(2x4) 6 (2x4)**	**7**
SEM.II	**21 AR2-01**	**8**	**55**	**7**	**B+**	**8X7 =56**	**SGPA = 139+56/30 = 6.50**
		30				**139**	**Sgpa = 6.50**

CGPA = 180 + 195 (TOTAL SGPA SEM.I + SEM.II) / 30+30(EARNEDCREDITS) = 6.25

CGPA = 6.25

B) **(b) CGPA Calculation of the Programme: An Illustrative Example**

SEMESTER	IST YEAR	IIND YEAR	IIIRD YEAR	IVTH YEAR	VTH YEAR	TOTAL
CREDITS OF THE SEMESTER	60	60	60	50	40	270
CGPA	6.25	7.50	6.50	8.00	10.00	38.5

CGPA = (60X6.25 +60X7.50+60X6.5+50X8+40X10) / 270 = 2015/270 = 7.46

CGPA = 7.46

B.ARCH. SEM.I
21 AR1 – 01: ARCHITECTURAL DESIGN- I

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	01	01	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	07	07	ISE	ESE	ICA	ESE	
Total	08	08	--	--	100	150	250

Course Objective:

Introduction to Architecture, its scope, relation to the fields of Science & Technology, Mathematics, Philosophy, Religion, Sociology, Psychology, etc.

To introduce students

- The concept of assembling of simple spatial elements in articulated concepts.
- Design processes through storylines, enactment of acts, sketches and models.
- The concepts of design process relationship between idea –concept, space and form for built unit with functional requirements.
- Concept of scale, proportion, and principles of design and composition.

Course Outcome:

By the end of the course student should be able to:

- Exhibit understanding of knowledge of create concept through story lines, enactment of acts, sketches and models.
- Exhibit understanding of knowledge enough to read design and create and design using elements and principles of design.
- Apply the concept of scale, proportion, and application of principles of design and composition.
- Assemble simple spatial elements in articulated concepts and visually represent them through hand-made 2D drawings and models.

Course Curriculum:

Unit 1	**Sketching**	Freehand sketching with different media. Preferably outdoor cityscapes, monuments, objects with varying surfaces, volumes using various time modes. (Same object in two minutes to two hours/ outdoor or indoor)
		Anthropometric sketches along with live models of units in design along with Interior furniture.
Unit 2	**Introduction Architectural Design**	Introduction to Architecture, its scope, relation to the fields of Science & Technology, Mathematics, Philosophy, Religion, Sociology, Psychology, etc.
		Introduction to Anthropometry; minimum and optimum area requirements with respect to human body and its postures; movement and circulation spaces.
		Case studies of a single functional connecting spaces.
		Understand space planning based on activity, which will involve human activity and movement.
		Major Design Assignment: Design of a single function individual units in a residence like bedrooms, living room, kitchen, etc.
Unit 3	**Time bound Assignment**	Design - 6 hours and one day assignment
		Example: Product design, furniture element, Paper Art, Signage, etc.

Submission/Assignments:

1.Study documentation, reports and data collection in file form/drawing form.

2.Study of local architecture with respect to their contexts in the form of sketches; exploration of principles of architecture.

3.Progressive work, Design portfolio, Design Models, study models.

Reference Books:

1. Anthony Di Mari and Nora Yoo, " Operative Design: A Catalogue of Spatial Verbs", BIS Publishers.
2. Bruno Munari,"Design as Art", Penguin UK, 25-Sep-2008
3. Charles George Ramsey and Harold Sleeper, " Architectural Graphic Standards", 1992, Wiley
4. Debkumar Chakrabarti, " Indian Anthropometric Dimensions for Ergonomic Design Practice", 1997
5. Frank Ching, James F. Eckler, "Introduction to Architecture", 2012, John Wiley & Sons, US
6. Frank D.K. Ching, " Architecture: Form, Space, and Order", 4th Edition, Sep. 2014, John Wiley &Sons
7. John Hancock Callender, " Time-Saver Standards for Architectural Design Data", 1982, McGraw-Hill
8. Neufert Architects' Data by Ernst Neufert
9. Francis D.K. Ching –Elements of Architecture
10. Rendering with pen and ink
11. Pramar V.S. – Fundamentals in Architecture

21 AR1-02: BUILDING CONSTRUCTION AND MATERIAL- I

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	01	01	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	05	05	ISE	ESE	ICA	ESE	
Total	06	06	---	100	50	100	250

Course Objective:

- To acquaint students with fundamental concept of basic building elements, their function and behavior under various conditions with specific reference to load bearing construction.
- To acquaint students with the principles of load bearing structures with respect to– foundation, plinth, wall using different materials suitable for load bearing construction.
- To learn various components of simple load bearing structure.
- To introduce student's various types of brick wall and bounds.
- To study and understand properties and uses of basic building materials.

Course Outcome:

At the end of course students should be able to**:**

- Exhibit understanding of basic building elements, their function and behavior under various conditions with specific reference to load bearing construction.
- Apply principles of load bearing structures with respect to foundation, plinth, and wall using different materials suitable for load bearing construction.
- Use various components of simple load bearing structure.
- Apply the acquainted knowledge to use various types of brick wall and bounds.
- Apply and exhibit understanding of various properties and uses of basic building materials

Course Curriculum:

Building Construction:

STRUCTURAL SYSTEM		
Unit 1	Introduction to load bearing masonry structure.	a. Introduction to Various components of a building. b. Tools used in construction of brick and stone masonry.
SUB – STRUCTURE		
Unit 2	Masonry foundations for load bearing walls, piers and buttresses.	a. Simple load bearing foundations in brick and stone – spread and strip foundation b. Masonry foundations in black cotton soil - strip or pad, pier. c. Foundation on sloping site.
SUPER STRUCTURE		
Unit 3	Brick masonry	a. Types of brick, b. Brick bonds up to 1.5 brick thick using cement mortar. (Header, Stretcher, Flemish, English, Rat trap bond) c. Brick masonry at junction -T-junction, L-junction, cross junction and stopped end d. Piers, Buttresses.
Unit 4	Stone masonry	a. Various types of stone masonry using different mortar. b. Dry stone masonry.
Unit 5	Alternative materials for Wall construction	a. Concrete Masonry Unit, Clay Blocks, Fly Ash Blocks, Aerated Concrete Blocks, Stabilized Mud Blocks with mud mortar, Adobe, Cob (Introductory)

	Composite Walls	a. Wall construction using various materials (Introductory)
Unit 6	Retaining walls in masonry work	a. Construction of brick and stone masonry retaining wall (Gravity type) types – a. Brick mass retaining wall, b. Dry stone retaining wall, c. Concrete block retaining wall.

Building Material:

Unit	Index	Detailed
Unit 1	Soil	a. Different types of soils, b. Properties- bearing capacity of soil with respect to foundation, concept of bulb of pressure, angle of repose. c. Soils best suited for building construction
Unit 2	Sand	Sources of sand e. Properties of good sand f. Types and grade od sand used in construction. g. Uses of sand in building construction
Unit 3	Brick	a. Types of bricks b. Properties of bricks c. Uses of bricks
Unit 4	Stone	a. Quarrying, finishing and dressing of stones. b. Types of stones c. Properties of stones d. Uses of stones

Submission/Assignments:

Sheet work on

1. Simple section showing all the building elements from foundation to parapet
2. Types of bricks
2. Brick bonds – stretcher bond, header bond, English and Flemish bond up to 1.5 BK. Thk, Rat trap bond
3. Brick masonry at Stopped end, T junction, L junction and cross Junction in brick wall
4. Brick piers – attached pier, detached piers, and buttresses.
5. Joints in stone masonry
6. Types of rubble stone masonry with mortar, rubble dry stone masonry
7. Types of ashlar stone masonry with mortar, ashlar dry stone masonry
8. Simple masonry foundations – Spread footing, Strip foundation, foundation on sloping sites
9. Foundations in black cotton soil
10. Masonry retaining walls in brick and stone.

Journal and sketches on building construction and material – Tools used in construction of brick and stone masonry, dressing of stones, Concrete Masonry Unit, Clay Blocks, Fly Ash Blocks, Aerated Concrete Blocks, Stabilized Mud Blocks with mud mortar, Adobe, Cob

Composite Wall construction using various materials.

Report – Site Visit and Case Study.

Model -Brick blocks

ESE Weightage: Building Construction 60% and Building Material 40%

Reference Books:

1. McKay, W. B. (2005). Building Construction Metric Vol. I–IV. 4th Ed. Mumbai
2. Moxley, R. (1961). Mitchell's Elementary Building Construction. London.
3. Rangwala,S.C. (1963). Building Construction: Materials and types of Construction. 3rd Ed. New York
4. Chudley, R. (2008). Building Construction Handbook. 7th Ed. London.
5. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi.
6. IS 1498 (1970) -classification and identification of soils for general foundations.
7. Rangwala, S. C. (1963). Engineering Materials. 3rd Ed. NewYork

21AR1 – 03: THEORY OF STRUCTURE – I

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	02	02	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	--	--	ISE	ESE	ICA	ESE	
Total	02	02	30	70	--	--	100

Course Objective:

To understand the concept of simple load-bearing and framed structure, different types of loads acting on the structure, the concept of force and its systems, the concept of Beams and determination of reaction, the concept of centroid and center of gravity.

Course Outcome:

By the end of term, the student should be able to

• Exhibit understanding about loads and load transfer on various structural components,

• Force and its properties,

• Beams and determination of reaction of beams from given support and loading conditions, Centroid and center of gravity of compound sections

Course Curriculum:

Unit-1	**Introduction**	**Terminology of common structural components from foundation to roof** Concept of structural components from foundation to roof, Types of structural systems – Load bearing and Framed structure, Difference between structural systems SI systems and Units
Unit-2	**Loads**	**Concept of major loads acting on a structure like** a) Dead load, b) Live load, c) Wind load, d) Earthquake load, e) Snow load along with relevant is codes, f) Concept of minor loads acting on a structure like thermal stresses, impact load, fatigue, creep
Unit-3	**Force**	**1. Applied mechanics and Statics** a) Importance of study of forces, b) Definition of force, c) Effects of forces, d) Different systems of forces, e) Principle of transmissibility, f) Principle of superposition, g) Resolution and composition of forces **2. Equilibrium of Concurrent and Non-Concurrent forces** a) Condition of equilibrium for a system of concurrent forces, b) Law of parallelogram, c) Polygon and triangular law of forces, d) Lami's theorem, e) Resultant and equilibrant of a system of concurrent forces, f) Moment as an effect of force, g) Couple and its properties, h) Varignon's principle, i) Condition of equilibrium for a system of non-concurrent forces

		3. Beam a) Definition, Types of supports, b) Types of beams classified as simply supported, c) cantilever, over-hanging, roller and hinged beam, d) Types of loads as point-load, uniformly distributed load, uniformly varying load, e) Determination of reaction of beam with different types of loading **4. Graphic Statics** a) Space diagram, b) Vector diagram, c) Polar and funicular polygon diagram, d) Bow's notation, e) Graphical condition of equilibrium, f) Determination of resultant force, Beam reaction by graphical method
Unit-4	**Centroid and Centre of Gravity**	a) Concept of Centroid and Centre of gravity, b) Formula of centroid for rectangular, triangular, circular, semi-circular, hollow rectangular and hollow circular section, c) Determination of centroid and centre of gravity of compound sections by analytical method

Submission /Assignments:
Topic-wise assignments

Reference books:
1.Strength of Materials by Khurmi.
2.Strength of Materials by A. P. Dongre.
3.Strength of Materials by Ramamrutham and S. Narayan.

21 AR 1 – 04: HUMAN SETTLEMENT PLANNING

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	02	02	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	--	--	ISE	ESE	ICA	ESE	
Total	02	02	30	70	--	--	100

Course Objective:

- To study the history and development of settlements planning, the concept of human need for shelter and co habitation through the history of human settlement, and their relevance to architecture.
- The study of this in intended to understand the process of evolution and development of particular civilizations/settlements with respect to geographical, geological, climatic, social, religious, cultural influences on the architecture.

Course Outcome:

By the end of the course the students should be able to:

- Develop understanding and get familiar to geographical, geological, climate, social, religious & cultural factors that influence the early society.
- Develop understanding about human needs and co-habitation through the history of human settlement during ancient, medieval and modern period and understand relationship between man and environment.

Course Curriculum:

Unit 1	Relationship between man, and environment	Physical Evolution of human being
		Natural and built□ environment
Unit 2	Origin and growth of human settlement	different phases of human settlement
		Role of River Banks in growth of early human settlement
Unit 3	Culture and civilisation	Rise of Culture and Civilization, Elements of civilization
Unit 4	Human settlement	Patterns of Human settlement
		Classification settlement – Rural and Urban and their types
Unit 5	Pre historic settlements	Palaeolithic, Mesolithic and Neolithic age
Unit 6	Ancient settlements	Ancient - Mohenjo-Daro city planning, Vedic period- Vedic village, Buddhist culture in India- City of Pataliputra, cave settlements of Ajanta, Ellora, Elephanta, Ancient town planning principles in India – Mansara, Vastushatra
		Mesopotamia - City of Babylon, City of Ur
		Egyptian civilization- City of Kahun
		Greek Civilization – City of Athens
		Roman Civilization – Roman Military Town- Timgad city
Unit 7	Medieval settlements	Study of ancient Indian educational university Taxila, Nalanda, temple town – Madurai, Islamic city – Fatehpur Sikri
		Impact of Christianity on Europe – City Constantinople
		Fortress towns Rothenburg Germany
		Renaissance settlements – Renaissance City, Baroque City
Unit 8	Industrial revolution	Industrial revolution and its effects
		new planning concept, factory town by Tony Garnier

Submission /Assignments:

Journal and sketches. Models of examples studied in above theory in group work.

Reference Books:

1. Francis D K Ching, Mark M. Jarzombek, Vikram Aditya Prakash, "A Global History of Architecture" by Wiley and Sons.

2. Town Planning by Abir Bandopadyay and G.K. Hiraskar

3. The Great Ages of World Architecture – By G.K. Hiraskar

4. Satish Grover, "Buddhist and Hindu Architecture in India", CBS Publishers and Distributors, 2003

5. History of Fine Arts in India and West

21 AR 1 – 05: ARCHITECTURAL GRAPHICS AND DRAWING –I

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	01	01	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	03	03	ISE	ESE	ICA	ESE	
Total	04	04	--	--	100	--	100

Course Objective:

- To learn and understand graphical language as tool for drawing as communication in Architecture.
- To introduce student's method of dimensioning of geometrical diagrams of the basic geometrical shapes
- To learn architectural lettering, lettering of various heights, using the right sizes for tittles, nameplate, written matters.
- To learn to use different media, color pencils etc.

Course Outcome:

By the end of the course students should be able to:

- To apply fundamentals of graphical language as tool for drawing as communication in Architecture
- To use relevant application of method of dimensioning of geometrical diagrams of the basic geometrical shapes
- To use relevant application of Lettering of various heights, Architectural lettering, using the right sizes for tittles, nameplate, written matters
- To use relevant application of different media, color pencils etc.
- Student will be well equipped with knowledge of drafting and drawings with the help pencil and different media

Course Curriculum:

Unit 1	Introduction	Introduction to different drawing instruments, paper, materials & Their uses.
Unit 2	Drawing Technics	Drawing line of different types, characteristics of lines with the help of different grades of pencils and mediums. Application of all types of lines in architectural drawings Making measured drawing of building & its parts. Presentation techniques.
Unit 3	Lettering	Introduction to architectural lettering, proportion of letter size as per scale, Different styles of lettering
Unit 4	Scale	Introduction of various proportions and scales, necessary for drawing to a scale, Graphic scale. To understand Metric Scale
Unit 5	Building Components, Materials & Annotations	Representation of various building components such as doors, windows, steps, stairs, chhajja, porch, canopy, balcony, roofs. Symbolic representation of building materials with colour code as specified in Indian standard Code of practice.

Submission / Assignments:

Graphical Drawings: Student will prepare drawings using different graphical method, lettering, scales, and symbolic way

Graphics portfolio of term work on drawing sheets

References Books:

1. Robert W. Gill, Rendering with Pen and Ink
2. The Thames and Hudson Manuals
3. Francis D. K. Ching "Architectural Graphics" Van Nostrand Reinhold Co. 1985

21 AR 1 – 06: BASIC DESIGN AND VISUAL ARTS- I

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	--	--	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	03	03	ISE	ESE	ICA	ESE	
Total	03	03	--	--	100	--	100

Course Objective:

- To acquaint students to develop understanding and observation of the basic elements, principles of basic design
- To learn various methods of designing and expression through various materials of 2D shapes.
- To make students familiar with multi- sensory aspects of space forms and pattern.
- To make students familiar with spatial relationships, positive and negative spaces.
- To learn various texture through various colour and material collection.

Course Outcome:

By the end of the course student should be able;

- To apply acquainted knowledge and understanding of the basic elements and principles of basic design.
- To use relevant application of various methods of designing and expression through various materials of 2D and 3D forms
- To exhibit understanding of multi- sensory aspects of space
- To exhibit understanding of the concept of Positive and negative spaces and Spatial relationships.
- To exhibit understanding of various texture through different material, color, and material collection

Course Curriculum:

Unit 1	Study of visual elements of design	Points, lines, planes, shapes, forms, space, colour and texture
Unit 2	Study of principles of design	Unity, balance, symmetry, contrast, scale, proportion, pattern, rhythm, hierarchy, focus Positive and negative spaces, Spatial relationships
Unit 3	Materials Study	Study of material through texture and colour
Unit 4	Forms	Study of forms with respect to light and shade; solids and voids
Unit 5	Sketching and visual representation of material	Sketching and visual representation of material in various media like paper, clay, plaster, wood, wire, wax, and photography

Submission /Assignments:

Assignments to cover the above topics i.e. 2 dimensional compositions, material
Study of color wheel, and tones. Etc.

1. Models of studio work. Communicating and explain their models.
2. Compositions made in studio work.
3. Documentation and portfolio of studio work.

Reference Books:

1. Architecture: Form Space and Order – Francis D. K. Ching
2. Design fundamentals in architecture- V. S. Parmar
3. Pattern Language – Christopher Alexander

21 AR 1 – 07: WORKSHOP – I

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	--	--	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	03	03	ISE	ESE	ICA	ESE	
Total	03	03	--	--	50	--	50

Course Objective:

- The main objective is to encourage student to explore various materials and model making technique
- To learn various model making techniques using basic material expressing their design concepts and perception
- To learn various methods to prepare models of basic design and abstraction of perceived images

Course Outcome:

By the end of the semester, students should be able to:

- To exhibit understanding and explore various materials and model making technique
- To use relevant methods to prepare various model making techniques using basic material expressing their design concepts and perception
- To use various methods to prepare models of basic design and abstraction of perceived images. prepare conceptual and final models for the design and technology process
- To apply and use knowledge enough to select, handle and use different materials in model making.

Course Curriculum:

Unit 1	Introduction to masonry tools and carpentry tools.
Unit 2	Introduction to clay modelling tools for carving, sculpturing.
Unit 3	Introduction to modelling with various material like; paper, paper board, foam core board, wood, acrylic, plaster of Paris etc.
Unit 4	Model making techniques like surface development, paper folding, origami, hand cutting.
Unit 5	Basic model making manual techniques, different types of material and their techniques
Unit 6	Various solid and hollow geometrical – forms making.

Submission /Assignments:

1. Models of basic forms-cube, cone, dome and arch etc..
2. Models of furniture units to scale of various elements like chair table room's furniture units etc.
3. Sketch file and notes.
4. Models of students' Architectural Design Studio Work and other allied subjects.

Reference Books:

1. Arjan Karssen& Bernard Otte, "Model Making: Conceive, Create and Convince", Frame Publishers (November 11, 2014)
2. David Neat, "Model-Making: Materials and Methods", CroWood Press, 2008
3. Jocqui Atkin, "250 tips, techniques, and trade secrets for potters", Barron's Educational Series, 2009
4. Matt Driscoll, "Model Making for Architects", The Crowood Press Ltd, 2013
5. Megan Werner," Model making", Princeton Archit.Press,2010
6. Nick Dunn, "Architectural Model Making", Laurence King Publishing, 2014
7. Roark T. Congdon, "Architectural Model Building", Fairchild Books; 1 edition, 2010

21 AR 1 – 08: ELECTIVE -I

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	--	--	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	02	02	ISE	ESE	ICA	ESE	
Total	02	02	--	--	50	--	50

The student will opt for any one of the following courses

A. Architectural Vocabulary

B. Communication Skills

C. Art and Art Forms

The detail syllabus for the above subjects is given hereby

A. ARCHITECTURAL VOCABULARY

Course Objective:

• To enable the student to understand the various terms used particularly in architectural design and practice.

• To improve the vocabulary of the student to communicate one's design, ideas and details

Course Outcome:

After successful completion of this course, student should be able to:

• Gain clarity of various terms used in Architectural Education and in practice

• Adopt architectural language, principles, styles and can communicate their design in written format and thereby improving the vocabulary skill required for juries, seminar etc.

• Prepare report, articles, essays, documentation required in Architectural Education and Profession.

Course Curriculum:

Unit 1	Elements of building	To introduce different elements of building
Unit 2	Architectural expression	To introduce appropriate terms for architectural expression
Unit 3	Terms of Building trade	To introduce technical terms used in building trade
Unit 4	Terms specific to Architectural styles	To introduce terms specific to architectural styles

Submission / Assignments:

Sketch file and write-ups and sketches involving the introduced terms.

PPT presentation on selected topics.

Reference Books:

1. Francis D K Ching 'A visual dictionary of Architecture'
2. Alban Janson, Fundamental Concepts of Architecture: The Vocabulary of Spatial Situations Alban Janson
3. Edward T. White, A graphic vocabulary for architectural presentation

B. COMMUNICATION SKILLS

Course Objective:

- To develop skills in effective communication – both written and verbal
- To explore the potential of media technology and the Internet to enhance communication.
- To facilitate the flow of information and proprietary knowledge between clients and architects to either bridge or exploit the gap between these two cultures.
- To facilitate the flow of information and knowledge to bridge the gap between two cultures.

Course Outcome:

After successful completion of this course, student should be able to

• Master both written and spoken exercises as per the course out line which leads to effective communication both written and verbal

• Facilitate the flow of information and proprietary knowledge between clients and architects to either bridge or exploit the gap between these two cultures.

Course Curriculum:

Unit 1	Reading Comprehension	Reading of a passage from famous books. Students to draw an image on A4 paper based on the read passage.
Unit 2	Listening Comprehension	Comprehension of lectures and speeches to locate key points.
Unit 3	Verbal presentations	Understanding the differences among seminars, conferences, convention, congress, debates, extempore speeches, panel discussions etc. Students to make brief oral and visual presentations on selected topics. Importance of gesture, posture and expressions in verbal presentations.
Unit 4	Analytical / Technical Writing	To develop the ability to write concisely and correctly and present ideas in a logical manner.
Unit 5	Introduction and discussion on exploratory topic for a survey questionnaire	To document a setting and to prepare a fifteen-point questionnaire with info- graphics and conduct survey.
		Interpretation of materials in true form- questionnaires, application forms, analysis of materials such as texts, reports, technical literature.

Submission /Assignments:

- Sketch file and write-ups and sketches involving the introduced terms.
- PPT presentation on selected topics.

Reference Books:

1. K Jain, A M Sheikh & Pravin S R Bhatia," Professional Communication Skills", S. Chand Publishing, 2001
2. Jones Leo, "Working in English: Teachers Book", Cambridge University Press, 2001.
3. Marsha J. Ludden, "Effective Communication Skills", Jist Works; 2 editions, 2001
4. Mudambadithaya G.S, "Communicative English for Professional Courses", Sapna Book House, 2002.
5. Taylor, Grant, "English Conversation Practice", McGraw Hill Education; 1 edition, 2001.

C.ARTS AND ART FORMS

Course Objective:

- To enable student, understand integration of art with architecture.
- To introduce students to various art forms and their relation to architecture.
- To write and speak effectively and clearly about works of art and architecture.
- To establish the relevance of architecture as the 'Mother of all arts'

Course Outcome:

After successful completion of this course, student should be able to:

- Explore different art forms in the form of presentations, acts, art works.
- Relate art with Architecture.
- Develop the technical skills and the ability to organize the visual elements necessary to communicate concepts and experiences.
- Develop Visual Literacy.

Course Curriculum:

Unit 1	Introduction	Definition of Art; role and meaning of art in Society
Unit 2	Various types of arts	Fine arts, performing arts, commercial arts, industrial arts, folk arts, abstract art, visual arts, spatial arts, temporal arts, pop art etc.
Unit 3	Relationship of architecture with arts	Proponents of various art forms to display the methods of conveying ideas, exploring form and space, techniques to engage the mind

Submission/Assignment:

- Acts, art works group activity to explain their theme
- File assignment notes
- Ppt presentation and videos to understand concept of art and art form

Reference Books:

1.Abid Husain, “National culture of India", National Book Trust, India, 1994
2.Antony Mason, John T. Spike, "A History of Western Art: from prehistory to the 21st Century", McRae Books, 2007.
3.Arthur Llewellyn Basham, ‘The Wonder That Was India", Picador; Indian ed edition, 2004
4.Fred S. Kleiner, "Art through the Ages", Cengage Learning; 14th edition, 2012
5.Ilay Cooper, John Gillow, "Arts and Crafts of India", Thames and Hudson, 1996
6.Jasleen Dhamija, "Indian Folk arts and Crafts", 2002
7.Michael Braungart, William Mc Donough, "Cradle to Cradle: remaking the way we make things", North Point Press; 1 edition, 2002
8.Paul Johnson, "Art: A New History", Weidenfeld & Nicolson, 2003
9.Peggy Holroyde, "An ABC of Indian Culture", MapinLit, 2007
10.Yashodhara Dalmia, "Contemporary Indian Art", Marg Publications, 2002

B.ARCH. SEM.II
21 AR2 – 01: ARCHITECTURAL DESIGN- II

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	01	01	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	07	07	ISE	ESE	ICA	ESE	
Total	08	08	--	---	100	150	250

Course Objective:

- To acquaint students with the process of data collection, anthropometry and analysis considering functional requirements of various spaces.
- To introduce students with various methods to study requirements and to find alternatives options for user comfort with help of block models.
- To introduce students with the concepts of bubble diagram, zoning, circulation and user analysis in design development process.
- To learn the importance of space planning considering different variable like movement, circulation, scale, volume, proportions and structure and its impact on built.
- To introduce the concept of multifunctional activity, entire building form along with site

Course Outcome:

At the end of the semester students should be able to:

- Apply the concepts of bubble diagram, zoning, circulation and user analysis in design development process
- Finalize alternatives options for space planning and user comfort with help of various block models
- Exhibit understanding and importance of space planning considering different variable like movement, circulation, scale, volume, proportions and structure and its impact on built
- Design space planning for multifunctional activity for entire residential building
- Assemble simple spatial elements in articulated concepts and visually represent them through hand-made drawings and models. to generate solution and represent it graphically

Course Curriculum:

Unit 1	**Major Design Problem**	Relationship between idea, concept, space- form and structure and functional requirements; various methods of idea generation with use of form, through study of nature and geometry, music, literature, other art forms.
		Case studies of a single functional, multi-functional and connecting spaces.
		Class activity to understand space planning based on activity, which will involve human activity and movement.
		Concept of zoning, bubble diagram, circulation user analysis and its application in design methods to represent in drawings.
		Application of material, load bearing and composite technology in design with relation to the shape and form.
		Design solution with use of different elements and spaces in design like landscape, courtyard, formal informal spaces, personal spaces etc.
		Major Design Assignment: The student should be introduced with a design problem with three to four functions of total area up to 150sqm -250sqm. Design development like Residences, Farm houses, Library, Cafeteria, gymnasium etc.
Unit 2	**Sketching**	Freehand sketching with different media. Preferably outdoor cityscapes, monuments, objects with varying surfaces, volumes using various time modes. (Same object in two minutes to two hours/ outdoor or indoor)
Unit 3	**Minor Design Problem**	**Minor Design Assignment: literature study and analysis** **Example:** The student should be introduced with a design problem with three to four functions of total area up to 75 sqm.

		Kindergarten, Doctor's Clinic, Courtyard spaces, ticket counters, entrance plazas etc
Unit 4	**Time Bound Design Problem**	Design - 6 hours and one day assignment
		Drawing work of minor design assignment to be completed in time bound

Submission/Assignments:

Sketch file.
Study documentation, reports and data collection in file form/drawing form.
Pre-Design Process Drawings
Design portfolio.
Design Models, study models.

Reference Books:

1. Anthony Di Mari and Nora Yoo, " Operative Design: A Catalogue of Spatial Verbs", BIS Publishers.
2. Bruno Munari,"Design as Art", Penguin UK, 25-Sep-2008
3. Charles George Ramsey and Harold Sleeper, " Architectural Graphic Standards", 1992, Wiley
4. Debkumar Chakrabarti, " Indian Anthropometric Dimensions for Ergonomic Design Practice", 1997
5. Frank Ching, James F. Eckler, "Introduction to Architecture", 2012, John Wiley & Sons, US
6. Frank D.K. Ching, " Architecture: Form, Space, and Order", 4th Edition, Sep. 2014, John Wiley & Sons
7. John Hancock Callender, " Time-Saver Standards for Architectural Design Data", 1982, McGraw-Hill
8. Neufert Architects' Data by Ernst Neufert
9. Francis D.K. Ching –Elements of Architecture
10. Rendering with pen and ink
11. Walter Gropius – Total Architecture
12. Pramar V.S. – Fundamentals in Architecture

21 AR 2- 02: BUILDING CONSTRUCTION AND MATERIAL- II

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	01	01	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	05	05	ISE	ESE	ICA	ESE	
Total	06	06	---	100	50	100	250

Course Objective:

- To acquaint students with fundamental concept of openings in both trabeated and arcuate construction methodologies.
- To acquaint students with the principles of design of doors and windows.
- To introduce principles of design of staircases and different types of staircases.
- To acquaint students with fundamental concept of types of roof and its terminology.
- To study and understand properties and uses of basic building materials.

Course Outcome:

At the end of course students shall be able

- To exhibit understanding of basic building elements, concept of openings in both trabeated and arcuate construction methodologies.
- To apply acquainted of the principles of design of doors and windows.
- To apply the acquainted knowledge of design of staircase.
- To apply concept of types of various types of roofs and use it in design
- To apply and exhibit understanding of various properties and uses of basic building materials

Course Curriculum:

Building Construction:

SUPER STRUCTURE		
Unit 1	Introduction to openings- Arches	a. Principles and terminology of arch construction b. Types of arches – based on shape, number of centres, materials used
Unit 2	Introduction to openings- lintels	a. Lintel construction b. Types of lintels using different materials
Unit 3	Timber doors	a. Terminology used in door and windows. b. Ledged and battened, ledged, braced and battened door. Ledged, braced and framed door. c. Panelled door (with and without glazing), Flush door.
Unit 4	Timber Windows And ventilators	a. Panelled windows. b. Types of ventilators c. Hardware and fixtures used for doors and windows.
Unit 5	Vertical movement in buildings	a. Introduction to vertical movement in buildings – ladder, ramp, stairs, lifts, escalators. b. Ramps and Staircase terminology c. Types of staircases based on shapes.
Unit 6	Roof	a. Roof terminology b. Various types of roof profiles -Flat, Pitched, Vaults, Domes.

Building Material:

Unit 1	Cement	a. Introduction to manufacturing process. b. Properties of cement c. Uses of cement d. Types of cement e. Field Tests of cement f. Initial and Final Setting Time.
Unit 2	Lime	a. Sources of lime. b. Introduction to manufacturing process of lime c. Classification of lime d. Uses of lime e. Tests for lime
Unit 3	Mortar	a. Mix, methods of preparation of mortar b. Various types of mortar (Mud mortar, Lime mortars, cement mortar, Sukhi mortar, gypsum mortar) c. Application and uses in building constructions.
Unit 4	Timber	a. Uses & application of timber in building construction b. Market forms of wood - plywood, block boards, hard boards and veneers, and eco-boards. c. Carpentry joints.

Submission /Assignment:

Sheet work on -

1. Terminology used in arches
2. Types of arches based on shape
3. Types of arches based on center and material used.
4. Types of lintels.
5. Terminology used in doors and windows
6. Ledged and battened, ledged battened and braced, ledged and framed door
7. Paneled door (with and without glazing), flush door.
8. Timber Paneled windows. Types of ventilators base on different materials and glazing methods
9. Terminology used in staircase, ramps, ladder.
10. Types of staircases based on shape
11. Terminology used in roof.
12. Various types of roof profiles – such as Flat, types of Pitched, Vaults, Domes.

Journal and sketches on building construction and material – Structural analysis of arches, difference between arches and lintels, types of doors based on working operations and materials used, number of panels, Hardware and fixtures used for doors and windows. Introduction to lifts and escalators, difference between flat and pitched roof.

Report – Site Visit and Case Study.

Model -Staircase, Roof, Door, Arches and Lintels.

ESE Weightage: Building Construction 60% and Building Material 40%

Reference Books:

1 Barry, R.(1999). The Construction of Buildings Vol. 2. 5th Ed. New Delhi: East-West Press.
2. Foster, J.and Mitchell, S. (1963). Building Construction: Elementary and Advanced, 17th Ed.London: B.T. Batsford
3. McKay, W. B. (2005). Building Construction Metric Vol. I–IV. 4th Ed. Mumbai: Orient Longman.
4. Rangwala,S.C. (1963). Building Construction: Materials and types of Construction. 3rd Ed.NewYork: John Wiley& Sons.
5. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi: Standard Publishers.
6. Rangwala, S. C. (1963). Engineering Materials. 3rd Ed. NewYork: John Wiley and Sons

21 AR2 – 03: THEORY OF STRUCTURE -II

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	02	02	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	--	--	ISE	ESE	ICA	ESE	
Total	02	02	30	70	--	--	100

Course Objective:

To understand the concept of material and its behavior under external loads like axial force, shear force, and bending moment, the concept of moment of inertia, basic details of frames and trusses

Course Outcome:

By the end of term, the student shall exhibit understanding of

- The stresses in a beam for given loading and support condition.
- They will also be able to select appropriate truss type for different conditions.

Course Curriculum:

Unit-1	Simple Stress and Strain	Concept of linear stress and strain, Hooke's law and stress-strain diagram for various materials, Lateral strain and Poisson's ratio, ,Shear stress and modulus of rigidity Volumetric strain and bulk modulus, Relation between various moduli like elastic modulus, modulus of rigidity and bulk modulus, Concept of elastic, plastic and ductile behaviour, Composite materials – modular ratio and equivalent area e.g. RCC column with steel reinforcement
Unit-2	Properties of Section	Concept of moment of inertia, Formula of moment of inertia for rectangular, triangular, circular and semi-circular shapes, hollow rectangular and hollow circular sections, Parallel and Perpendicular Axis theorem, Concept of the radius of gyration and its formula for a rectangular section, Determination of centroidal moment of inertia for composite lamina
Unit-3	Bending Moment and Shear Force	Concept of shear force and bending moment at a section Relation between rate of loading, shear force and bending moment, Shear force and bending moment diagram in case of a simply supported beams, cantilevers, overhanging beam with distributed vertical point loads and moments, Concept of point of contraflexure
Unit-4	Bending Stress in beams	Concept of bending stress, Theory of pure bending, Assumptions made in theory of pure bending, Flexural formula, Concept of moment of resistance, Concept of section modulus, Bending stress distribution across a section
Unit-5	Shear Stress in beams	Concept of shear stress, Shear stress formula, Stress distribution across a rectangular, circular, T, L, I, C sections, Difference between bending stress and shear stress distribution across a section, Relation between average and maximum shear stress
Unit-6	Material Properties	Material Properties of various materials like concrete, Structural steel/ Reinforcement, Soil

Submission/Assignments:

Topic-wise assignments

Reference Books:

1. Strength of Materials by Khurmi
2. Strength of Materials by A. P. Dongre

21AR 2 – 04: HISTORY OF ARCHITECTURE -I

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	02	02	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	--	--	ISE	ESE	ICA	ESE	
Total	02	02	30	70	--	--	100

Course Objective:

- To study the evolution of prehistoric, Indus valley, Vedic, Buddhist, Mauryan, Egyptian, Mesopotamia, pre-Greek, pre- Roman architecture through critical analysis of appropriate examples.
- To discuss building materials and building construction technology, built form, study of plans, structural system, building types, aesthetics and architectural compositions of buildings that flourished during the ancient period.

Course Outcome:

At the end of semester students should be familiar:

- Evolution of different architectural periods through critical analysis of appropriate example
- About construction technology-built form during ancient period through models exercised in group work.

Course Curriculum:

Unit 1	Pre- historic shelters, settlements, burial systems, megaliths and memorials	Huts and houses, oval huts near Nice, Houses at Catal Huyuk
		Cromlech & Dolmen tomb at Ireland, Stonehenge at Wiltshire England
		Passage grave & Gallery Graves, at Ireland
Unit 2	Indian Architecture	Principals Town- planning and housing in Mohenjo-Daro and Harrapa
		Vedic architecture- Vedic village, huts and Torana
		Buddhist Architecture- The great Stupa at Sanchi, Viharas at Ajanta, Chaitya Hall at Karli, Stamatas- Sarnath pillar
		Mauryan architecture- housing and planning of garden city of Pataliputra
Unit 3	Egyptian architecture	Mastabas, Pyramid of Cheops at Giza
		Temple of Khons at Karnak, Sphinx, obelisk
Unit 4	West Asiatic architecture	Sumerian Period- Ziggurat at Ur; Babylonian Period- City of Babylon;
		Assyrian Period- Palace of Sargon at Khorsabad; Persian Period- Palace of Persepolis
Unit 6	Pre-Greek architecture	Minoan Architecture – e.g. Palace of King Minos in Knossos,
		Mycenaean architecture - Palace of Tiryns, Megaron.
Unit 7	Pre-Roman architecture	Etruscan Architecture – e.g., Temple of Juno Sospita, lanuvium.

Submission/Assignment:

Journals with sketches, A3 size sheets with sketches- preferably plans and sections- of various buildings discussed in the above units. Models of examples studied in above theory in group work.

Reference Books:

1. Bannister Fletcher."History of Architecture", CBS Publishers, 1992
2. Henri Stierlin, "Architecture of the world - Greece", Herron Books 1994 , - The Roman Empire", Taschen Pub., 1997, "Architecture of the world - Romanesque", Taschen Pub., 2008.
3. The Great Ages of World Architecture – By G.K. Hiraskar
4. Satish Grover, "Buddhist and Hindu Architecture in India", CBS Publishers and Distributors, 2003
8. History of Fine Arts in India and West

21 AR2- 05: ARCHITECTURAL GRAPHICS AND DRAWING- II

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	01	01	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	03	03	ISE	ESE	ICA	ESE	
Total	04	04	30	70	--	--	100

Course Objective:

To help students to understand graphical language as tool for drawing as communication in Architecture.

Course Outcome:

At the end of the semester students should be able to:

- Understand, imagine, and draw design forms and three-dimensional representation.
- Exhibit understanding of projection methods for representing the solids,
- Draw orthographic projection, Isometric views of plans, elevations & section of solids.
- Visualize and draw complex, compound objects and their true cut portion of shapes.

Course Curriculum:

Unit 1	Solid Geometry orthographic projections	Projection methods of representing the solids on drawing such as orthographic projection.
Unit 2	Isometric view	Isometric views of plans, elevations & section of solids
Unit 3	Surface development of objects.	Study of complex, compound objects, their penetration, true cut portion of shapes. Application of such forms in architecture & their inter relationship
Unit 4	Three-dimensional development of building block	Isometric & axonometric views
Unit 5	Photography and videography	Introduction to photography and videography for Environment/ Building

Submission/Assignment:

- Portfolio on Graphical Drawings: Student will prepare drawings using different graphical method, lettering, scales, and symbolic way.
- Student will prepare three-dimensional drawings using different graphical methods given.

Reference Books:

1. Robert W. Gill, Rendering with Pen and Ink
2. The Thames and Handsomeness
3. Francis D. K. Ching “Architectural Graphics” Van Nostrand Reinhold Co. 1985

21 AR2 – 06: BASIC DESIGN AND VISUAL ARTS- II

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	--	--	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	03	03	ISE	ESE	ICA	ESE	
Total	03	03	--	--	100	--	100

Course Objective:

- To make students familiar with principles of composition and organization.
- To acquaint students with various methods to work with models and forms.
- To learn various methods of designing and expressing creativity in 2D and 3D forms.
- To learn analysis of architectural designs with respect to principles of composition and organization.

Course Outcome:

By the end of the course student should be able to:

- Apply acquainted knowledge to principles of composition and organization.
- Apply acquainted knowledge of various methods to work with forms and model.
- Exhibit understanding of various methods of expressing creativity through 2D and 3D forms.
- Analysis work of architectural designs with respect to principles of composition and organization.

Course Curriculum:

Unit 1	Articulation of form	Study of organization of form and space- spatial, centralized, linear, radial, clustered and grid organization
Unit 2	Study of architectural works	Study of architectural works to explore the principles of composition and organisation of forms Space making through basic elements of design and principles of composition. Space making through principals of spatial organization
Unit 3	Role of experience, memory, fantasy, reality, imagination in design.	Sources of inspiration such as nature, history, material, climate, geometry, paradox, etc. for creativity.

Submission/Assignment:

Assignments to cover the above topics i.e., two dimensional compositions, three dimensional forms and material study

Submission Format:

Models of studio work.
Compositions made in studio work.
Documentation and portfolio of studio work.

References Books:

1. Architecture: Form Space and Order – Francis D. K. Ching
2. Design fundamentals in architecture- V. S. Parmar
3. Pattern Language – Christopher Alexander

21 AR 2 – 07: WORKSHOP – II

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	--	--	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	03	03	ISE	ESE	ICA	ESE	
Total	03	03	--	--	50	--	50

Course Objective:

- The main objective is to study various model making techniques using advanced different or specific material expressing their design concepts and perception.
- Models of basic design and abstraction of perceived images.

Course Outcome:

By the end of the semester, students will be able to:

- Prepare final models for the subjects like Architectural design and Building technology, Basic Design
- Students will be well equipped to select, handle and use different materials in model making
- Make basic design and architectural design single unit model

Course Curriculum:

Unit 1	Models for basic design and basic architectural design elements. (Composite forms, Free Forms, Architectural forms).
Unit 2	Practical exercises related to making models of simple buildings, furniture and everyday objects and Interior detail models of units.
Unit 3	Models of Building Technology Studio work and History of Architecture assignments.
Unit 4	Laser cutting and 3D printing etc. Making of block models and detail models.
Unit 5	Models of multi activity spaces developing connection between them
Unit 6	Introduction to site model

Submission/ Assignments:

1. Brick bonds model, any historical building in group work.
2. Presentation of Models into sketches, photos and live demo.
3. Model of Architectural design studio work and some of the other subjects
4. In coordination with the Architectural Design, Basic Design and Building Construction and Technology Studios

Reference Books:

1. Arjan Karssen & Bernard Otte, "Model Making: Conceive, Create and Convince", FramePublishers (November 11, 2014)
2. David Neat, "Model-Making: Materials and Methods", CroWood Press, 2008
3. Jocqui Atkin, "250 tips, techniques, and trade secrets for potters", Barron's Educational Series,2009
4. Matt Driscoll, "Model Making for Architects", The Crowood Press Ltd, 2013
5. Megan Werner," Model making", Princeton Archit.Press,2010
6. Nick Dunn, "Architectural Model Making", Laurence King Publishing, 2014
7. Roark T. Congdon, "Architectural Model Building", Fairchild Books; 1 edition, 2010

21 AR2- 08 ELECTIVE -II

Teaching Scheme Per week		Credit	Examination Scheme				
Lecture/ week - L	--	--	Theory Exam		Practical oral exam		Total
Practical/Studio -P/S	02	02	ISE	ESE	ICA	ESE	
Total	02	02	--	--	50	--	50

The student will opt for any one of the following courses

A. Furniture design

B. Creative writing

C. Mud architecture

The detail syllabus for the above subjects is given hereby

A: FURNITURE DESIGN

Course Objective:

- To explore the scope of furniture design.
- To explore integration of furniture design into building, street and landscape design.

Course Outcome:

After successful completion of this course, student should be able to:

- Become conversant with ergonomics and scope of furniture design.
- Develop skill in conversant with model making material selection and joinery in indoor and outdoor furniture.

Course Curriculum:

Unit 1	Introduction	A brief introduction to history of furniture design and contemporary practices- Indian traditions, Arts and Crafts Movement, Bauhaus, Works by Saarinen, Alto, Rietveld, Charles and Ray Eames, Le Corbusier, Mies van der Rohe, Zaha Hadid.
Unit 2	Aspects of Furniture design	Role of furniture, Ergonomic factors of furniture design
		Design and types of furniture based on its style, characteristics and functional application
		Materials and methods of construction of furniture, design trends, innovations and ideas of furniture for specific types of interiors.
		Design for the specially abled

Submission/ Assignments:

- Documentation
- File and portfolio of Sketches work.

Reference Books:

1. Time-Saver Standards for Interior Design and Space Planning byJoseph DE Chiara, Julius Panero and Martin Zelnik | Architectural Detailing
2. 1000 Chairs – Peter Fiell and Charlotte Fiell
3. Furniture Design – An Introduction to Development, Material, and Manufacturing – Stuart Lawson

B: CREATIVE WRITING

Course Objective:

- To develop methods of exercising an architectural narrative or description through different forms of creative writing.
- To learn techniques of writing various genres
- To analyze methods and vocabulary styles of writing.

Course Outcome:

After successful completion of this course, student will be able to:

- Incorporate techniques and methods of expressing an architectural narrative or description through forms of creative writings such as fiction, poetry, travel writing, blogging which are based on architecture.
- Learn architecture as a context.
- Prepare Presentations on the techniques of writing different genres.
- Discuss on various readings to familiarize and analyze the methods and vocabulary styles of writing.
- Write assignments related to the genres culminating in a term paper.

Course Curriculum:

Unit 1	Introduction	Techniques and methods of expressing an architectural narrative or description through forms of creative writings such as fiction, poetry, travel writing, blogging which are based on architecture or employ architecture as a context.
Unit 2	Various genres of writing	Presentations on the techniques of writing different genres.
Unit 3	Verbal presentations	Discussions of various readings to familiarize and analyze the methods and styles of writing.
		Writing assignments related to the genres culminating in a term paper
		Interactions with architectural writers and journalists to share their experience / perspective.

Submission/ Assignments:

- Documentation
- File and presentation.

Reference Books:

1.The Creative Writing MFA Handbook,by tom kealey
2.. Creative Writing: An Introduction to Poetry and Fiction – by Starkey, David
3. College handbook of creative writing by Robert DeMaria

C: MUD ARCHITECTURE

Course Objective:
- To introduce the relevance of the material though history of building craft.
- To introduce the material and relevant technologies.
- To provide relevant examples.
- To discuss works by architect's works in mud architecture.

Course Outcome:
After successful completion of this course, student will be able to:
- Be conversant with the scope and possibilities of mud architecture.

Course Curriculum:

Unit 1	Introduction	History of mud architecture since river valley civilizations, Middle Ages and contemporary practices.
Unit 2	Different forms and technologies	Cob, Compressed Earth Block, Mud Brick, Rammed Earth, Wattle and Daub, Adobe; preparation, properties, specifications and application with examples.
Unit 3	Works and technologies employed by master architects	Hassan Fathy, Laurie Baker, Revati Kamat, Didi Contractor, Auroville Earth Institute and others

Submission/ Assignments:
- Documentation
- File and portfolio of Sketches work.

Reference Books:
1. Jain, K. and Jain, M. (1992). Mud Architecture of the Indian Desert. Ahmadabad: Aadi Centre
2.Architecture for the poor – Hasan Fathy
3.Natural energy and vernacular architecture, Hassan Fathy
4.K S Jagadish, "Building with Stabilised Mud"; IK International Publishing House PVT Ltd.