VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF I SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Examination Scheme						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Dur (hrs)	Theory Marks	Prog. /CIE Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC11	PC	Architectural Design-I	-	3	5	-	8	-	-	150	-	150	300	9
2	18ARC12	BS&AE	Materials and Methods in Building Construction-I	1	2	2	-	5	-	-	75	-	75	150	5
3	18ARC13	PC	Architectural Graphics-I	1	-	3	-	4	-	-	75	75	-	150	4
4	18ARC14	PC	History of Architecture - I	3	-	-	-	3	3	100	50	-	-	150	3
5	18ENG15	BS&AE	Building Structures-I	1	-		2	3	3	100	50	-	-	150	2
6	18ART16	PC	Basic Design & Visual Arts	-	1	3	-	4	-	-	100	-	-	100	3
7	18ARC17	PC	Model Making workshop	-	-	-	3	3	-	-	50	-	-	50	2
8	18HUM18	SEC	Communication Skills	-	-	-	2	2	-	-	50	-	-	50	1
			Total	6	6	13	7	32	-	200	600	75	225	1100	29

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 08 No. of Theory Examinations = 02

Progressive Marks to be awarded by the subject teacher. Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF II SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Examination Scheme						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Dur (hrs)	Theory Marks	Prog./ CIE Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC21	PC	Architectural Design- II	-	3	5	-	8	-	-	150	-	150	300	9
2	18ARC22	BS&AE	Materials and Methods in Building Construction-II	1	2	2	-	5	4	100	50	-	-	150	5
3	18ARC23	PC	Architectural Graphics-II	1	-	3	-	4	-	-	75	75	-	150	4
4	18ARC24	PC	History of Architecture-II	3	-	-	-	3	3	100	50	-	-	150	3
5	18ENG25	BS&AE	Building Structures-II	1	-	-	2	3	3	100	50	-	-	150	2
6	18ART26	PC	Basic Design and Art Appreciation	1	-	3	-	4	-	-	100	-	-	100	3
7	18ENG27	BS&AE	Site Surveying and Analysis	1	-	-	2	3	3	100	50	-	-	150	2
8	18HUM28	SEC	Kannada Bhashe - Aadalitha Matthu Vyavahara	-	-	-	2	2	-	-	50	-	-	50	1
			Total	8	5	13	6	32	-	400	575	75	150	1200	29

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 08 No. of Theory Examinations = 04

Progressive Marks to be awarded by the subject teacher.
Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF III SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Examination Scheme						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Dur (hrs)	Theory Marks	Prog./ CIE Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC31	PC	Architectural Design- III	-	3	5	-	8	-	-	150	-	150	300	9
2	18ARC32	BS&AE	Materials and Methods in Building Construction-III	1	2	2	-	5		-	75	-	75	150	5
3	18ARC33	BS&AE	Climatology	3	-	-	-	3	3	100	50	-	-	150	3
4	18ARC34	PC	History of Architecture-III	3	-	-	-	3	3	100	50	-	-	150	3
5	18ENG35	BS&AE	Building Structures-III	1	-	-	2	3	3	-	75	-	75	150	2
6	18ARC36	PC	Theory of Architecture-I	3	-	-	-	3	3	100	50	-	-	150	3
7	18ARC37	SEC	Computer Applications in Architecture-I	-	-	-	3	3	-	-	100	-	-	100	2
8	18ARC38	PE	Professional Elective (a): Architectural Photography	3				3	-	-	50	-	-	50	2
		PE	Professional Elective(b): Vernacular Architecture												
		PE	Professional Elective(c): Visual Communication												
		OE	Open Elective:												
			Total	11 or 14	5	7	5 or 8	31	-	300	600	-	300	1200	29

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 08 No. of Theory Examinations = 03

Progressive Marks to be awarded by the subject teacher. Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF IV SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Examination Scheme						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Dur (hrs)	Theory Marks	Prog./ CIE Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC41	PC	Architectural Design- IV	-	3	5	-	8	-	-	150		150	300	9
2	18ARC42	BS&AE	Materials and Methods in Building Construction-IV	1	2	2	-	5	4	100	50	-	-	150	5
3	18ARC43	BS&AE	Building Services-I	1	-	-	2	3	3	100	50	-	-	150	2
4	18ARC44	PC	History of Architecture-IV	3	-	-	-	3	3	100	50	-	-	150	3
5	18ENG45	BS&AE	Building Structures-IV	1	-	-	2	3	-		75	-	75	150	2
6	18ARC46	PC	Theory of Architecture-II	3	-	-	-	3	3	100	50	-	-	150	3
7	18ARC47	SEC	Computer Applications in Architecture-II	-	-	-	3	3	-	-	100	-	-	100	2
8	18ARC48	PE	Professional Elective (a): Environment Responsive Architecture	3				3			50			50	2
		PE	Professional Elective(b): Product Design												
		PE	Professional Elective(c): Heritage Documentation												
		OE	Open Elective:												
			Total	9 or 12	5	7	7 or 10	31	-	400	575	-	225	1200	28

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 08 No. of Theory Examinations = 04

Progressive Marks to be awarded by the subject teacher. Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF V SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Examination Scheme						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Dur (hrs)	Theory Marks	Prog./ CIE Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC51	PC	Architectural Design- V	-	3	5	-	8	-	-	150	-	150	300	9
2	18ARC52	BS&AE	Materials and Methods in Building Construction-V	2	1	2	-	5		-	75	-	75	150	5
3	18ARC53	BS&AE	Building Services-II	1	-	-	2	3	3	100	50	-	-	150	2
4	18ARC54	PC	History of Architecture-V	3	-	-	-	3	3	100	50	-	-	150	3
5	18ENG55	BS&AE	Building Structures-V	1	-	-	2	3	-	-	75	-	75	150	2
6	18HUM56	PAEC	Sociology and Building Economics	2	-	-	-	2	3	100	50	-	-	150	2
7	18ARC57	PC	Working Drawing I	1	3	-	-	4	-	-	100	-	-	100	3
8	18ARC58	PE	Professional Elective (a): Alternative Building Technology & Materials	3				3	-	-	50	-	-	50	2
		PE	Professional Elective(b): Digital Architecture												
		PE	Professional Elective(c): : Architectural Lighting Design												
		OE	Open Elective												
			Total	10 or 13	7	7	4 or 7	31	-	300	600	-	300	1200	28

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 08 No. of Theory Examinations = 03

Progressive Marks to be awarded by the subject teacher. Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF VI SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Examination Scheme						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Dur (hrs)	Theory Marks	Prog./ CIE Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC61	PC	Architectural Design-VI	-	3	5	-	8	-	-	150	-	150	300	9
2	18ARC62	BS&AE	Materials and Methods in Building Construction-VI	2	1	2	-	5	4	100	50	-	-	150	5
3	18ARC63	BS&AE	Building Services-III	3	-	-	-	3	3	100	50	-	-	150	2
4	18ARC64	PE	Contemporary Architecture	3	-	-	-	3	3	100	50	-	-	150	3
5	18ENG65	BS&AE	Building Structures-VI	1	-	-	2	3	-	-	75	-	75	150	2
6	18ARC66	PC	Landscape Architecture	1	-	-	2	3	3	100	50	-	-	150	3
7	18ARC67	PC	Working Drawing II	1	3	-	-	4	-	-	100	-	-	100	3
8	18ARC68	PE	Professional Elective (a): Culture & Built Environment	3				3	-	-	50	-	-	50	2
		PE	Professional Elective(b): Geographical Information System												
		PE	Professional Elective(c): Design of High-Rise Buildings												
		OE	Open Elective:												
9	18ARC69		Study Tour	-	-	-	-	-	-	-	50	-	-	50	1
			Total	11or14	7	7	4 or 7	32	-	400	625	-	225	1250	30

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 09 No. of Theory Examinations = 04

Progressive Marks to be awarded by the subject teacher. Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF VII SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Examination Scheme						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Dur (hrs)	Theory Marks	Prog./ CIE Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC71	PC	Architectural Design- VII	-	5	5	-	10	-	-	150	-	150	300	11
2	18ARC72	BS&AE	Materials and Methods in Building Construction-VII	1	-	3	-	4	-	-	75	-	75	150	4
3	18ARC73	BS&AE	Building Services-IV	3	-	-	-	3	3	100	50	-	-	150	2
4	18ENG74	PC	Specification, Quantity and Costing of Buildings	1	-	-	2	3	3	100	50	-	-	150	2
5	18ARC75	PC	Urban Design	3	-	-	-	3	3	100	50	-	-	150	3
6	18ARC76	PE	Interior Design	1	3	-	-	4	-	-	100	-	-	100	3
7	18ARC77	PE	Professional Elective (a): Craft in Architecture	3				3	-	-	50	-	-	50	2
		PE	Professional Elective(b): Architectural Writings & Journalism												
		PE	Professional Elective(c): Biomimicry												
		OE	Open Elective:												
			Total	9 or 12	8	8	2 or 5	30	-	300	525	-	225	1050	27

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 07 No. of Theory Examinations = 03

Progressive Marks to be awarded by the subject teacher. Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF VIII SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Examination Scheme						Credits
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Dur (hrs)	Theory Marks	Prog./ CIE Marks	Term work Marks	Viva Marks	Total	
					Core	Applied									
1	18ARC81	PC	Architectural Design- VIII	-	5	5	-	10	-	-	150	-	150	300	11
2	18ARC82	BS&AE	Materials and Methods in Building Construction-VIII	1	-	3	-	4	4	100	50	-	-	150	4
3	18ARC83	PAEC	Thesis Seminar	-	-	-	3	3	-	-	50	-	-	50	2
4	18ARC84	PAEC	Professional Practice	3	-	-	-	3	3	100	50	-	-	150	2
5	18ENG85	PAEC	Construction and Project Management	1	-	-	2	3	3	100	50	-	-	150	2
6	18ARC86	PC	Urban Planning	3	-	-	-	3	3	100	50	-	-	150	2
7	18HUM87	PAEC	Constitutional Law	2	-	-	-	2	-	-	50	-	-	50	1
8	18ARC88	PE	Professional Elective (a): Research Methods	3				3	-	-	50	-	-	50	2
		PE	Professional Elective(b): Principles of Real Estate Development												
		PE	Professional Elective(c): Adaptive Re-use of Built Form												
		OE	Open Elective:												
			Total	10or13	5	8	5 or 8	31	-	400	500	-	150	1050	26

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 08 No. of Theory Examinations = 04

Progressive Marks to be awarded by the subject teacher. Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF IX SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Duration	Examination Scheme						
					Dur (hrs)	Theory Marks	Prog./ CIE Marks	Term work Marks	Viva Marks	Total	Credits
1	18ARC91	PAEC	Professional Training	16 Weeks*	-	-	50	-	300	350	18
			Total	- - - - -	-	-	50	-	300	350	18

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 01 No. of Theory Examinations = Nil

Progressive Marks to be awarded by the subject teacher. . . .

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

* The commencement date of Professional Training shall be the date of commencement of the semester as notified by the University.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF X SEM B.ARCHITECTURE (CBCS SCHEME-2018)

SN	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Examination Scheme						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Dur (hrs)	Theory Marks	Prog./ CIE Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC101	PC	Architectural Design Project [Thesis]	-	7	7	-	14	-	-	200	-	300	500	16
			Total	-	7	7	-	14	-	-	200	-	300	500	16

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 01 No. of Theory Examinations = Nil

Progressive Marks to be awarded by the subject teacher. The Viva Voce examination shall be conducted jointly by one internal & two external examiners appointed by the University.

Minimum Marks for passing: Progressive Marks 50%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses
PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses

18ARC11 – ARCHITECTURAL DESIGN -I

CONTACT PERIODS : 8 (Studio) per week
PROGRESSIVE MARKS : 150
VIVA MARKS : 150

OBJECTIVES:
Beginning Design - To develop the ability to generate solutions to spatial constructs, which integrate principles of design with functional requirements.

PREAMBLE:
We inhabit and function in space, both the manmade and the natural i.e., "a life spent within an enclosure". These enclosures have functional and cultural meanings, are symbols of abstract ideas of that period in time.

> *"Architecture is the art we all encounter most often, most intimately, yet precisely because it is functional and necessary to life, it's hard to be clear about where the "art" in a building begins." - Jonathan Jones*
>
> *"Architecture is a discipline directly engaged with shaping enclosure, of erecting and toppling barriers or—more explicitly—of extending and limiting 'freedoms'." - E. Sean Bailey & Erandi de Silva*

OUTLILNE:

1. Introduction to Architecture:
- What architectural education entails?
- What being an architect involves?
- Understanding of Architecture's connection with other disciplines of knowledge: Science & Technology, Mathematics, Philosophy, Religion, Sociology, Psychology, etc.

Method of learning: Observation & Study
- Documentation of local stories on architecture, important local buildings and other favourite buildings or places.
- Observing and documenting the built environment around and experiencing enclosures (field trips) to learn basics of architectural representation.

2. Introduction to Principles of Design:
- Elements of form from abstract concepts like point, line, plane, mass and / or volume, 2D forms - circle, square and triangle, 3D forms – cube, sphere and pyramid, therefore , development of more complex forms by the method of addition and / or subtraction.
- Concepts of volume and scale, width to height ratio.
- Concepts of composition like rhythm, contrast, balance and symmetry.

Method of learning: Observation & Study
- Study models and sketches to explore the design principles.
- Drawings of study models - plans and sections (suitable scale).

3. Introduction to Anthropometry:
- Understanding the relationship between function and spatial requirements with respect to the human body and its postures.

- Minimum and optimum areas for mono functions.
- User's data, movement and circulation diagrams.

Method of learning: Observation & Study

- Drawings of the human body in various postures with required measurements.
- Drawing exercise of artefacts, eg. - a table (object) with the human body - contextual.
- Measured drawing exercise of spaces – to get a grip of the functional and spatial aspects of the space, eg. - a classroom (mono functional) and a staircase (static/transitional), pavilions & open/ enclosed spaces (multi-functional).

4. Introduction to Design process –

- Understanding the relationship between idea, context, space (form & structure), and functional requirements.
- Introduction to the various methods of idea / concept generation - use of form, patterns in nature and in geometry, music, text, and other allied fields.
- Space planning based on activity, which will involve the entire body, and its movement in space.

Method of learning: Observation & Study

- Understanding the difference and similarity while design of a non-enclosed space, a semi-enclosed space, an enclosed space.
- Study of patterns and use the pattern, both physical and material patterns as well as patterns of transformation and Integration. Appreciation of the difference between architecture and the chosen pattern.
- Design of functional furniture layout with requisite circulation, lighting and ventilation for a specific function.
- Design of Spaces such as pavilion, gazebo, kiosk, bus stop, stage, living/dining, bedrooms, Architect's office, Doctor's clinic etc,.
- Submission will include Idea generation, Study models, Sketches and drawings to achieve the desired results.

NOTE:

- Discussions, presentations, and case studies will cover all the topics.
- The portfolio covering all the assignments shall be presented for term work.

Learning outcome:

The student will get an introduction into the field of Architectural Design viz. a viz. the duality & the tension that exists between the form and function of a space.

REFERENCES:

1. Alain de Botton, " How Proust Can Change your life", Picador, 1997.
2. Alain de Botton, " The Architecture of Happiness", Sep. 2006, Vintage Books.
3. Alan Fletcher, " The art of looking sideways", Phaidon Press, 2001
   and Partis", Van Nostrand Reinhold, 1985
4. Anthony Di Mari and Nora Yoo, " Operative Design: A Catalogue of Spatial Verbs", 2012, BIS Publishers.

5. Anthony Di Mari, " Conditional Design: An Introduction to Elemental Architecture", 2014, 1st Edition, Thames & Hudson.
6. Bruno Munari,"Design as Art", Penguin UK, 25-Sep-2008
7. Charles George Ramsey and Harold Sleeper, " Architectural Graphic Standards", 1992, Wiley
8. Christopher Alexander, "Notes on the Synthesis of Form", 1964, Harvard University Press.
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10. François Blanciak, " Siteless: 1001 Building Forms", 2008, MIT Press
11. Frank Ching, James F. Eckler, "Introduction to Architecture", 2012, John Wiley & Sons, US
12. Frank D.K. Ching, " Architecture: Form, Space, and Order", 4th Edition, Sep. 2014, John Wiley & Sons
13. Herman Hertzberger, "Lessons for Students in Architecture", 2005, 010 Publishers
14. Italo Calvino, " Invisible Cities", Harcourt Brace Jovanovich (May 3, 1978)
15. John Berger, " Way of Seeing", 1972, Penguin, UK
16. John Hancock Callender, " Time-Saver Standards for Architectural Design Data", 1982, McGraw-Hill
17. Michael Pause and Roger H. Clark, " Precedents in Architecture: Analytic Diagrams, Formative Ideas,
National Institute of Design.
18. Paul Jacques Grillo, " Form, Function and Design", 1975 , Dover Publications, New York
19. Paul Jacques Grillo, " What is Design ?", 1960, P. Theobald
20. Paul Lewis,Marc Tsurumaki, David J. Lewis, "Manual of Section", Princeton Architectural Press, 2016
21. Peter H. Reynolds, " The Dot", 2013, Candlewick Press
22. Philip Jodidio, "Tree houses. Fairy tale castles in the air", 2012, Taschen
23. Robert W. Gill, "Rendering with Pen and Ink", Van Nostrand Reinhold (1 June 1984)
24. Tom Alphin, "The LEGO Architect", 2015, No Starch Press

18ARC12: MATERIALS AND METHODS IN BUILDING CONSTRUCTION-I

CONTACT PERIODS: 5 (1 Lecture +4 Studio) per week
VIVA MARKS: 75
PROGRESSIVE MARKS :75

OBJECTIVE: *Introduction to building components, wall construction in masonry , foundations in masonry, wooden doors and windows, use of timber for construction.*

OUTLINE:

MODULE 1

1. Overview of simple masonry building, its various components and materials used for construction.
2. Various conventions used for drawing plan, section and elevation.
3. Brick: Types, properties, uses and manufacturing methods.
4. Brick Walls: Types of brick walls and bonds, mortar types, plasters, buttresses, arches and lintels.

MODULE 2

5. Stone: Types, properties, quarrying and finishing.
6. Stone Walls: Bonds, arches and lintels.

MODULE 3

7. CMU: Hollow and solid concrete Blocks: Manufacture, uses and properties, CMU Wall construction and detailing.
8. Alternative materials for Wall construction: Clay Blocks, Fly Ash Blocks, Aerated Concrete Blocks, Stabilized Mud Blocks and Glass Blocks: Manufacture, uses and properties, wall construction and detailing.

MODULE 4

9. Masonry Foundation: Simple load bearing foundations in brick and stone.
10. Wood: Natural, hard and soft wood; quality, properties; joints in wood. Timber: Quality of Timber used in buildings, defects, seasoning and preservation.

MODULE 5

11. Wooden doors: Types of wooden Doors - battened, ledged, braced, panelled, flush and glazed doors; details of joinery.
12. Wooden windows: Types of wooden glazed windows; details of joinery.

Note:

- **Minimum of one plate on each topic. Study of building materials may be compiled in the form of portfolio.**
- **Site visits to be arranged by studio teacher. Construction plates and portfolio of material shall be assessed for progressive marks.**

Learning Outcome: The students would be able to understand the use of brick, stone and timber in construction of basic components of buildings viz. walls, foundations, doors & windows.

REFERENCES:

1) Francis K Ching 'Building construction', Wiley; 5 edition (February 17, 2014)
2) R. Barry, "Construction of Buildings" Vol 1., 1999 by Wiley-Blackwell
3) Roy Chudley, "Construction Technology", 3rd Edition, Longman, 1999
4) W.B. Mckay, "Building Construction", Donhead, 2005

18ARC13: ARCHITECTURAL GRAPHICS-I

CONTACT PERIODS: 4 (1 Lecture + 3 Studio) per week
TERM WORK MARKS: 75
PROGRESSIVE MARKS : 75

OBJECTIVE: *To introduce students to the various concepts and techniques of architectural and graphic presentations. Train the students to work on drawing methods both in freehand and with instruments.*

OUTLINE:

1. **Introduction to Graphic Representations**: Basic principles and methods of drawing, methods of using instruments, and sign conventions.
    - Exercises in line - weightage and its application
    - Exercises in free-hand drawing.
2. **Exercises of Practice in Lettering**: Lettering used in architectural drawings, including different fonts.
3. **Introduction to Euclidian Geometry:** Exercises in lines and angles. Basic geometrical constructions, construction of triangles, quadrilaterals and regular polygons. Introduction to the development of simple surfaces of basic geometrical shapes and their applications.
4. **Arches:** Typical arch shapes and their construction methods.
5. Introduction to plane curves such as ellipse, parabola, hyperbola and ovals and their construction methods.
6. Introduction to reduced scales and its application to architectural drawings.
7. **Introduction to orthographic projection (First - angle projection):** Principles of orthographic projection, projections of points, lines and planes in different positions.
8. Orthographic Projection of Solids, architectural elements and built forms.
9. **3D Projections-I:** Isometric and Axonometric views of solids and architectural elements.
10. **3D Projections-II:** Isometric and Axonometric views of built forms.

Note: A consolidated portfolio containing exercises related to each of the above topics are to be submitted for term work examination.

Learning outcome: At the end of the semester, the students will be equipped with graphical skills which shall be useful in translating the graphical ideas into technically appropriate drawing presentations.

REFERENCES:

1) Francis D.K.Ching, "Architectural Graphics", Van Nostrand Reinhold Co., 1985
2) I.H.Morris, " Geometrical Drawing for Art Students", Longmans (1902)
3) Shankar Malik, " Perspective & Sciography", 1994, Allied Publisher

18ARC14: HISTORY OF ARCHITECTURE - I

CONTACT PERIODS: 3 (Lecture) per week
THEORY MARKS: 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3 HRS

OBJECTIVE: *To appreciate the culture and architecture of first societies and early civilizations. (The scope limited from Prehistory, Stone Age to civilizations across continents, early Iron Age); to develop critical reading, discussion and representation skills for architectural history.*

MODULE 1

1. **Introduction** meaning, methods and significance of History and Architecture's connection with History.
2. **Introduction to Pre-Historic Civilization (early cultures):** Primitive man - shelters, settlements, ritual centers (religious and burial systems) E.g.: Oval hut, Nice; settlement at Çatalhöyük; Megalithic architecture (Dolmen tomb, gallery grave, passage grave); Henge Monuments, Stonehenge.

MODULE 2

3. **Introduction to river valley cultures:** generic forces shaping settlements and habitats.
4. **Introduction to Desert and Mountainous Cultures:** Forces shaping settlements and habitats (environmental and cultural influences)
   E.g.: include First civilization of Americas, Andes, Mayans, early societies/ cultures in the Sahara, Thar, North America.
5. **Introduction to Tribal Cultures:** Forces shaping settlements and habitats
   E.g.:include Indigenous Peoples across the globe (environmental, cultural influences on settlements).

MODULE 3

6. **Indus Valley Civilization (Indus and Ghaggar Hakra):** Forces shaping settlements and habitats, E.g.: Mehrgarh, Layout of Mohenjo-Daro, dwellings and monumental architecture (House plan, Community well, Great Bath, Granary)
7. **Mesopotamia (Tigris and Euphrates):** Forces shaping settlements and habitats
   E.g.: Ziggurats at Warka, Ur and Tchoga Zanbil, Palace of Sargon.
8. **Egyptian Civilization (Nile):**Forces shaping settlements and habitats(funerary and sacred spaces), E.g.: Mastabas, Pyramid complex, Temple of Khons, Karnak.

MODULE 4

9. **Chinese Civilization (Yellow and Yangtze):** Forces shaping settlements and habitats.
   E.g.:Niuheliang Ritual Center and dwellings at Banpo, Shang dynasty (Layout of Zhengzhou, Palace and Tomb at Yin), Zhou dynasty (ritual complex and Wangcheng Plan).

10. **Japanese Civilization:** Forces shaping settlements and habitats.
    E.g.:Jōmon and Yayoi Period (dwellings), Kofun Period (burial mounds/ tumulus)

MODULE 5

11. **Introduction to Pre-Classical Civilization:** Mycenaean, Etruscan, Persian (Achaemenid)
    E.g.: Lion Gate and Treasury of Atreus, Mycenae; Palace of Tiryns (megaron), Etruscan Temples (Juno Sospita, Lanuvium), Tomb of Cyrus, Pasargadae, Palace of Persepolis.
12. **Introduction to Pre-Classical Architecture (Indian sub-continent):** Aryan and earlyMauryan
    E.g.: Vedic village, Vedic Town and city planning principles (mandalas), Palace at Pataliputra.

NOTE: Progressive marks to include Submission of a portfolio of sketches, Assignments and study models

Learning Outcome: At the end of the course the students will be able to appreciate geographical, geological, social, cultural and political factors that influenced the early society and its architecture. They will also understand the use of materials and structural/construction systems explode during that era.

REFERENCES:

1. Francis D K Ching, Mark M. Jarzombek, Vikramaditya Prakash, "A Global History of Architecture" by Wiley and Sons, 2011.
2. Percy Brown , "Indian Architecture Buddhist and Hindu", Read Books, 2010.
3. Sir Banister Fletcher; edited by Dan Cruickshank , "History of Architecture", CBS Publishers and Distributors, 2003
4. Satish Grover, "Buddhist and Hindu Architecture in India", CBS Publishers and Distributors, 2003

18ENG15: BUILDING STRUCTURES-I

CONTACT PERIODS: 3 (1 Lecture + 2 Pract./Tutorial/Seminars) per week
THEORY MARKS: 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3 HRS

OBJECTIVE: *Introduction to principles of mechanics, structural material & different force system & on structural properties.*

OUTLINE:

MODULE 1

1. Different construction materials with emphasis on structural properties viz. steel , concrete, wood, glass, aluminium. Different types of loads, the structure is being subjected to as per IS 875 Part I & II.

MODULE 2

2. Mechanics - Classification of mechanics, force, characteristics of force, classification of force system, Resultant of force, Composition of force, Axioms in mechanics, Principles of transmissibility, Moment of force, Resultant of coplanar concurrent force system, and Free body diagrams.

MODULE 3

3. Resultant of coplanar noncurrent force system, couple & characteristics of couple, different types of loads, different types of beams, statically determinate & statically indeterminate, different types of supports, problems on support reactions, Equilibrium of Co-planar Concurrent and Non-Concurrent forces.

   Note: In the numerical pertaining to support reactions, loading on the beam shall be restricted to only **point load & uniformly distributed load**].

MODULE 4

4. Center of gravity, centroid, to locate the centroid of composite section from the 1st principles. Moment of inertia, radius of gyration, parallel axis theorem, perpendicular axis theorem. Numericals on determination of moment of inertia of composite section about any defined axis.

   Note: In the question paper restrict the question to the numericals **and not on the derivation of the formula.**

MODULE 5

5. Truss - Triangulation concept, different types of trusses, assumption made in the analysis of truss. Analysis of the truss by the **"Method of Joints" (Simple problems)** to calculate the dead weight of the truss from given data.

Learning outcome: At the end of the course the students will have the ability to understand the mechanics of forces acting on rigid bodies and the structural properties.

REFERENCES:

1) R.K.Bansal, " A Textbook of Engineering Mechanics", Laxmi Publications, 2008
2) S.S. Bhavikatti, " Engineering Mechanics", New Age International, 1994.
3) S. Ramamrutham, " Engineering Mechanics ", Dhanpat Rai Publishing, New Delhi, 2016.

18ART16: BASIC DESIGN & VISUAL ARTS

CONTACT PERIODS: 4 (Studio) per week
PROGRESSIVE MARKS : 100

OBJECTIVE: *To encourage a critical orientation to design thinking and action.*

1) **Composition :** Elements of Design & Principles of Design**.**

2) **Observation & Study 1:** Selection of two outdoor objects/systems and observation of their natural occurrence, relationships with context, form & structure, colors & textures, and function Sketching & visual representation in various media.

3) **Observation & Study 2:** Selection of two indoor objects/systems and observation of their situation, relationships with context, form & structure, colors & textures, and functions.
Sketching & visual representation in various media.
3 dimensional modeling in appropriate medium
(Clay/paper/wire/plaster/wax etc.).

4) **Additive and Subtractive of Forms**

5) **Material Study-1:** Selection of two materials used in everyday life (textiles, Earthenware, terracotta, metals, stone, plastic, glass etc.) Study of properties, Strength, examples of use.

6) **Freehand sketching:** Objects and surroundings.

7) Exercises of freehand pencil drawings, sketches of objects, solids, furniture, architectural elements and built forms.

8) Exercises of rendering techniques using pencil and pen of objects, built forms showing light, shade, shadow and textures.

9) **Material Study-2:** Sketching & visual representation of material in various media, like Paper, clay, plaster, wood, wire, wax, photography.

10) **Material Study-3:** Hands-on making of object/joint/structure of own choice with one of the materials studied.

Learning Outcome: At the end of the course the students would have understanding of various principles of design. They would be able to appreciate the scope and limitations of using different materials for creating different forms and shapes.

REFERENCES:

1) Donald Norman , 'Design of Everyday Things" , Basic Books; 2 edition (5 November 2013)
2) John Berger , 'Ways of Seeing' 1972, Penguin, UK
3) Maitland Graves , 'The Art of Color and Design' , McGraw-Hill, 1951
4) Robert Gill, "Rendering with Pen and Ink" , Thames & Hudson; Revised, Enlarged edition (2 April 1984)

18ARC17: MODEL MAKING WORKSHOP

CONTACT PERIODS: 3 (Pract./Tutorial/Seminars) per week
PROGRESSIVE MARKS : 50

OBJECTIVE: *To train the students to experiment and manipulate materials leading to creative exploration of forms.*

OUTLINE:

1. Generation of basic forms-cube, cone, dome and arch.
2. Generating of organic and geometrical forms/objects.
3. Generation of forms &Material exploration: hands on skill by using wood, bamboo, metal wire, thread, balsa wood, clothe, paper board etc.
4. Composite forms: Experimental form generation by combining various materials and shapes. (rods, pipes, slabs,etc.)
5. Free Forms: Tensile structures, Funicular Shells using wood, fabric, plastic etc.
6. Architectural forms: making of windows, wall doors, roofs, trees, shrubs, roads, vehicles etc.
7. Introduction to digital modeling like 3D printing and laser cutting.

Note: Student may be encouraged to use environment friendly materials.

Learning Outcome: At the end of the course the students would be able to use variety of materials to construct architectural models and different geometrical forms.

REFERENCES:

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

18HUM18: COMMUNICATION SKILLS

CONTACT PERIODS: 2 (Pract./Tutorial/Seminars) per week
PROGRESSIVE MARKS : 50

OBJECTIVE: *To develop skills in effective communication – both written and verbal and to explore the potential of media technology and the Internet to enhance communication.*

OUTLINE:

1. **Introduction:** Introduction to course objective and framework of assignments and assessment. Discussion on exploratory topics.
2. **Reading and listening comprehension:** Reading of a passage from famous books (e.g. Samskara). Students to draw an image on A4 paper based on the read passage.
3. **Listening Comprehension:** Comprehension of lectures and speeches to locate key points.
4. **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.
5. **Analytical / Technical Writing:** To develop the ability to write concisely and correctly and present ideas in a logical manner.
6. **Introduction and discussion on exploratory topic for a survey questionnaire:** Need to document infrastructure (or lack of) on college campus and students to prepare a fifteen point questionnaire with info- graphics and conduct survey.
7. **Interpretation of materials:** such as questionnaires, application forms, analysis of materials such as texts, reports, technical literature.
8. **Notes taking:** From spoken and written English.
9. **Formal / Informal Communication:** Understanding the difference between formal and informal letters etc. Students to Write /draw a letter to fellow architects, clients, public authorities, contractors, enquiries to industries, dealers.
10. **Article writing:** on a Design or a Building, Introduction to Design Basis Report.
11. **Writing a term paper and book review:** An article or paper on a chosen topic. Writing of a review on a chosen book on art or architecture**.**
12. **Using the Internet to enhance communication**

Learning outcome: The course would enable the students to communicate effectively using verbal, visual and electronic modes and media.

REFERENCES:

1) A 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 edition, 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.

18ARC21 – ARCHITECTURAL DESIGN -II

CONTACT PERIODS : 8 (Studio) per week
PROGRESSIVE MARKS : 150
VIVA MARKS : 150

OBJECTIVE: *Beginning Design contd. - To develop the ability to generate solutions to spatial constructs, i.e.,* space and form *which integrate principles of design with functional requirements by emphasising the study of variables like light, movement, transformation, scale, structure & skin., physical constraints and cultural context, either urban or rural.*

PREAMBLE:

We inhabit and function in space, both the manmade and the natural i.e., "a life spent within an enclosure". These enclosures have functional and cultural meanings, are symbols of abstract ideas of that period in time.

> *"Architecture is about giving form to the places where people live. It is not more complicated than that but also not simpler than that." - Alejandro Aravena*
>
> *"Architecture is both an art and a practical pursuit, and the profession has always been divided between those who emphasize the art, that is pure design, and those who give priority to the practical." - Paul Goldberger*
>
> *"Architecture is used by political leaders to seduce, to impress, and to intimidate." - Deyan Sudjic*

OUTLINE:

1. To relearn the "principles of Design" and anthromopometric requirements of space planning,

   Method of learning: Observation & Study

   - Study of the relationship between human body and the built environment understanding usage and comfort

2. Introduction to "Nature of Space":

   - Understanding the notions of PLACE: A "boundary", a "center" and a "spirit", PATH: A "way" and a "goal", DOMAIN: A conglomeration of paths and goals that forms a "whole" with its own "identity",
   - Understanding the notions of "Enclosure, Ambiguity, and Transparency", "Spatial Context - open, closed, transition spaces", "cultural context – inclusion, exclusion, spatial segregation",

   Method of learning: Observation & Study

   - Mapping of one's journey from home to studio/of the campus/of a Neighbourhood. Explore issues of movement, navigation, circulation, direction and discovery. Explore issues of representation, scale, starting point, orientation, landmarks, and imagery.

- Culture & Design: Understanding social attitudes to Built-form: extroverted/introverted, formal/informal, typical/individual, simple/labyrinthine, contiguous/isolated etc.

3. Introduction to "Poetics of Space" :
   - light, movement, transformation, scale, structure and skin,
   - key tools for learning : text / language as a tool; emotion, cultural, climatic, eg.- contemplative / severe / dramatic / minimalist / natural / organic / contemporary / traditional / etc.,

   Method of learning: Observation & Study

   - Presentation of case studies based on literature survey & field visit.
   - Study models, Sketches and Drawings of study models - plans and sections (suitable scale) using a mono functional space.

4. Understanding the role of Physical Context - terrain, materials, structure, etc.,

   Method of learning: Observation & Study

   - Hands-on Design exercise – creation of a simple design in which form is distinct from structure and creation of a simple design in which form is integral with structure.
   - Presentation of case studies based on literature survey & field visit.
   - Study models, Sketches and Drawings of study models - plans and sections (suitable scale) using a mono functional space.

5. Design process to test the learning of the semester using a multifunctional program to incorporate
   "nature of space", "poetics of space" and "physical constraints",
   - Generation of a design brief for a multifunctional program, generation of areas based on human activity and anthropometric data,
   - Selection a of suitable site,
   - Idea generation, design development, & design drawings,
   - Eg. - A House for self, Guest House, Farm house, Villa, Container house, Courtyard house, Tree house, etc.

   Method of learning: Observation & Study

   - Presentation *of case studies based on literature survey & field visit*,
   - Submission will include Idea generation, Study models, Sketches to achieve the desired result, development drawings and a set of plans, sections and elevations & model to suitable scale.

NOTE:

- Discussions, presentations, and case studies will cover all the topics.
- The portfolio covering all the assignments shall be presented for term work.

Learning outcome:

The student will be equipped to understand the requirements of a multifunctional programs with respect to aspects of locating the design program on site viz a vie light, movement, etc.. The student will also be equipped to understand how to start a settlement study.

REFERENCES:

25. Alain de Botton, " How Proust Can Change your life", Picador, 1997.
26. Alain de Botton, " The Architecture of Happiness", Sep. 2006, Vintage Books.
27. Alan Fletcher, " The art of looking sideways", Phaidon Press, 2001
28. Anthony Di Mari and Nora Yoo, " Operative Design: A Catalogue of Spatial Verbs", 2012, BIS Publishers.
29. Anthony Di Mari, " Conditional Design: An Introduction to Elemental Architecture", 2014, 1st Edition, Thames & Hudson.
30. Bruno Munari,"Design as Art", Penguin UK, 25-Sep-2008
31. Charles George Ramsey and Harold Sleeper, " Architectural Graphic Standards", 1992, Wiley
32. Christopher Alexander, "Notes on the Synthesis of Form", 1964, Harvard University Press.
33. Debkumar Chakrabarti, " Indian Anthropometric Dimensions For Ergonomic Design Practice", 1997, National Institute of Design.
34. François Blanciak, " Siteless: 1001 Building Forms", 2008, MIT Press
35. Frank Ching, James F. Eckler, "Introduction to Architecture", 2012, John Wiley & Sons, US
36. Frank D.K. Ching, " Architecture: Form, Space, and Order", 4th Edition, Sep. 2014, John Wiley & Sons
37. Herman Hertzberger, "Lessons for Students in Architecture", 2005, 010 Publishers
38. Italo Calvino, " Invisible Cities", Harcourt Brace Jovanovich (May 3, 1978)
39. John Berger, " Way of Seeing", 1972, Penguin, UK
40. John Hancock Callender, " Time-Saver Standards for Architectural Design Data", 1982, McGraw-Hill
41. Michael Pause and Roger H. Clark, " Precedents in Architecture: Analytic Diagrams, Formative Ideas, and Partis", Van Nostrand Reinhold, 1985
42. Paul Jacques Grillo, " Form, Function and Design", 1975 , Dover Publications, New York
43. Paul Jacques Grillo, " What is Design ?", 1960, P. Theobald
44. Paul Lewis,Marc Tsurumaki, David J. Lewis, "Manual of Section", Princeton Architectural Press, 2016
45. Peter H. Reynolds, " The Dot", 2013, Candlewick Press
46. Philip Jodidio, "Tree houses. Fairy tale castles in the air", 2012, Taschen
47. Robert W. Gill, "Rendering with Pen and Ink", Van Nostrand Reinhold (1 June 1984)
48. Tom Alphin, "The LEGO Architect", 2015, No Starch Press

18ARC22: MATERIALS AND METHODS IN BUILDING CONSTRUCTION-II

CONTACT PERIODS: 5 (1 Lecture +4 Studio) per week
THEORY MARKS: 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 4 HRS

OBJECTIVE: *To understand Roofing systems using Timber, Steel Truss and Concrete. Cement, Steel and Reinforced Concrete.*

OUTLINE:

MODULE 1

1) Timber Roof – Lean to roof, Collared Roof, King post roof, Queen Post Roof; details of joinery.
2) Steel Roof – Types of Steel Truss Roofs and method of construction.

MODULE 2

3) Cement: Types, applications, Tests - laboratory and field.
4) Steel: Properties and uses of reinforced steel.
5) Concrete: Ingredients, grades, admixtures, properties, production, mix, proportioning

MODULE 3

6) Reinforced Cement Concrete: Form work, placing, and compaction, curing of concrete, sampling and testing of concrete. Construction joints, expansion joints, finish in concrete, chemical admixtures.
7) RCC Foundations (Isolated footing) and Columns (Square and Round). Raft foundations, Grillage foundations and combined footing.

MODULE 4

8) Staircase: Anthropometry of stairs, types of Staircases.
9) Timber Stairs: Single and Double Stringer stairs: construction methods and joinery.
10) RCC Stairs: Waist slab, folded plate, stringer beam stairs, precast stairs: construction methods and joinery.

MODULE 5

11) Steel Stairs: Stringer stairs, Folded Type, Spiral stairs, Fire escape stairs: construction methods and joinery.
12) Composite Stairs: Brick/stone, Steel/Timber, Concrete/wood, steel/ glass: construction methods and joinery.

Note:

- **Minimum of one plate on each topic. Study of building materials may be compiled in the form of portfolio.**
- **Site visits to be arranged by studio teacher. Construction plates and portfolio of material shall be assessed for progressive marks.**

Learning outcome: At the end of the course, the students would be able to appreciate the procedure involved and various materials that can be used in construction of roofs, foundations and staircases with greater understanding of details involved in joinery.

REFERENCE:

1) Francis K Ching 'Building construction', Wiley; 5 edition (February 17, 2014)
2) R. Barry, "Construction of Buildings" Vol 1., 1999 by Wiley-Blackwell
3) Roy Chudley, "Construction Technology", 3rd Edition, Longman, 1999
4) W.B. Mckay, "Building Construction", Donhead, 2005

18ARC23: ARCHITECTURAL GRAPHICS-II

CONTACT PERIODS: 4 (1 Lecture + 3 Studio) per week
TERM WORK MARKS: 75
PROGRESSIVE MARKS : 75

OBJECTIVE: *To develop visual communication and representation skills and methods of presentation of spatial design through 3D drawing techniques.*

OUTLINE:

1. 3D-Projections: exercises in 3D representation of exploded isometric and axonometric views of objects, furniture and built forms.
2. Development of surfaces for architectural roof forms, built enclosures and envelopes such as tents, upholstery and exercises of application to develop the paper and cardboard models.
3. Section of geometrical solids and construction of true shapes.
4. Interpenetration of geometric solids, combination of different forms in architectural compositions.
   Ex: Projecting towers of vertical circulation on building facades, chimney over sloping roofs and projecting canopies and balconies on facades and dormer windows.
5. Introduction to perspective drawing: Its importance in architectural drawings, principles of perspective drawing, visual perceptions and its limitations. Exercises of observation, recording and representing the visual effects of depth, diminution and vanishing of built forms and understanding the methods of perspective projection.
6. Studies in perspective drawing: Understanding the importance and purpose of picture plane, station point, vanishing point, ground level, eye level, cone of vision and central line of vision - their variations and resultant effects.
7. One - point perspective drawings: Exercises of perspective drawings of simple built forms, interior views of a room with furniture. Exercise of perspective by changing the variables, their positions of PP, CV, SP and eye level etc.
8. Two-point perspective drawings: exercises of perspective drawings of simple built forms, architectural elements. Interior views of a room with furniture. Exercises of perspective by changing the variables, their positions of PP, CV, SP and eye-level etc.
9. Free-hand perspective drawings of architectural elements, built forms. Exercises of rendering techniques showing light, shade and shadow on built forms. Rendering of plants, trees, water, landscape, human figures, vehicles, furniture and buildings with suitable elements of foreground and background.
10. Introduction to Sciography: Principles of shade and shadow constructions for geometrical solids, architectural elements and built forms. Construction of shadows on floor plans, elevations, sectional elevations and roof-top views.

Learning outcome: At the end of the course, the students will be equipped with a skills to use 3D techniques in architectural presentations. They would also attain skills to make architectural presentation using rendering and sciographic techniques.

REFERENCES:

1) Francis D.K.Ching, "Architectural Graphics", Van Nostrand Reinhold Co., 1985
2) I.H.Morris, " Geometrical Drawing for Art Students", Longmans (1902)
3) Robert.W.Gill, "Rendering with pen and ink".
4) Shankar Malik, " Perspective & Sciography", 1994, Allied Publisher

18ARC24: HISTORY OF ARCHITECTURE - II

CONTACT PERIODS: 3 (Lecture) per week
THEORY MARKS: 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3 HRS

OBJECTIVE: *To study the evaluation of greek, roman, byzantine, medieval and gothic architecture through critical analysis of appropriate examples.*

OUTLINE:

MODULE 1

1. Classical Greek Architecture 1: Critical appreciation of works and synoptic study of architectural characteristic features from the Greek early periods.
2. Classical Greek Architecture 2: Critical appreciation of works and synoptic study of architectural characteristic features from the Greek later periods, Doric, ionic and Corinthian orders and optical correction.
3. Greek architecture Typologies: Study of principles of design of Greek buildings through study of three kinds of Architecture: a) Monumental (Built to impress and Last) ex. Parthenon, Theatre at Epidauros. b) Domestic (Built to inhabit): House of Colline, House of Masks, etc. and c) Civic space: The Agora and Acropolis.

MODULE 2

4. Introduction to Roman Architecture: Critical appreciation of works and synoptic study of architectural characteristic features from the Roman periods. Study of Tuscan and composite orders.
5. Roman architecture Typologies 1: Study of principles of design of Roman buildings through study of proportion, composition, visual effects etc. in Monumental (Built to impress and last) Pantheon, Colosseum, Thermae of Caracalla, Pont du Gard, Nimes, Basilica of Trajan.

MODULE 3

6. Roman architecture Typologies 2: Study of principles of design of Roman buildings through study of Domestic (Built to inhabit)-House, villa and apartments.
7. Roman architecture Typologies 3: Study of principles of design of Roman buildings through study of Civic space with elements like triumphal arch, Column of Trajan(Septimius Severus), Roman Forum.
8. Early Christian: Evolution of architecture parallel to the evolution of religious practices. Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental b) Domestic (Built to inhabit) and c) Civic space.

MODULE 4

9. Byzantine: Study of principles of design of buildings through study of its Architecture: a) Monumental; Hagia Sophia b) Domestic (Built to inhabit) and c) Civic space-St.Marks Venice.

10. Medieval: Study of principles of design of buildings through study of its Architecture: a) Monumental; Pisa Cathedral, the Campanile and Baptistery, Angouleme Cathedral b) Domestic (Built to inhabit) and c) Civic space; Pisa.

MODULE 5

11. Gothic: Study of principles of design of buildings through study of its Architecture:
a) Monumental; Notre Dame, Paris. b) Domestic (Built to inhabit) and c) Civic space;
12. Gothic: Study of Gothic Architecture, typical characteristics including the pointed arch, the ribbed vault and the flying buttress, aesthetic elements with examples like Chartres Cathedral: French High Gothic style

NOTE: Progressive marks to include Submission of sketch book, study models relating to structure, aesthetics and building typology resulting from different functions.

Learning outcome: The students would develop appropriate skills of reading, writing and understanding the physical and aesthetic experience of buildings.

REFERENCES:

1. Bannister Fletcher , "History of Architecture", CBS Publishers, 1992
2. Henri Stierlin, "Architecture of the world - Greece", Herron Books 1994
3. Henri Stierlin, "Architecture of the world - The Roman Empire", Taschen Pub., 1997 .
4. Henri Stierlin , "Architecture of the world - Romanesque", Taschen Pub., 2008.
5.James Stevens Curl," Classical Architecture", W. W. Norton & Company; Reissue edition, 2003.
Robert Adam, " Classical Architecture", Harry N. Abrams; 1st edition, 1991

18ENG25: BUILDING STRUCTURES-II

CONTACT PERIODS: 3 (1 Lecture + 2 Pract./Tutorial/Seminars) per week
THEORY MARKS: 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3 HRS

OBJECTIVE: *Introduction to Mechanics & Materials.*

OUTLINE:

MODULE 1

1. **Simple Stresses & Strains:** Types of stresses and strains, Hookes law, factor of safety, stress-strain curve for, mild steel, hgh strength steel, brittle materials. Elongation of bars of varying cross section, uniformly varying bars, bars of varying width**(no derivation),** Poisson's ratio, relationship between elastic constants **(no derivation).** Concept of temperature stresses **(no numericals),** analysis of composite bars.

MODULE 2

2. **Bending Moment Diagram & Shear Force Diagram:** Concept of bending moment & shear force, sign convention. To draw bending moment & shear force diagrams of cantilever, simply supported & over hang beams only. Subjected to **point load & uniformly distributed** load & its combination. Relationship between rate of loading, shear force and bending moment.

MODULE 3

3. **Stresses in Beams:** Theory of simple bending, assumption made in bending theory, bending equation **(no derivation)**, section modulus, numericals to determine bending stresses across the cross section **(restricted to rectangular section T & I sections only).** Shear stresses in beams, shear stress equation **(no derivation),** numericals to determine the shear stress variation across the cross section **(restricted to rectangular section, T & I sections only)**

MODULE 4

4. **Elastic Stability of Columns:** Introduction - Actual length of column, Effective length of column, expression for Effective length of columns for various end conditions (fixed, hinged, free) - **No derivations**. Classification of columns based on slenderness ratio criteria, and on criteria based on least lateral dimension, and based on failure of columns, Euler's theory of long columns. Assumption and limitations of Euler's theory for critical load on long column **(no derivations),** Numericals based on the above concepts.

MODULE 5

5. **Deflection of Beams:** Moment curvature equation **(no derivation)**, assumptions made in the deflection theory. To determine deflection and slope for cantilever beam, simply supported and overhang beam, subjected to **point load & uniformly distributed load** by Double Integration Method & Macaulays method.

Learning outcome: At the end of the course the students will have the ability to understand the effect of forces on deformable bodies.

REFERENCES:

1) B.S.Basavarajaih & P. Mahadevappa, "Strength of Materials", Universities Press, 3rd editn. 2010.
2) Dr. S. Ramamrutham & R. Narayan "Strength of Materials", Dhanpat Rai Publ., 8th edi. 2014.
3) William A. Nash, "Strength of Materials", McGraw-Hill Education; 6th edition, 2013.
4) R.K.Bansal, "Strength of Materials", Laxmi Publications; 6th edition (2017).
5) R.S.Khurmi & N. Khurmi, " Strength of Materials", S Chand Pub., revised edition 2006.

18ART26: BASIC DESIGN & ART APPRECIATION

CONTACT PERIODS : 4 (1 Lecture + 3 Studio) per week
PROGRESSIVE MARKS : 100

OBJECTIVE*: To explore the relationship between materiality & space, between building, the environment and culture and to initiate an understanding of abstraction and analysis of space and form. Study of Arts and crafts and its aesthetics and application.*

OUTLINE:

1. Pattterns-1: Study of pattern –making in nature, (such as trees, leaves, crystals, shells etc.)
   Observation &representation of 2 dimensional patterns in various visual media. Eg. Charcoal/ pencil/crayons/oils etc.
2. Pattterns-2: Study of pattern-making in technology. (Such as geodesics, nanotech, fractals etc.)
   Observation &representation of 2 &3 dimensional patterns in various media.eg. Wire/soap bubble/photographs/digital models etc.
3. Pattterns-3: Use of patterns to synthesize and create form. Use of both physical and material patterns as well as patterns of transformation and Integration. Appreciation of the difference between architecture and pattern.
4. Structure-1. Understanding gravity, and the different ways we resist it. Study of Material & structure in nature, and how design brings them together. Sketch analysis of structure and form in an example taken from Patterns-1.
5. Structure-2. Hands-on Design exercise- creation of a simple design in which form is distinct from structure. Eg. Portal frames, tensile structures.
6. Structure -3: Hands –on Design exercise- creation of simple design in which form is integral with structure. Eg. Shells, massive forms, pneumatics.
7. Study of shades & shadows.
8. Study of Art Forms & Crafts of India and Asia. Difference between art and craft.
9. Art Styles of India- folk, popular and modern art, Art trends, periods and Isms.
10. Appreciation of oriental and western performing arts.

Learning outcome: The students will be able to appreciate the concept of abstraction by experimenting with different patterns and materials. They will also develop an ability to appreciate various art forms.

REFERENCES:

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) Christopher Alexander , "The Timeless way of Building" , Oxford University Press (1979)
5) Francis D.K. Ching,"Architecture: form, space & order", John Wiley & Sons, 2010
6) Fred S. Kleiner, "Art through the Ages", Cengage Learning; 14 edition, 2012

7) IDEO , "Human Centered Design Toolkit", 2009.
8) Ilay Cooper, John Gillow, "Arts and Crafts of India", Thames and Hudson, 1996
9) Jasleen Dhamija, "Indian Folk arts and Crafts", 2002
10) Michael Braungart, William Mc Donough, "Cradle to Cradle: remaking the way we make things", North Point Press; 1 edition, 2002
11) Paul Johnson, "Art : A New History", Weidenfeld & Nicolson, 2003
12) Peggy Holroyde , "An ABC of Indian Culture", MapinLit, 2007
13) Yashodhara Dalmia , "Contemporary Indian Art", Marg Publications, 2002

18ENG27: SITE SURVEYING & ANALYSIS

CONTACT PERIODS: 3 (1 Lecture + 2 Pract./Tutorial/Seminars) per week
THEORY MARKS : 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3HRS

OBJECTIVE: *To develop the knowledge and skills related to surveying and levelling principles and practice and carrying out surveys of land of medium complexity and preparation of survey plans.*

OUTLINE:

MODULE 1

1) **Introduction to Surveying** – Definition, classification, principles of surveying, character of work, shrunk scale.
2) **Introduction to Chain Surveying Instruments –** Chain and its types, Ranging Rod, Tapes, pegs.

MODULE 2

3) **Chain Surveying 1 –** Ranging and Types of Ranging.
4) **Chain Surveying 2 –** Setting out angles, erecting perpendicular, Obstacles in chain surveying, calculation of area by offsets.

Plane Table Surveying – Accessories used, advantages and disadvantages, Methods of plane table surveying (radiation and intersection).

MODULE 3

5) **Levelling –** Definition, Classification, booking and reduction of levels (HI Method, Rise and Fall Method).
6) **Levelling –** Profile levelling – Calculation of depth of cutting and filling

MODULE 4

7) **Contouring**: Characteristics of contours, direct and indirect methods of contours, interpolation and uses of contours.
8) **Introduction to Contemporary Survey Instruments** – Theodolite, Total Station, GPS
Theodolite – Basic Concepts, Measuring horizontal and vertical angles
Total Station – Accessories used, uses of total station and applications, Introduction to GPS

MODULE 5

9) **Observation and Analysis of a Site –** Survey without instruments using geometry and anthropometric measures. To learn a terrain on site factors like topography, hydrology, soils, landforms, vegetation, climate and micro climate and influence of water bodies.
10) **Studying Survey Drawing –** Learning to read a land survey drawing, types of land survey drawing, scale and north, legends and symbols.

Field work – Setting out works such as center lines of a building instruments used in center line marking.

Learning outcome: At the end of the course the students will have ability to understand, measure and analyze the topographical characteristics of a given site for its effective use in site planning.

REFERENCES:

1) B C Punmia, " Surveying Volume I", Firewall Media, 2005
2) K R Arora,"Surveying " Standard Book House,7th edition.
3) R. Subramanian, " Fundamentals of Surveying and Levelling", Oxford Uni. Press., 2014.
4) S K Duggal," Surveying", Vol 1, 14th Edition, McGraw Hill Education, 2013.
5) TP Kanetkar, SV Kulkarni, "Surveying and Levelling(Part-1)", PuneVidyarthi Griha Prakashan, 2014.

18HUM28: KANNADA BHASHE - Aadalitha Matthu Vyavahara

CONTACT PERIODS: 2 (Pract./Tutorial/Seminars) per week
PROGRESSIVE MARKS : 50

DqÀ½vÀ PÀ£ÀßqÀ ¥ÀoÀåPÀæªÀÄ

(for Kannadigas - Common to all branches)

[As per Outcome Based Education(OBE) and Choice Based Credit System (CBCS) scheme]

DqÀ½vÀ PÀ£ÀßqÀ ¨sÁµÁ PÀ°PÉAiÀÄ GzÉÝÃ±ÀUÀ¼ÀÄ:

- ¥ÀzÀ« «zÁåyð¼ÁVgÀÄªÀÅzÀjAzÀ DqÀ½vÀ PÀ£ÀßqÀzÀ ¥ÀjZÀAiÀÄ ªÀiÁrPÉÆqÀÄªÀÅzÀÄ.
- «zÁåyðUÀ¼À°è PÀ£ÀßqÀ ¨sÁµÉAiÀÄ ªÁåPÀgÀtzÀ §UÉÎ CjªÀÅ ªÀÄÄr¸ÀÄªÀÅzÀÄ.
- PÀ£ÀßqÀ ¨sÁµÁ gÀZÀ£ÉAiÀÄ°è£À ¤AiÀÄªÀÄUÀ¼ÀÄ ªÀÄvÀÄÛ PÀ£ÀßqÀ ¨sÁµÁ §gÀºÀzÀ°è PÀAqÀÄ§gÀÄªÀ zÉÆÃµÀUÀ¼ÀÄ ºÁUÀÆ ¯ÉÃR£À aºÉßUÀ¼À£ÀÄß ¥ÀjZÀ¬Ä¸ÀÄªÀÅzÀÄ.
- ¸ÁªÀiÁ£Åå CfðUÀ¼ÀÄ, ¸ÀPÁðj ªÀÄvÀÄÛ CgÉ ¸ÀPÁðj ¥ÀvÀæªÀåªÀºÁgÀzÀ §UÉÎ CjªÀÅ ªÀÄÄr¸ÀÄªÀÅzÀÄ.
- ¨sÁµÁAvÀgÀ ªÀÄvÀÄÛ ¥Àæ§AzsÀ gÀZÀ£É §UÉÎ C¸ÀQÛ

DqÀ½vÀ PÀ£ÀßqÀ ¥ÀoÀå ¥ÀÄ¸ÀÛPÀzÀ ¥ÀoÀåPÀæªÀÄ

¥Àj«r

CzsÁåAiÀÄ − 1, DqÀ½vÀ PÀ£ÀßqÀ − MAzÀÄ ¥ÀQë£ÉÆÃl

CzsÁåAiÀÄ − 2, PÀ£ÀßqÀ ¨sÁµÁ §gÀºÀzÀ°è PÀAqÀÄ§gÀÄªÀ zÉÆÃµÀUÀ¼ÀÄ ºÁUÀÆ ¤ªÁgÀuÉUÀ¼ÀÄ

CzsÁåAiÀÄ − 3, ¯ÉÃR£À aºÉßUÀ¼ÀÄ ªÀÄvÀÄÛ CªÀÅUÀ¼À G¥ÀAiÉÆÃUÀ ºÁUÀÆ §¼ÀPÉAiÀÄ jÃw

CzsÁåAiÀÄ − 4, ¸ÁªÀiÁ£Åå CfðUÀ¼ÀÄ ªÀÄvÀÄÛ ««zsÀ jÃwAiÀÄ CfðUÀ¼À £ÀªÀÄÄÆ£ÉUÀ¼ÀÄ

CzsÁåAiÀÄ − 5, DqÀ½vÀ ¥ÀvÀæªÀåªÀºÁgÀ - ««zsÀ jÃwAiÀÄ CfðUÀ¼À £ÀªÀÄÄÆ£ÉUÀ¼ÀÄ, ¸ÀPÁðj ¥ÀvÀæUÀ¼ÀÄ ªÀÄvÀÄÛ CgÉ¸ÀPÁðj ¥ÀvÀæUÀ¼ÀÄ, ªÉÊAiÀÄQÛPÀ ¥ÀvÀæUÀ¼ÀÄ ªÀÄvÀÄÛªÀÄ£À« ¥ÀvÀæUÀ¼ÀÄ

CzsÁåAiÀÄ − 6, ¸ÀPÁðgÀzÀ DzÉÃ±À, £ÀqÉªÀ½, C¢s¸ÀÆZÀ£É, ¸ÀÄvÉÆÛÃ¯ÉUÀ¼ÀÄ ªÀÄvÀÄÛ eÁ»ÃgÁvÀÄ, ¥ÀwæPÁ ¥ÀæPÀluÉ ºÁUÀÆ mÉAqÀgï ¥ÀvÀæUÀ¼ÀÄ

CzsÁåAiÀÄ – 7, ¨sÁµÁAvÀgÀ ªÀiÁqÀÄªÀÅzÀÄ, ¸ÀAQëÃ¥ÀÛ ¥Àæ§AzsÀ ºÁUÀÆ ¥Àæ§AzsÀ gÀZÀ£É. ¨sÁµÁAvÀgÀ ªÀÄvÀÄÛ ¥Àæ§AzsÀzÀ ªÀiÁzÀjUÀ¼ÀÄ.

CzsÁåAiÀÄ – 8, PÀ£ÀßqÀ ¨sÁµÁ¨sÁå¸À, PÀ£ÀßqÀzÀ zÉÃ±Àå ¥ÀzÀUÀ¼ÀÄ ªÀÄvÀÄÛ PÀ£ÀßrPÀgÀtUÉÆArgÀÄªÀ C£ÀåzÉÃ±Àå ¥ÀzÀUÀ¼ÀÄ.

CzsÁåAiÀÄ – 9, PÀ£ÀßqÀ ªÀÄvÀÄÛ PÀA¥ÀÆålgï/ªÀiÁ»w vÀAvÀæeÁÕ£À

CzsÁåAiÀÄ –10, ¥Áj¨sÁ¶PÀ PÀ£ÀßqÀ ¥ÀzÀUÀ¼ÀÄ ªÀÄvÀÄÛ vÁAwæPÀ / PÀA¥ÀÆålgï PÀ£ÀßqÀ ¥Áj¨sÁ¶PÀ ¥ÀzÀUÀ¼ÀÄ

¥ÀjÃPÉëAiÀÄ «zsÁ£À :

- CIE/Progressive Marks - PÁ¯ÉÃdÄ ªÀÄlÖzÀ°èAiÉÄ DAvÀjPÀ ಮೌಲ್ಯಮಾಪನ 50 CAPÀUÀ½UÉ «±Àé«zÁå®AiÀÄzÀ ¤AiÀÄªÀÄUÀ¼ÀÄ ªÀÄvÀÄÛ ¤zÉÃð±À£ÀzÀAvÉ £ÀqÉ¸ÀvÀPÀÌzÀÄÝ.

¥ÀoÀå¥ÀÄ¸ÀÛPÀ :

- DqÀ½vÀ PÀ£ÀßqÀ ¥ÀoÀå ¥ÀÄ¸ÀÛPÀ, ¥ÀæPÁ±ÀPÀgÀÄ : ¥Àæ¸ÁgÁAUÀ, «±ÉéÃ±ÀégÀAiÀÄå vÁAwæPÀ «±Àé«zÁå®AiÀÄ, ¨É¼ÀUÁ«.

ªÀåªÀºÁjPÀ PÀ£ÀßqÀ ¥ÀoÀåPÀæªÀÄ

[Communicative Kannada/ Kannada for Communication]

(for **Non – Kannadigas,** Common to all branches**)**

Course Learning Objectives:

Learners are Non – Kannadigas, so that course will make them to understand the kannada words and to communicate in kannada language.

ªÀåªÀºÁjPÀ PÀ£ÀßqÀ ¥ÀoÀå ¥ÀÄ¸ÀÛPÀ (Vyavaharika Kannada Text Book)

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CIE/Progressive Marks - PÁ¯ÉÃdÄ ªÀÄlÖzÀ°èAiÉÄ DAvÀjPÀ ಮೌಲ್ಯಮಾಪನ 50 CAPÀUÀ½UÉ «±Àé«zÁå®AiÀÄzÀ ¤AiÀÄªÀÄUÀ¼ÀÄ ªÀÄvÀÄÛ ¤zÉÃð±À£ÀzÀAvÉ £ÀqÉ¸ÀvÀPÀÌzÀÄÝ.

¥ÀoÀå¥ÀÄ¸ÀÛPÀ :

1. Vyavaharika Kannada Text Book (ªÀåªÀºÁjPÀ PÀ£ÀßqÀ ¥ÀoÀå ¥ÀÄ¸ÀÛPÀ)
   Published by Prasaranga, Visvesvaraya Technological University, Belagavi.

18ARC31–ARCHITECTURAL DESIGN-III

CONTACT PERIODS: 8(Studio) per week
VIVA MARKS: 150
PROGRESSIVE MARKS: 150

OBJECTIVE: Sense of Place: Towards understanding the transformation of an architectural space into ***a Place***.

OUTLINE:

> *"Everything about this kitchen was typical of a traditional kitchen. There was nothing special about it. But, perhaps it was just the fact that it was so very much; so naturally, a kitchen that had imprinted its memory indelibly on my mind. [...] memories like these contain the deepest architectural experience that I know. They are the reservoirs of the architectural atmosphere and images I explore in my work as an architect."*
>
> — Peter Zumthor, *Thinking Architecture* (1998, p.7-8)

When we as humans create a ***'place'***, we define it in multiple ways. We attribute it with an importance and an identity. We select the siting of the ***'place'*** in a geographical location, it's activities, boundaries, and social neighborhoods, we give it meaning, infuse it with memories, and give it significance.

While ***space*** is created by physical and notional boundaries, ***place*** is characterized by the forces that signify it with an "architectural atmosphere". We could attempt to describe ***place*** as the complete human spatial experience - the spectrum of how one studies a ***place*** ranges from the abstract, physical/formal ***place***, to the one that lives in one's mind and memories.

A ***place*** may be indoors or outdoors, permanent or temporary, private or layered until it becomes very public, imbued with history, meaning, values and memories or new, radical, rebellious and looking into the future.

However, it is through the eyes of architecture that ***place*** is viewed at this semester.

COURSE OF STUDY – The primary architectural goal is going from **spaces** to **places.** Hence contextual elements and factors influencing the built environment should be indentified and studied in detail.

KEYWORDS – site/situation, neighborhood, memory, identity, belonging, defining characteristics/particularity of place(activity, need, function, scale, hierarchy, perception).

MODE OF STUDY

A. EXPERIENCE

1. Visits to different ***places***, sacred places and the mundane, bridging places, edges of various places, entrance places, transitional places, dwelling places, semi-public and public places - to name just a few.

The attempt here is to understand the *experience of a space*, that can enable a person to define its particularities as *a place.* An understanding of being "inside" that particular place, versus "outside" it, needs to be explored.

Students need to experience and study at least 3 different types of *places*, and what differentiates these from others.

B. EXPLORATION

1. Sketches, models, drawings, photographs, collages, short films, that can illustrate the specificity of that particular place. Architectural representation through various media that evoke the ***essence of a place***.
2. Studies of how scale, proportions, physicality, materiality and situation, affect a ***place*** and how it is perceived.
3. Studies of less tangible aspects of a ***place***, like identity, belonging, memory, and stories, through discussions, documentation, and other media. **Their architectural representation is an important conclusion of this exploration.**

This period could include book readings, seminars, and field trips.

C. DESIGN TASKS

2 design projects (minor & major) that address the study, exploration and expression of the ***Sense of Place*** in all its aspects (suggested projects include but or not limited to temporary shelters, pavilions, context specific community driven built forms like health centers) .

Example: Place: The front entrance of dwellings. Visit to a traditional neighbourhood, and a contemporary neighbourhood. What is the nature of this place? What are the moments of transcience? What is the character of space before and after the front? Rangolis/kollams, threshholds, gateways, doors, verandahs/jaglis, toranas, porches.

After careful study, a design task based on the sense of place in the same context can be formulated.
An emphasis on the translating of one's observations well - primarily in architectural drawing as well as in other methods that support it.

12 Weeks for all A, B, & C, including Design Tasks. These need to be scheduled in order A, B and then C.

NOTES:

1. Discussions, book reading as well as writing, seminars, field trips, and group as well as individual study are important for the development of the architecture student's understanding of essential concepts such as that of a ***Sense of Place***.

2. The **DESIGN TASKS *should be interspersed*** with the experience and exploration of the idea of ***Sense of Place***, and not necessarily attempted separately.

COURSE OUTCOME:

To understand how architectural space becomes more than just a physical entity because of the way it has been located, sited, edged, layered, and imbued with values and meaning to transform it into its own entity or ***'place'***.

SHAPE OF THINGS TO COME

The enquiry through exploration and creation of a place from its bare spatial existence leads the architecture student to the next phase where he/she studies the particularity of **the dwelling**.

All spaces "house" activities, whereas a dwelling has a deeper, and more specific character. As one progresses through the course, we move from a wider, more general study of architecture, to a more complex, specific, and nuanced understanding of different areas of architectural design.

REFERENCES:

1. Steen Eiler Rasmussen, "Experiencing Architecture", MIT Press, 2nd Edition, 1962
2. Edward Relph , "Place and Placelessness", Sage Publications, 2008
3. David Seamon , "Life Takes Place", Routledge , 2018
4. Yi Fu Tuan , "Space And Place: The Perspective of Experience", Univ Of Minnesota Press , 2001
5. Gaston Bachelard , "The Poetics of Space", French university publishing , 1958
6. D'Arcy Wentworth Thompson ,"On Growth and Form", Cambridge University Press, 1917.
7. Martin Heidegger, "Building, Dwelling, Thinking, (Poetry, Language, Thought), 1951
8. Tim Cresswell , "Place: An Introduction", John Wiley & Sons, 2014
9. Marc Auge , "Non-Places: An Introduction to Supermodernity" , Verso, 1995
10. Peter Zumthor, Brigitte Labs-Ehlert "Atmospheres: Architectural Environments. Surrounding Objects", Birkhauser, 2006
11. Christian Norberg Schulz, "Genius Loci: Towards a Phenomenology of Architecture", New York : Rizzoli , 1979
12. Christopher Alexander, "The Timeless Way of Building", Oxford University Press , 1979
13. Doreen Massey, "For Space", Sage Publications , 2005
14. Christian Norberg Schulz, "Architecture: Presence, Language, Place", 1996
15. Peter Zumthor , "Thinking Architecture", Lars Müller, 1998

18ARC32–MATERIALS AND METHODS IN BUILDING CONSTRUCTION-III

CONTACT PERIODS: 5 (1 Lecture + 4 Studio) per week
VIVA MARKS : 75
PROGRESSIVE MARKS : 75

OBJECTIVE*: To acquaint the students with construction practices pertaining to RCC, floors, roofs and flooring alternatives, masonry plastering and paint finishes.*

OUTLINE:

MODULE 1

Introduction to RCC Slabs: one way, two-way slabs, cantilever slabs, sloping RCC roof, one way continuous, and two ways continuous.

1. **RCC one way slab and one-way continuous slabs :** Principles and methods of construction.
2. **RCC two way slab and two-way continuous slabs:** Principles and methods of construction.
3. **RCC cantilever slabs and sloping slab**: Principles and methods of construction.

MODULE 2

4. **Vaults & domes I**: Principles and methods of construction including techniques and details of form-work. Construction of Masonry Vaults and Domes – Concepts of Reinforced Concrete Domes and Vaults.
5. **Vaults & domes II:** Concepts and construction of Reinforced concrete domes and vaults with formwork design.

MODULE 3

6. **Introduction to Floor finishes including Toilet flooring**: Mud flooring, Murrum flooring, and Stone flooring in marble, granite, tandur/kota stone, other flooring in mosaic, terrazzo, ceramic tiles, wooden flooring and polished concrete: Laying, Fixing and Finishes.
7. **Introduction to Paving**: Cast in situ concrete including vacuum dewatered flooring, concrete tiles, interlocking blocks, clay tiles, brick and stone.

MODULE 4

8. **Introduction to internal and external masonry plastering and paint finishes:** Materials – Paints, varnishes and distempers, emulsions, cement based paints. Constituents of oil paints, characteristics of good paints, types of paints and process of painting different surfaces. Types of varnish, methods of applying varnish and French polish and melamine finish.

MODULE 5

9. **Method of plastering (Internal and External):** smooth, rough, textured, grit plaster etc. Use of various finishes viz., lime, cement, plaster of Paris, buffing etc.
10. **Introduction to wet Cladding:** wet cladding in stone, marble, etc. including toilet cladding.
11. **Alternative roofing:** Jack Arch, Madras terrace, and stone slab roof.

Note – Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of portfolio. This is for progressive marks.

REFERENCES:

1) Chudley , Construction Technology, ELBS, 1993
2) Barry, Construction of Buildings, East West Press, 1999

18ARC33 – CLIMATOLOGY

CONTACT PERIODS: 3(Lecture) per week
DURATION OF EXAM: 3 Hrs
THEORY MARKS:100
PROGRESSIVE MARKS : 50

OBJECTIVE: *To develop the knowledge required for understanding the influence of Climate on architecture including the environmental processes which affect buildings, such as thermal, lighting, etc.*

OUTLINE:

MODULE 1

1. **Introduction to Climate-1:** The Climate-built form interaction; some examples. Elements of climate, measurement and representations of climatic data. Classifications and Characteristics of tropical climates.
2. **Introduction to Climate-2:** Major climatic zones of India. Site Climate: Effect of landscape elements on site/micro climate.
3. **Thermal comfort-1:** Thermal balance of the human body, Thermal Comfort Indices (Effective temperature, corrected effective temperature, bioclimatic chart, tropical summer index by CBRI Roorkee). Measuring indoor air movement: Kata-thermometer, and measuring indoor radiation: Globe thermometer.

MODULE 2

4. **Thermal comfort-2:** Calculation of Overheated and Under heated period (based on air temperature only) for locations in Climatic zones and their optimization in terms of solar heating and Passive cooling desired.
5. **Sun-path diagram:** Solar geometry & design for orientation and use of solar charts in climatic design.
6. **Thermal performance of building elements:** Effect of thermo-physical properties of building materials and elements on indoor thermal environment. Convection, Radiation, concept of Sol-air temperature and Solar Gain factor.

MODULE 3

7. **Thermal Heat gain or loss**: Steady state and periodic heat flow concepts, Conductivity, resistivity, diffusivity, thermal capacity, time lag and 'U' value. Calculation of U value for multilayered walls and Roof, Temperature Gradient, Inference of time lags from Graphs for walls and Roof. Construction techniques for improving thermal performance of walls and roofs. (Effect of density, Insulation, and Cavity).

MODULE 4

8. **Shading devices**: Optimizing Design of Shading devices effective for overheated periods while allowing solar radiation for under heated periods for different wall orientations.

9. **Natural ventilation:** Functions of natural ventilation, Stack effect due to thermal force and wind velocity. Air movements around buildings, Design considerations and effects of openings and external features on internal air flow and Wind shadows.

MODULE 5

10. **Day Lighting:** Nature of natural light, its transmission, reflection, diffusion, glare. Advantages and limitations in different climatic zones, North light, Daylight factor, components of Daylight devices.

11. **Climatic Design considerations-1**: Literature study of relevant traditional and contemporary building examples.

12. **Climatic Design considerations-2**: Two Indian case studies and one international for each climatic zone.

REFERENCES:

1. Koenigsberger, Manual of Tropical Housing & Buildings (Part-II), Orient Longman, Bombay, 1996.
2. Arvind Kishan, Baker & Szokolay, Climate Responsive Architecture, Tata McGraw Hill, 2002.
3. Martin Evans; Housing, Climate, and Comfort; Architectural Press (1 March 1980)
4. Donald Watson and Kenneth Labs; Climatic Building Design - Energy-Efficient Building Principles and Practice; McGraw-Hill Book Company, 1983.
5. Mili Majumdar (Editor); Energy Efficient Buildings in India; The Energy and Resources Institute, TERI (28 February 2009)
6. Baruch Givoni; Passive and Low Energy Cooling of Buildings; John Wiley & Sons (1 July 1994).
7. Energy Conservation Building Code (ECBC) 2007; Bureau of Energy Efficiency, Ministry of Power, Government of India.

18ARC34 – HISTORY OF ARCHITECTURE – III

CONTACT PERIODS: 3 (Lecture) per week
DURATION OF EXAM: 3 Hrs
THEORY MARKS: 100
PROGRESSIVE MARKS: 50

OBJECTIVE: *To provide an introduction to the culture and architectural currents of Western Architecture during Renaissance, Baroque, Neo Classical and Modern periods. To identify the socio-cultural changes aptly reflected in the typology of buildings through this phase.*

OUTLINE:

MODULE 1

1) **Introduction to Renaissance Architecture:** Background and influences on Renaissance Architecture. Characteristics of Renaissance Architecture in general. Monumental, public and residential spaces.

2) **Renaissance Architecture Examples:** St Andrea, Mantua and Palazzo Rucellai by Leon Alberti, Villa Rotunda (Capra) by Palladio, (New) St Peter‟s Rome by Michelangelo and others, St Paul‟s London by Sir Christopher Wren. Baroque Architecture: General characteristics of Baroque. Eg: St Peter‟s Piazza by Bernini. Monumental, public and residential spaces.

3) **1750-1900 Transitional Period Architecture:** A brief account of the situation before the changeover to Modern architecture in Europe. Palladian Revival in Britain, Greek revival and Gothic Revival. Transitional Period Examples: Chiswick House, London, Mereworth castle, Kent, St Pancras Church, London, West Minister Palace, London, Arc de Triomphe, Paris. Monumental, public and residential spaces.

MODULE 2

4) **Impact of Industrial Revolution in Europe**: The Social, economic and political changes effected, new requirements, fuctions, new materials and technological developments. New proto types- Ex. Bridges, Expositions, Factories and Railway stations-Use of metal and glass. palace. Monumental, public and residential spaces.

5) **Early Modern Architecture I**: Modern movement-Arts and crafts, Art-Noveau, Italian futurism-The Chicago School and rise of early sky scrapers-Ex Monadnock building, Carson pierre Scott, store in NewYork-Public and private spaces Casa Mila, , Sagrada Familia church etc.

MODULE 3

6) **Early Modern Architecture II:** Destijl movement, Brutalian and Bahaus, Schroder House, Ronchamp, Modern sky scraper, Mies Van der Rohe (Glass and Steel), Bahaus School design-Examples for the above movements for Public and private spaces and Monumental approach(eg Sky scrapers)- IIT Campus buildings- Public and private spaces.

7) **Modern Architecture III:** Influence of concepts and ideas generated by FL Wright - Robie House, Falling Waters, Guggenheim Museum, Johnson Wax Tower. Le Corbusier- Villa Savoy, Domino House, Five points of Architecture. Mies Van der Rohe-Less is more, minimalism, Glass and steel tower - Seagram.

8) **Modern Architecture IV:** Walter Gropius, Bahaus building, Fagus shoe Factory, Harward campus, Team approach. Louis Sullivan-Chicago Auditorium, Wain Wright Building, Theory of Sky scrapers. Alvar Aalto and his works.

MODULE 4

9) **Modern Architecture V:** International style, works of Eero Sarinen- TWA and Kennedy Airports. Richard Neutra- Lovell Beach House. Phillip Johnson- Glass House, Museum Building. Oscar Niemeyar-Work in Brazilia- Legislature building and Church. Monumental, public and private spaces.

10) **Modern Movement-VI:** New Ideas – Archigram Britain-Walking City, Floating City etc. Kenzo Tange- Japan-Floating City and Shimbon Office Building. Moshe Safdie- Housing in Isreal. Sir Buck Minster Fuller-US Pavilion in Expo-67, Dymaxion Car, Bucki Dome- Public and private Building and spaces.

MODULE 5

11) **Modern Movement-VII:** Brutalism- Works of Le Corbusier, Peter and Allison Smith, James Sterling-Udse of Raw concrete, Ronchamp, Nun"s Quarters-Lyon, Library-Oxford University, elementary School by Smithsons- development of Corporate Sky Scrapers- NewYork- Having multiple uses and tinted glass cladding, Rock Feller Centre-NewYork- Public and Private examples.

12) **Modern Movement-VIII:** Parallel movement-Soviet Union of 1920‟s- Constructivist movement, Modernism and works of Vladimir Tatlin- contributions of Engineers like Pierre Luigi Nervi- Rome Olympic Buildings, Pirelli Tower Italy, Gaustav Eiffel-Eiffel Tower, bridges, Statue of Liberty base, Candela etc.

NOTE : Progressive Marks A) individual presentation by a Student on one topic. B) Group studies of chosen issues. C) Impact of modernism on India.

REFERENCES:

1) Frampton Kenneth ; “Modern Architecture – A Critical History”.
2) Fletcher, Bannister ; “A History of Architecture”.
3) Siegfried Gideon ; "Time, Space and Architecture".

18ENG35 BUILDING STRUCTURES – III

CONTACT PERIODS: 3(1 Lecture+2 Pract./Tuto./Semi.) per week
VIVA MARKS:75
PROGRESSIVE MARKS: 75

OBJECTIVES:

1) *To understand the fundamental principles and structural behaviour of concrete buildings in withstanding gravity, lateral (seismic and wind), and other environmental forces.*
2) *To understand the mechanics of reinforced concrete, and the ability to design and proportion structural concrete members including slabs, beams, and columns.*

OUTLINE:

1) Introduction to Reinforced Cement Concrete.
2) Properties of materials - with emphasis on cement, fine aggregates, coarse aggregates, admixtures
3) Mechanics of Reinforced Cement Concrete
4) Loads on the structure as per IS 875
5) Concrete structural system design
6) Design of one way continuous slab - as per IS 456[using the BM coefficients given in IS 456]
7) Design of singly reinforced continuous beam as per IS 456 (using the BM & SF coefficient given in IS 456).
8) Design of Tee beam as per IS 456 - using limit state phylosophy.
9) Design of staircase as per IS 456 - using limit state phylosophy.
10) Design of Axially loaded short columns.
11) Design of isolated column footing.
12) Data given drawing for different cases viz.
    a. Singly reinforced beam
    b. Doubly reinforced beam
    c. One way slab
    d. Two way slab - for at least 2 cases
    e. Staircase detailing (dog legged staircase)
    f. Cantilever slab.

REFERENCES:

1) Dr. S. Ramamrutham, "Design of Reinforced Concrete Structures", Dhanpat Rai Publishing Co Pvt Ltd, January 2010.
2) Dr.H.J.Shah, "Reinforced Concrete Vol 1 (Elementary Reinforced Concrete)", Charotar Publishing House Pvt. Ltd.; 11th Edition edition (2016)
3) Dr. S.S. Bhavikatti, "Design Of R.C.C. Structural Elements", Volume1., New Age International, 2007
4) IS 456-2000 Plain and Reinforced Concrete - Code of Practice
5) SP 34 (1987): Handbook on Concrete Reinforcement and Detailing

18ARC36 – THEORY OF ARCHITECTURE-I

CONTACT PERIODS: 3(Lecture) per week
PROGRESSIVE MARKS : 50
DURATION OF EXAM: 3 Hrs
THEORY MARKS: 100

OBJECTIVE: *To acquaint the students with the basic aesthetic principles involved in architectural design and the grammar of architectural aesthetics.*

OUTLINE:

MODULE 1

1. **Definition of Art and role of Art in Society:** Role and meaning of art, 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., relationship of architecture with other arts like Painting and Sculpture.
2. **Principles of Aesthetics and Architectural Composition -1 –** Unity, Balance, Proportion, Scale in Architectural composition. Illustrations and its application to the practice of design with historical as well as contemporary buildings.

MODULE 2

3. **Principles of Aesthetics and Architectural Composition -2:** Contrast, harmony, accentuation, restraint in Architectural composition. Illustrations and its application to the practice of design in historical as well as contemporary building.
4. **Principles of Aesthetics and Architectural Composition -3:** Repose, vitality, strength in Architectural composition. Illustrations and its application to the practice of design in historical as well as contemporary building.

MODULE 3

5. **Organizing principles of Aesthetics and Architectural Composition -1:** Symmetry, asymmetry, hierarchy, datum, axis, rhythm in Aesthetics and Architectural Composition and its application to the practice of design.
6. **Spatial organizations of Masses in Architecture -1:** Centralized and clustered; Illustrations of centralized and clustered massing in spatial organizations of masses in Architecture and its application to the practice of design with both historical as well as contemporary buildings.

MODULE 4

7. **Spatial organizations of Masses in Architecture -2:** linear, radial, grid organization. Illustrations of linear, radial, grid organization in spatial organizations of masses in

Architecture and its application to the practice of design with both historical as well as contemporary buildings.

8. **Ornamentation in Architecture:** Historical perspective of the use of ornament in buildings and use of ornament as a decoration to embellish parts of a building. Use and need of ornament in architectural design – different types of ornamentation in buildings.
9. **Ornamentation in Architecture Criticism**–Argument against ornamentation. Ideas of architect Adolf Loos (Ornament and Crime); Ornaments as economically inefficient and morally degenerate, reduction of ornament or lack of decoration as the sign of an advanced society.

MODULE 5

10. **Materials, Materiality and Tectonics:** Aesthetic and structural potentials in Architecture of materials like brick, timber, stone, concrete, glass.
11. **Style in Architecture:** Basis for classification of styles including chronology of styles arrangement according to order that changes over time. Evolution of styles; reflecting the emergence of new ideas as reaction to earlier styles as a result of changing of fashions, beliefs, technology etc.
12. **Perceptions in Architecture:** Experience of architecture in basic psychological and physiological terms. Way in which human minds and bodies respond to space, light, texture, color, and other architectural elements.

REFERENCES:

1. Form, Space and Order" by Francis DK Ching
2. Design Fundamentals in Architecture" by Parmar VS
3. Theory of Architecture by Paul Alan Johnson
4. Creating Architectural Theory by John Lang

18ARC37 – COMPUTER APPLICATIONS IN ARCHITECTURE -I

CONTACT PERIODS: 3 (Pract./Tuto./Semi.) periods/ week with 1-2 periods of instruction and Remaining hrs of working on CAD workstation for submission of Assignments.

PROGRESSIVE MARKS : 100

OBJECTIVE: *To develop and train students to use computers and digital media as tools to explore, develop, evaluate and present architectural ideas. To equip the student with a range of digital tools and techniques in 2D drafting, 3D modelling, and vector graphics.*

OUTLINE:

1. Introduction to 2D drafting software: Using latest version of relevant CAD software:

a. 2D commands, viewports, dimensions, annotations. Time problem introduction;

Classroom exercises such as measured drawing of studio (windows, doors and staircases included), architecture School (windows, doors and staircases included) etc.

b. Understanding layers, paper space Vs model space, line weights, print set up and Modelling of Walls, Doors, Windows, Stairs etc.

2. 2D drafting: Presentation of time problem; plan, sections, elevations of a floor of a single storied building of II / III semester architectural design studio project.

3. Introduction to 3D modelling: Latest version of relevant 3D modelling software – software interface, demonstration of 3D modelling commands required to convert 2D project (of 2D drafting) into 3D as a time-problem.

4. Simple 3D modelling: Presentation of time problem; drawing quickly with basic shapes in 3D, viewing models in 3D, adding detail to Models in 3D space, use of cameras, material applications. Presenting models.

5. Rendering & Visualization: Presentation of time problem, generating 3D Model and introduction to concepts of visualization using rendering engines such as VRay. Flamingo,3D studio Max, or any other appropriate software.

6. Introduction to concepts of Building Information Modelling (BIM) using REVIT or other relevant BIM software.

7. Introduction to graphics editing tools:

   a. Introduction to appropriate techniques to model walls, insert fenestration, curtain walls & staircases.

   b. Lecture and Classroom exercise to convert into BIM project, relationship of other Industry standard file types (.dwg for AutoCAD or Trimble Sketchup input files or from any other relevant software.).

   c. Lecture and Classroom exercise to further utilize rendering and visualization

8. a. Concepts of image scanning, image editing, effects and filters.

   b. Classroom exercise to demonstrate use of Image editing for simple architecture design project projects. For e.g., rendering of 2D drawings, adding nature to 3D visualizations.

9. Graphics editing tools: – Presentation of any simple project to illustrate skills attained in 2D drafting, 3D modeling, graphics editing tool.

NOTE: A portfolio of exercises and assignments done in the class to be submitted for progressive marks.

REFERENCES:.

1. Website and training material of relevant Image/Graphics editing software
2. Learning resources on Building Information Management (BIM).
3. Vast amount of CAD learning resources available on the Internet.
4. Vast amount of learning resources for Graphics editing tools available on the Internet.

18ARC38- ELECTIVE I

CONTACT PERIODS: 3 (Lecture/Studio/Practical)per week
PROGRESSIVE MARKS: 50

a. ARCHITECTURAL PHOTOGRAPHY

OBJECTIVE

To impart the skills of taking aesthetically appealing and creative architectural photographs through the use of appropriate cameras/ lenses and lighting conditions.

OUTLINE

1. Introduction to architectural photography. Various types of compositions framing, silhouette photography.
2. Use of various cameras, lenses and accessories, handling of equipment.
   a . SLR,DSLR cameras, lenses for different focal lengths for various contexts
   b. Use of wide angle, normal, tele, zoom, macro, close up lenses.
   c. Filters- UV, Skylight, colour filters, special effect filter.
3. Shutter speeds- slow, normal and high and their various applications.
4. Apertures- use of various apertures to suit different lighting conditions and to enhance depth of fields.
5. Selection of ISO rating to match various lighting conditions.
6. Optimizing selection of shutter speed, aperture and ISO.
7. Twilight and night photography.
8. Various uses of photography- documentation, presentations, competitions, lectures, etc.
9. Creative photography/ photo renderings, for special effects using software.
10. Play of light and shadows to achieve dramatic pictures.
11. Effects of seasons, inclusion of greenery, foliage, clouds, human scale etc.
12. Architectural photography as a profession, law on photography.

REFERENCES:

1. Schulz, Adrian. Architectural Photography: Composition, Capture, and Digital Image Processing, Rocky Nook, 2012.
2. McGrath, Norman . Photographing Buildings Inside and Out, Watson-Guptill Publications, 1993.

b. VERNACULAR ARCHITECTURE

OBJECTIVE:

To inculcate an appreciation of vernacular architecture; as an expression of local identity and indigenous traditions of the culture.

OUTLINE:

The course would be conducted through seminars and field work.

1. Introduction to the approaches and concepts to the study of vernacular architecture, history and organisation of vernacular buildings of different regions in the Indian context; with an understanding of forms, spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction techniques. Study of factors that shape the architectural character and render the regional variations of vernacular architecture - geographic, climatic, social, economic, political and religious aspects, local materials and skills available in the region etc.

2. Methods of observation, recording, documenting and representing vernacular architecture with examples.

3. Study and documentation of vernacular architecture of selected building typologies. Rigorous documentation, accuracy in measuring, collating the recorded information and drawing them up in specified formats and scales are part of this module.

4. A critical review of the relevance and application of vernacular ideas in contemporary times. An appraisal of architects who have creatively innovated and negotiated the boundaries of 'tradition' while dynamically responding to the changing aspirations and lifestyles of the world around.

REFERENCES:

1. Carter, T., & Cromley, E. C. Invitation to Vernacular Architecture: A Guide to the Study of Ordinary Buildings and Landscapes. Knoxville: The Unversity of Tennessee Press. 2005
2. Cooper, I. Traditional buildings of India. Thames and Hudson Ltd, London, 1998
3. Oliver, P. Encyclopaedia of Vernacular Architecture of the World, Cambridge University Press, 1997

c. VISUAL COMMUNICATION

OBJECTIVE: *To impart the techniques of visual communication.*

OUTLINE:

1. Visual communication used in day to day life, print, electronic media, advertisement and in art / architecture context - differences and similarities.
2. Understanding meaning generation process in visual language.
3. Devices of visual language - space, context, scale, associate, transform, crop, frame, distort, abstract, fragment, exaggerate, and subvert, irony.
4. Pictograms and ideograms.
5. Understanding the differences between logo and symbol. Process of logo creation.
6. Hierarchy in visual content being presented.
7. Relationship between text and images and their interrelationships.
8. Cultural context of meaning generation and aesthetic principles involved.

REFERENCES:

1. Barnes, Susan B. An Introduction to Visual Communication: From Cave Art to Second Life, Peter Lang Publishing Inc, 2011
2. Bergström, Bo. Essentials of Visual Communication, Laurence King Publishing, 2009

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus . The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

18ARC41 – ARCHITECTURAL DESIGN - IV

CONTACT PERIODS: 8(Studio) per week
VIVA MARKS: 150
PROGRESSIVE MARKS: 150

OBJECTIVES: From space to dwelling: An understanding of what it means to dwell in a space/s, and to further explore as to why and how people choose to dwell together.

This semester follows on the heels of the past one, where students have attempted to understand the nature of places with shared memories and purposes.

A. The Dwelling: How spaces change when people stake claim over them, and what boundaries are drawn between what is private and the many stages between that and the common public space?.

What it means to arrive "home", and what is the nature of that feeling of belonging that one gets when we "arrive" and are welcomed in to a familiar space?.

We enquire into the nature of a dwelling space, and what is the nature of spaces outside them? Common rangolis, porches, verandahs, balconies, paths, pavements, plinths, wells, washing areas, vrindavanas, backyards, parking spaces for carts, cattle, and vehicles. We need to enquire in the nature of the spaces in-between these.

Picking from memories, can we recollect and draw spaces that endure, ones that recall the same feelings and create similar expectations as before? Which spaces and behaviours have changed, and which remain. Which are in transition?

B. Dwelling Together:

Explore as to why people live together, and how we have lived together in the past.
Questions to be addressed here are:
How do we make common decisions?
What do we share, and when, where and how does it change to the more intimate, personal space?
Which spaces are "designed"? What is the meaning of "organic" growth?
What is the meaning of Vernacular Architecture?
What is the meaning of the term "sustainable"?

OUTLINE:

1. Continuing on the discussion on 'sense of place'; we move on to further differentiation of space to idea of making a space for dwelling. We address the difference between making a **'house'** for people, from making a **'dwelling'** for them? It is necessary then to enquire into **what is the nature of a dwelling**, what it needs, and whom it includes and involves, and how places and spaces in a dwelling are different from other places and spaces.
2. We need to enquire into what one needs to support the act of dwelling and the transitions in space and scale that lead one to the dwelling.
3. To understand the needs of sharing land, spaces inside and outside dwellings, common places, common interests like security, economy, services, belonging and

identity. Concepts of varying types of needs for privacy in the dwelling, and the transitions from the public realm to it.

4. To understand the basic reasons for grouping dwellings together. Enquiry into some types and typologies of unifying dwellings: clusters, terraces, linear/ row formations, block formations, semi-detached, and detached, to name a few.
5. To understand the nature of dwellings in organic and planned communities, and to enquire into what the changes are, and how they came about.
6. **Suggested site size: From 1500 - 3000 sqm to allow for a deeper study rather than repetition of typical configuration**.

MODE OF STUDY:

Three component approach to the Design Studio:

A) TRAVEL FOR SITE VISITS: Learning from visiting various settings: urban and rural, traditional, contemporary, permanent and temporary, to introduce them first hand to students.

B) SEMINARS: Seminars are intended to expose the students to a range of real issues that are integral to their understanding of house-form. These should lead students to explore different approaches to house-form.

C) DESIGN TASKS: Emphasis in teaching and learning is placed on bridging the gap between the imaginative and conceptual, the material and formal. Projects should involve activities that encourage students to develop techniques for identifying and negotiating competing demands and prioritizing and ordering variables. An essential part of the studio process should be peer reviews and reviews by practicing architects.

Assignment-1: SITE VISITS

1) Two site visits to observe, discuss and document existing residential settlements, housing projects.

2) The emphasis should be on both conceptual understanding and accurate measured drawing. However, scale and proportion need to be observed carefully, as a method of understanding buildings.

3) Attention should be given to community spaces/common areas and the emergent grouping of individual dwellings.

4) Sketches and documentation should show observations and inferences from the studies.

Assignment-2: SEMINARS

1) To understand the architect as the facilitator: the architect's role in the process of building a dwelling community.
2) To understand some issues related to group housing/dwelling or settlements like basic services[lighting, ventilation & water supply] and building regulation.
3) To explore the character of community spaces and their significance in housing projects[points of discussion could include different ways of occupying land: rentals, ownership, temporary squatting, organic settlements, informal urban settlements].

Suggested topics:

- Indigenous building technologies, Post Independence Housing: Otto Koenigsberger.
- Studying housing projects in India [Laurie Baker, BV Doshi, Charles Correa, MN Ashish Ganju, Raj Rewal, Shilpa Sindoor, Revathi Kamath] and other contemporary housing projects from around the world.

Assignment-3: PROJECTS

One major project and one minor/time assignment to be tackled in the semester. Project work could be done in the following four stages of activity interspersed with seminars.

1. **Introduction to the initial design parameters which include choice of:**

a. Geography/situation (context),
b. Understanding the dwellers, their lifestyle, and social context,
c. Exploring ways in which dwellers come together to live in a small community.

2. **Explore issues of community, public and private realms, edge conditions, communication and connectedness.**

3. **Enquire into individual and family/user group needs and aspirations.**

4. The emphasis in the studio has to be on **inclusion** and **integration** of differences in age, gender, mobility, health, economic status. In today's world, there is a need to make buildings equitable to all at the outset, and we should begin with our dwellings.

5. Suggested plot size: From 1500 - 3000 sqm

REFERENCES:

I. Amos Rapoport , "House Form and Culture", Prentice-Hall, 1969
II. Christopher Alexander, "Pattern Language", Oxford University Press, 1977
III. Christopher Alexander, "A Timeless Way of Building", Oxford Uni. Press , 1979
IV. Gautam Bhatia, "Laurie Baker, Life, Work, Writings", Viking , 1991
V. Dick Van Gameren & Rohan Verma, "Designs for Housing: Charles Correa", 2018
VI. Atul Deulgaonkar, "Laurie Baker, Truth in Architecture", Jyotsna Prakashan , 2015
VII. Otto Koenigsberger, "Manual of Tropical Housing and Building", 1975
VIII. Geoffrey Bawa, The Complete Works, 2002

18ARC42 –MATERIALS AND METHODS IN BUILDING CONSTRUCTION-IV

CONTACT PERIODS : 5 (1Lecture + 4 Studio) per week
PROGRESSIVE MARKS : 50
THEORY MARKS : 100
Duration of Exam – 4 Hrs

OBJECTIVE: *To acquaint the students with construction practices pertaining to RCC framing systems, and other building elements such as metal doors and windows(In Steel and Aluminium)*

OUTLINE:

MODULE 1

1. **Introduction to Advanced RCC roofs:** Moment framed, Flat slab and Flat plate, Filler slabs, Waffle slab.
2. **RCC Moment framed:** Principles and methods of construction including detailing of Reinforcement.
3. **RCC Flat Plate & Slab:** Principles and methods of construction including detailing of Reinforcement.

MODULE 2

4. **RCC filler slabs**: Principles and methods of construction. Introduction to different filler materials, Mangalore tiles, Burnt Clay Bricks, Hollow Concrete blocks, Stabilized Hollow Mud blocks, Clay pots, Coconut shells etc.
5. **RCC Waffle slabs**: Principles and methods of construction.

MODULE 3

6. **Structural steel as a building material:** Types, properties, uses and manufacturing methods.
7. **Steel construction:** Steel columns/beam construction; Principles and methods of construction.

MODULE 4

8. **Steel doors and windows:** Study of joinery details.
9. **Steel doors for garages and workshops:** uses and manufacturing methods.
10. **Collapsible gate and rolling shutters:** uses and manufacturing methods.

MODULE 5

11. **Aluminum as a building material:** Types, properties, uses and manufacturing methods. Detailing of aluminum partitions.
12. **Aluminum doors and windows:** Casement, Pivot, Sliding type: Study of joinery details.

Note – Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.

REFERENCES:

1) Chudley , Construction Technology, ELBS, 1993
2) Barry, Construction of Buildings, East West Press, 1999

18ARC43 – BUILDING SERVICES – I (Water Supply and Sanitation)

CONTACT PERIODS: 3 (1 Lecture + 2 Pract./Tuto./Semi.) per week
DURATION OF EXAM: 3 Hrs
THEORY MARKS: 100
PROGRESSIVE MARKS: 50

OBJECTIVE: *To impart the knowledge and skills required for understanding the role of essential services of water supply and sanitation and their integration with architectural design.*

OUTLINE:

MODULE 1

1)Introduction to Environment and Health Aspects: History of Sanitation with respect to human civilization, Importance of Health, Hygiene Cleanliness, Waterborne, Water-related, Water based, Epidemic diseases, Conservancy to water carriage system, Urban and Rural sanitation.

2)Water Supply: Source of Water supply – Municipal, bore well, river, etc, Quantity of water for different usages like Domestic, Hot water, Flushing, Gardening, Commercial, Industrial Applications, Assessment of requirement for different uses, Quality of supply for different uses as per national and international standards, Treatment of water for different uses, filtration, softening, disinfection, Storage and pumping – gravity system, hydro-pneumatic system, Distribution of water to fixture and fittings, schematic diagrams, Swimming pool, water bodies, Efficient usage of water.

MODULE 2

3)Sewerage System: Assessment of sewage generated, Collection of sewage / wastewater from all sources, schematic diagram, Conveyance of sewage – gully trap, chamber, manhole, intercepting trap, grease traps, backflow preventer, Materials of construction of sewerage network – PVC, uPVC, HDPE, corrugated PP pipes, Objective of Sewage treatment, type of treatment, aerobic, anaerobic, Ventilation of STP, Space requirements

4)Storm water Management: Assessment, quantification of rainfall, flood control measures, Drainage system – piped drains, open drains, Recharging of storm water, Harvesting of roof top water, first flush, pretreatment, Drainage of basements, podium, paved areas, Collection, Reuse of water within the project, reduction of the load on municipal system, landscape drainages and Rainwater harvesting.

MODULE 3

5) Plumbing: Water supply piping – hot, cold, flushing water, Piping in sunken areas, false ceiling areas, shaft sizes, Drainage – floor traps, drains, P-trap, bottle traps, Single stack, two stack, cross venting, fixture venting, Material of construction like GI, PPR, PB, CPVC, Composite pipes, Copper, Flow control Valves – Gate valve, Globe valves, butterfly valves, Pressure Reducing valves & station, Pipe supports, hangers, fixing, plumbing of small houses.

MODULE 4

6) Sanitary Fixtures, Fittings & Wellness: Soil appliances – Water closets, Bidet, urinals, Cisterns, Flush valve, Waste appliances – wash basin, sink, dishwasher, washing machine, Hot water system – Geysers, boilers, heat pump, Bath & water fixtures – Taps, mixers, single lever, quarter turn, bathtub, multi-jet bath, rain showers, health faucets, Wellness products : Sauna bath, steam bath, Jacuzzi, single and double stack system.

7) Solid Waste Management: Assessment of waste, Waste to wealth concept, Municipal waste, garden waste, organic & inorganic, Commercial waste, Medical waste & Industrial waste, Collection, segregation, treatment, disposal, Organic waste – Biomethanation, Vermicomposting, Organic waste converter.

MODULE 5

8)Introduction to Fire and Life safety: Causes of fire, reasons for loss of life due to fire, development of fire, fire classification of buildings, Fire water storage requirements, Fire control room, Code of practices, Idea of smoke detectors, Fire alarms, Wet risers, Fire escape stair case, equipment used eg: snorkel ladder, materials used to fight fire, Fire rating and Hydrants.

9) Special requirements: Solar Hot Water Generation, Central LPG Supply System, Medical Gases Supply, Storage of High Speed Diesel, Central Vacuum and Waste Collection.

Site Visits:

1. Water Treatment Plants, Sewage Treatment Plants, LPG & HSD Yards.
2. High Rise Residential Building – Plumbing (water supply, drainage)
3. Commercial Buildings like IT Campus, Hotel & Hospital for acquaintance of installation & space requirements.

NOTE*: For Progressive Marks, individual submission of the following:*

a) Layout of Water supply and Sanitation with all fixtures in Kitchen, Bath and Utility for a small Residence i.e. Plan and Section, Terrace plan with Rainwater down take pipes, Sump and OHT calculation design.
b) Schematic diagram of similar study for a Basement floor.
c) Portfolio on
  I. Solid waste management and
  II. Firefighting schematic plans

REFERENCES:

1) Deshpande, RS. A Text Book of Sanitary Engineering, Vol:1, United Books, Pune, 1959.

2) Birdie, G. S. and Birdie J. S. Water Supply and Sanitary Engineering, Dhanpat Rai Publications, 2010

18ARC44 - HISTORY OF ARCHITECTURE-IV

CONTACT PERIODS: 3 (Lecture) per week
DURATION OF EXAM: 3 Hrs
PROGRESSIVE MARKS:50
THEORY MARKS: 100

OBJECTIVE*: To provide an understanding of the evolution of Hindu Architecture in India in its various stylistic modes, characterized by technology, ornamentation and planning practices.*

OUTLINE:

MODULE: 1

1. **Introduction to Classical (Buddhist)**: Mahayana phase, stupa and rock cut cave Architecture.
2. **Buddhist Examples:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Great Stupa at Sanchi, Chaitya at Karli, Viharas at Ajanta, and Toranas at Sanchi b) Domestic (Built to inhabit) and c) Civic space.
3. **Introduction to Jain Architecture:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; b) Domestic (Built to inhabit) and c) Civic space.

MODULE: 2

4. **Evolution of Hindu temple**: Indo Aryan and Dravidian – Early temples at Udaigiri, Tigawa and Sanchi.
5. **Evolution of Hindu temple**: Dravidian Experiments at Aihole (Durga temple and LadKhan temple), Deogarh, Bhitargaon and Badami.
6. **Beginnings of Dravidian architecture:** Pallavas, rathas at Mamallapuram, Shore temple, Kailsanatha and Vaikuntaperumal temples at Kancheepuram.

MODULE: 3

7. **The Cholas contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Brihadeshwara temple at Thanjavur and Gangaikonda Cholapuram b) Domestic (Built to inhabit) and c) Civic space;
8. **The Pandyan & Madurai Dynasties contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Gopurams Madurai (Meenakshi temple) and Srirangam. b) Domestic (Built to inhabit) and c) Civic space;

MODULE: 4

9. **The Hoysala contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Eg: Channakesava temple, Belur, Hoysalesvara temple, Halebid, Kesava temple, Somnathpur b) Domestic (Built to inhabit) and c) Civic space;
10. **Indo Aryan Mode**: the beginnings in Orissa – the Lingaraja at Bhubaneshwar.

MODULE: 5

11. **Hindu architecture at Rajputana & Khajuraho group:** (Temple of Surya, Orisa, Marwar) and Gujarat (Temple of Surya, Modhera). The Khajuraho group: Khandariya Mahadev, Jain temples – Chaumukh temple at Ranpur
12. **Later Dravidian period:** The Vijayanagar and– Noted temples at Hampi (Vitthala temple and Hazara Rama temple),

NOTE: Site visit and documentation of a Temple may be made for part assessment of the progressive marks.

REFERENCES:

1) "Indian Architecture, Buddhist and Hindu Period" by Brown, Percy
2) "Architecture of India – Buddhist and Hindu" by Grover Satish

18ENG 45 – BUILDING STRUCTURES – IV

CONTACT PERIODS: 3(1 Lecture+2 Pract./Tuto./Semi.) per week
VIVA MARKS: 75
PROGRESSIVE MARKS: 75

OBJECTIVE:

1. *To Gain understanding of Steel Structural Systems including composite construction and fundamental principles and structural behavior of steel buildings in withstanding gravity, lateral (seismic and wind), and other environmental forces.*
2. *To understand the process of the design of structural steel systems and the design of simple steel structures.*

OUTLINE :

1) Structural Steel: Different kinds of Steel, their Basic characteristics of Steel & Light Gauge Steel materials.

2) Concepts of design of Steel Structures: Introduction to the concept of Working Stress Design and Load and Resistance Factor Design.

3) Steel Structural Systems: Introduction to Rigid Portal Frames design of a one story industrial building 18M X 48m with two-bay mezzanine office floor. Project work to include a framing plan for both the industrial building and the mezzanine, an approximate design of structural frame elements, columns and beams. Introduction to available sections in structural steel used in the design of frame elements(Indicative).

4) Introduction to National Building Code: IS 800: Criteria & Design to satisfy Building Codes and Standards, Dead and Live load calculations as per IS875 (Part1&2). Determine the general loads to be considered in the design of the structure, based on the type of occupancy for each area specified.

5) Rigid Frames design-1: Properties of Indian standard rolled steel section and general framing arrangement of beams and columns for the one story 18M X 48m industrial building.

6) Rigid Frames design-2: Design of Rigid frame including selection of frames according to the span, spacing and frame configuration using steel manuals.

7) Composite Flooring Systems: Discussion on steel-concrete composite construction using steel beams, metal decking and concrete, including the role of shear connectors' attachment to the beam for composite action.

8) Composite flooring systems design for mezzanine: Loading and Analysis (Moment diagram to be provided) and design of composite steel decking with concrete topping.

9) Rigid frame elements design-1: Steel Structural Column design using IS special publication for the design of steel structures [SP-6 (1)].

10) Rigid frame elements design-2: Steel Structural Beams and trusses design using IS special publication for the design of steel structures [SP-6 (1)].

11) Drawings and Specifications for the Rigid frame design: Structural design criteria, including loads used, calculations, drawings and detailing, and steel tonnage calculation.

12) **Field Inspection of Steel Construction Site:** ***The project work to include documentation and a report about the observations, learning and findings at Site***

Note: Minimum one plate on loading calculation on each Structural steel topic.

REFERENCE:

1) Martin Bechthold, Daniel L Schodek, STRUCTURES - PHI Learning Private limited.

18ARC46 – THEORY OF ARCHITECTURE -II

CONTACT PERIODS : : 3 (Lecture) per week
DURATION OF EXAM : 3 Hrs
THEORY MARKS: 100
PROGRESSIVE MARKS:50

OBJECTIVE: *To acquaint the students with architectural theory from antiquity to the present and to identify issues which shaped the approach to architectural design in a particular context and age.*

OUTLINE:

MODULE 1

Introduction to Theory in Antiquity: Marcus Vitruvius and his multi-volume work entitled De Architectura. Mayamata: Indian Treatise on Housing & Architecture.

Introduction to Theory in Renaissance: Leon Alberti, Andrea Palladio – Jacques Francois Blondel and Claude Perrault of French Academic Tradition.

1) **18th Century Theory**: Ideas of Laugier, Boullee, Ledoux
2) **19th Century Theory:** Concepts of Viollet Le Duc, John Ruskin, Quatramere de Quincy and Gottfried Semper

MODULE 2

3) **Modern Movement Theory:** Ideas of Adolf Loos, Eero Saarinen, Erich Mendelsohn, Richard Neutra, Otto Wagner, Kenzo Tange.
4) **Post Modern Theory-1:** Ideas on Post-Modern Classicism by Robert Venturi and Charles Jencks. Deconstruction: Fundamental beliefs and philosophy and ideas of Peter Eisenman.

MODULE 3

5) **Post Modern Theory-2:** Contribution to architectural thought: Ideas of Kenneth Frampton and Christopher Alexander
6) **Post Modern Theory-3:** Contribution to architectural thought: Ideas of Amos Rapoport, Geoffrey Broadbent-his design generation theories.

MODULE 4

7) **Architectural Criticism:** Definition & Sources, to examine fundamental questions of what Architectural criticism actually is, its role and function in architecture and the relationship between criticism and judgment. Specifically in terms of, thinking, discussing, and writing on architecture, social or aesthetic issues. Positive and Normative theories of Jon Lang.,
8) **Architectural Criticism types:** Definition, Sources, Types of Criticism according to Wayne Attoe.

MODULE 5

9) **Design Logic:** Design generation process: Role of logic and intuition in concept generation. Step by step development of design from problem definition, site analysis to post occupancy evaluation as the last stage of design.

10) **Contemporary Significant Theory:** Ideas of Hassan Fathy who pioneered the use of appropriate technology for building in Egypt, especially by working to re-establish the use of mud brick (or adobe) and tradition as opposed to western building designs and layouts and Paolo Soleri's concept of "Arcology", architecture coherent with ecology. Shape of built environment to come. Floating, walking, plug-in, satellite settlements, earth sheltered etc. Works of Archigram, Paolo Soleri, Kenzo Tange, Moshe Safdie etc.

REFERENCES:

1) Broadbent, Geoffrey. Design in Architecture, John Wiley & Sons Ltd, 1977
2) Lang, Jon , Creating Architectural Theory, Van Nostrand Reinhold Co, New York 1987
3) " A moment in Architecture" and Other Books by Gautam Bhatia.

18ARC47 – COMPUTER APPLICATIONS IN ARCHITECTURE – II

CONTACT PERIODS: 3(Pract./Tuto./Semi.) periods / week with 1-2 periods of instruction and remaining hrs of working on CAD workstation for submission of Assignments.

PROGRESSIVE MARKS : 100

OBJECTIVE – *To develop awareness and familiarity with Advanced Computer applications in Architecture and to equip students with skills required in using digital tools to conceive, develop and present architectural ideas.*

OUTLINE:

1) **Introduction to advanced popular 3D modelling software**– e.g. 3DStudio Max, Maya, Rhinoceros and other appropriate software. Introduction to online resources, blogs, tutorials.
2) **Concepts of NURBS modelling**:(curves and surfaces), curve / surface editing, solid modelling, layer management, etc.
3) **Classroom exercise to demonstrate 3D modelling of transformed/ modified/complex 3D objects**: for e.g. Twisted tower, deformed cube, sliced cylinder. Introduction to file conversions and interdependencies between 3D modelling software and 2D drafting software, e.g. Rhinoceros to AutoCAD, or any other relevant CAD software. Conversion of 3D model(of transformed/modified objects) to 2D drawings (e.g. plan, section, elevation)
4) **Conversion of Architecture/interior design project into NURBS modelling project:** For e.g. measured drawing of classroom, Architecture School, computer room etc.
5) **Working on 3D modelling & Visualisation software with rendering:** such as 3DS Max OR Maya or any other appropriate software.

   Concepts of solid modelling: polygonal modelling, modifier, application of materials, simple timeline animations.

   Techniques of 3D visualisations – Introduction to tool settings in 3D rendering engines for photo-realistic rendering. Application of materials and Simple Timeline animations, For e.g. using VRay, Maxwell, Flamingo, Mental Ray or any other appropriate software, Classroom demonstration of objects, of simple Architecture design projects.
6) **Working on Graphics/Vector/Image editing software**: To present Architecture design studio projects –Introduction to publishing tools for creating presentations and portfolios.

   Project 1 – Classroom exercise to convert architecture design project 2D drawings (of semester 3 / 4 OR any simple one to three-storeyed building) into 3D model using relevant software. Project to be rendered using an appropriate 3D visualisation software.

Project 2 – Classroom demonstration/exercise of image rendering/collage using Graphics/Image editing software (for e.g., adding context to visualisations), foreground, backgrounds etc.

Project to include presentation of final outcomes in the form of drawing panels, booklets, posters.

REFERENCES:

1. Internet resources, blogs, and learning resources on the web of popular 3D modelling software and NURBS modelling,
2. Vector/Graphics/Image editing software

18ARC48– ELECTIVE II

CONTACT PERIODS: 3 (Lecture/Studio/Practical)per week
PROGRESSIVE MARKS : 50

a. ENVIRONMENT RESPONSIVE ARCHITECTURE

OBJECTIVE: *To develop awareness and familiarity with green design and its integration with Architectural design.*

OUTLINE:

1) **Introduction to Green Buildings**: Why make Buildings Green? Concept and necessity.
2) **Green Building Rating System**: The seven categories in the rating system : Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, Innovation in Design and Regional Priority.
3) **Introduction to a design exercise (Project application):** Design of a small building with an objective to integrate categories of green building rating.
4) **Sustainable Sites**: Site Specific Design; Development Density and Community Connectivity, Alternative Transportation, Site Development, Storm water Design and Heat Island Effect.
5) **Water Efficiency:** Innovative Wastewater Treatment and Reuse and Water Use Reduction and Re-use factors.
6) **Energy and Atmosphere**: Optimization of Energy Performance, On-site Renewable Energy, Enhanced Commissioning and Green Power. To apply the principles of Solar Passive Architecture to design of buildings.
7) **Materials and Resources**: Building Reuse: Maintain Existing Walls, Floors, and Roof, Construction Waste Management, Materials Reuse, Recycled Content, Regional Materials and Certified Wood.
8) **Indoor Environmental Quality**: Construction Indoor Air Quality Management Plan and Daylight and Views. Rating Systems: GRIHA and LEED Systems.
9) **Regional Priority**: To provide incentive for project teams to address geographically significant environmental local issues. Introduction to passive techniques of cooling such as evaporative cooling, earth tubing, wind scoops, roof ponds, shaded courtyards etc.
10) Review of a design project considering various factors listed above.

REFERENCES:

1. Steemers, Koen and Steane, Mary Ann. Environmental Diversity in Architecture, Spon Press, 2004.
2. McGlynn, Sue et al,. Responsive Environments, Architectural Press, 2008.

b. PRODUCT DESIGN

OBJECTIVES:

1) *To introduce the students to the discipline of Product Design*
2) *To develop basic skills required in handling simple product design projects*

OUTLINE:

Preamble:

We live in a world of objects. Objects can have meanings, carry associations or be symbols of more abstract ideas. These objects are predominantly functional in nature, some are purely symbolic / decorative in nature and there are a few which combine both the functional with the symbolic and decorative.

Great Architecture has demonstrated this fusion of the functional with the symbolic through the ages. Product design, on a smaller scale, seeks to blend the technical with the aesthetic, the utilitarian with the emotional delight; the dialogue between what people need / want vs what people will buy / discard.

1. **Product design as a noun**: the set of properties of an artifact, consisting of the discrete properties of the form (i.e., the aesthetics of the tangible good and/or service) and the function (i.e., its capabilities) together with the holistic properties of the integrated form and function.
2. **Product design as a verb**: the process of creating a new product to be sold by a business to its customers. A very broad concept, it is essentially the efficient and effective generation and development of ideas through a process that leads to new products.
3. **Product design process**: from idea generation to commercialization; concept, development, detail; materiality, technicality, imageability.
4. Relationship between Design, Technology and Product.
5. History of product design as a discipline, the various theories of design via study of design practices.
6. Mode and method of Design Process as applicable to product ideation and development.
7. Materials and manufacturing process and its influence on product ideation and development.
8. influence of ergonomics on product ideation and development.
9. Impact of culture i.e. the aesthetics on product ideation and development, the dialogue between people's aspirations and people's needs.
10. Relationship and difference between craft based and mass manufactured products.
11. Market as a tool for product promotion.

12. Indian aesthetic sense and its influence on product ideation and development.
13. Influence of product design on other disciplines like automobile styling, furniture, jewellery, toys, systems design, computer interfaces, etc.

Class assignments / exercises:

Short projects along with a time problem will be tackled in the class exploring the influences of design process, and ergonomics on the product ideation and development.

The student will also study the product changes that will occur through the choices made of materials, manufacturing process, and marketing techniques.

Discussions, video presentations, seminars and case studies will cover all the other topics.

REFERENCES:

1. Alexander, Christopher ,Notes on the Synthesis of Form, Harvard University Press, 1964
2. Morris, R, The fundamentals of product design, AVA Publishing 2009.

c. HERITAGE DOCUMENTATION

OBJECTIVE: *To understand the character of a settlement, street, building, spaces, materials through a process of measured drawings and photographic documentation.*

OUTLINE:

1. Introduction to Documentation

- Need for Documentation undertaken? Tools for Documentation available, Methodology, Importance of Archival research, Old Photographs, Maps etc

2. Site work

- Secondary information on the /street/heritage
- Reconnaissance survey of the /street/heritage building;
- Mapping of the street
- Identification of selected typology of structures for detailed measured drawing
- Recording of measurements- horizontal, vertical, measuring angles, marking center lines, datum, notations, building orientation
- Legend of materials used; Structural details and joineries
- Details of various elements – openings, ornamental details
- Mapping activities in various locations
- Supporting sketches
- Information on people, surroundings, climate, Access to site

3. Preparation of Drawings

- Developing drawings from the field data – Plans at various levels, Building floor plans, Reflected ceiling plans, roof plans, all elevations, relevant sections.
- Drawings of details such as openings, ornamental details, joineries

4. Analysis:

- Analysis as tools for understanding and interpreting the measured drawings

REFERENCES:

1) RSP Program Monographs –CEPT University
2) Building Craft Lab- DICRC, CEPT University

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus . The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

18ARC51 – ARCHITECTURAL DESIGN -V

CONTACT PERIODS : 8 (Studio) per week
PROGRESSIVE MARKS : 150
VIVA MARKS : 150

OBJECTIVES:

1) *To understand the need for creating architecture as an envelope to system dependent program.*
2) *To understand the use of technologies developed in other fields as a precursor to creating architecture.*
3) *To identify and understand the role of services in the design of buildings; significance of material and construction techniques; climatic factors.*
4) *Introduction to development Regulations (building byelaws and rules); circulation networks (people, vehicular access), site planning.*
5) *To explore Computer Aided Design techniques to generate drawings and models to better understand envelopes and systems in architecture.*
6) *To understand the (thematic) abstract character of architecture (symbolism, aesthetics, identity) in the public domain; influence of socio-cultural, economic dimensions; user perception.*

OUTLINE:

(a) Familiarize with the impact of technology, utilities, and regulations in shaping architecture
(b) Understand the various complex parameters to be considered while designing in the public domain

MODE OF STUDY*:* 3 component approach to the Design Studio:

A. Literature review and case studies: Learning from detailed study and analysis of building systems and envelopes; character of public buildings through literature review and visiting buildings in varied settings (urban, contemporary, permanent and temporary)**.**

B. Seminars: Seminars are intended to review parallel academic studies completed up to and during 5th semester studies in Building Construction/Structures/history/computer graphics, climatology/services and its importance and integration with the studio.

C. **Design Projects:** Studio projects structure shall emphasize the non-linear **interdisciplinary design process** encountered in Architectural design and the importance of other fields of knowledge in Architectural Design. The Design Studio will give prominence to bridging the gap between innovations in materials and techniques of construction. An essential part of the studio process should be peer reviews and reviews by consultants in the field of Structures, Utilities and Services.

Assinment-1: Case Study

1. Detailed review of each of the building types: retail/hospitality/transport. Students to be split into three groups; each group assigned to perform a case study of one building type. Short study trips to observe, discuss and document building types: retail/hospitality/transport, building projects in the vicinity of their colleges.

2. The emphasis should be on conceptual understanding and accurate measured drawing.
3. Attention should be given to Structures, Utilities and Services and Passive energy systems.
4. Sketches and documentation should show observations and inferences from the studies.

Assinment-2: Seminars

1. Overview by a PHE, MECH/Elec., HVAC & firefighting consultant on what to expect and practical rules of thumb to help students plan.
2. Overview by a Structural consultant on large span structural systems in parallel academic studies of 5th semester in MATERIALS AND METHODS IN BUILDING CONSTRUCTION – V and BUILDING STRUCTURES - V.
3. Discussion on innovations in materials and techniques of construction and passive energy systems.

Assinment-3: Projects

One major project and one minor/time problem to be tackled in the semester. Projects shall be of urban scale with multiple functions and a need for imagery as one of the architectural goals. Museums, art galleries, theme-based hotels, transport interchanges, terminals and shopping, Industrial structures areas can be chosen.

Project work could be done in 3 stages of activity interspersed with seminars.

1) Introduction to the initial design parameters which include choice of;
    a. *Geography/situation (context),*
    b. *User Group/development model,*
    c. *Development guidelines (byelaws).*
2) Approaches and strategies to address issues of community, public and private realms, edge conditions, communication and connectivity. This could result in the generation of diagrams/models exploring attitudes to site, allocation of built and un-built volumes and communication and connectivity.
3) The design shall be sensitive to the needs of disabled, aged people and children.

It is recommended that site sizes should not be larger than 1 acre to allow for intensive study. However the Design studio faculty shall determine the extent of the site size.

Projects shall be of urban scale with multiple functions; identity of public building (aesthetics, symbolic character, meaning) will be one of the architectural goals. Museums, art galleries, theme-based hotels, transport interchanges, terminals and shopping areas can be chosen. Design emphasis shall be on the use of innovations in materials and techniques of construction. Concurrent or sequentially, another project shall be attempted with utilities and service dominant buildings like pharmaceutical manufacturing units or medical facilities. Consultants in the field of utilities and services shall be called as part of studio review.

Alternatively projects involving large span structures like industrial structures may be attempted. Design emphasis shall be on the skins and support of structural systems and resulting architectural form, space and experience.

NOTE:

- One major project and one minor/ time problem to be tackled in semester.
- Detailing of architectural features of the major project like entrance lobby, skylights and staircases has to be attempted.
- Submission shall comprise of duly drawn/drafted site plans, elevations, section views, models etc.

REFERENCES:

1. Richard Patrick Parlour(200); "Building services : A Guide to Integrated Design : Engineering for Architects"; 3rd Edition - Integral Publishing.
2. Paul Tymkow ; Building Services Design for Energy Efficient Buildings.
3. Russell Fortmeyer, Charles Linn ; Kinetic Architecture: Designs for Active Envelopes.
4. Michael Fox ; Interactive Architecture: Adaptive World (Architecture Briefs).
5. Prof. A.K.Bansal ; Solar Passive Design.

SHAPE OF THINGS TO COME – 6TH SEMESTER

This studio should equip a student to tackle the 6th Semester program like Institutional projects of higher learning, vocational training or a small-scale campus.

18ARC52 – MATERIALS AND METHODS IN BUILDING CONSTRUCTION – V

CONTACT PERIODS : : 5 (2 Lecture + 3 Studio) per week
VIVA MARKS : 75
PROGRESSIVE MARKS : 75

OBJECTIVE: *This course will further student's understanding of the logic and details of construction technologies of complex systems and their impact on production of complex buildings.*

OUTLINE:

MODULE 1

1) **Introduction to Steel plane Trusses:** Construction of Steel trusses for various spans, ridged truss, saw tooth truss with lattice girders, roof lighting, aluminum sheet and profiled MS sheet cladding and roof fixing details**.**
2) **Detailing of Steel trusses:** Tubular and L-angle trusses with 8-16m spans.

MODULE 2

3) **Introduction to pre-engineering metal buildings**
4) **Detailing of a Pre-engineered building:** Including Roof fixing details with aluminium sheet and profiled MS sheet cladding.
5) **Introduction to large span roofs:** Shell roof, vaults folded plate, geodesic domes, space frame, tensile structures, pneumatic structures etc.

MODULE 3

6) **Detailing of hyperbolic paraboloid shell roof:** Principles and methods of construction including form-work techniques and reinforcement details.
7) **Detailing of folded plate and cylindrical shell roof:** Principles and methods of construction including form-work techniques and reinforcement details.
8) **Detailing of a geodesic domes:** Principles and methods of construction with explorations using physical models.

MODULE 4

9) **Detailing of a space frame;** Principles and methods of construction with explorations using physical models.
10) **Tensile structures and pneumatic structures:** Principles and methods of construction with explorations using physical models.

MODULE 5

11) **Plastics as a building material:** types, properties and uses of plastics such as polycarbonates, acrylics, PVC polymer films, and fiber reinforced plastic**.** Application and details.

12) **Waterproof components:** Water Proofing elements, construction chemicals and additives, adhesives, plaster of Paris, gypsum, Polystyrenes, sealants. Detailing of waterproofing of basement, toilets, terrace garden, French drains etc.

NOTE: Minimum one plate relating to each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of portfolio.

REFERENCES:

1) Emitt & Gorse (2006), "Barry's Advanced Construction of Buildings", Second Edition, Wiley India Pvt. Ltd.
2) Francis, D.K. (2008), "Building Construction Illustrated", Fourth Edition, Wiley India Pvt. Ltd.
3) Mackay, J.K. (2015), "Building Construction", Fourth Edition, Pearson India.
4) Roy Chudley (2014), "Construction Technology" Second Edition, Pearson India.
5) Barry R. (1999) – Volume 3 & 4, "The Construction of Buildings", Fourth Edition, East-West Press Pvt Ltd., New Delhi.
6) Lyons Arthur (2014), "Materials for Architects and Builders", Fifth Edition: 2014, Routledge.
7) Varghese P.C. (2015), "Building Materials", Second Edition, PHI Learning Pvt. Ltd.

18ARC53-BUILDING SERVICES-II (Electrical Services and Illumination)

CONTACT PERIODS: 3 (1 Lecture + 2 Pract./Tuto./Semi.) per week
THEORY MARKS: 100
PROGRESSIVE MARKS: 50
DURATION OF EXAM: 3 Hrs

OBJECTIVE: *To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.*

OUTLINE:

MODULE 1

Electrical Services - Electricity Generation; Transmission and Distribution

1. **Introduction to Electrical Services**: Introduction to commonly used terminology – Voltage, Current, Power, Connected Load, Max. Demand, Load Factors, Diversity Factor Etc.; Importance of Electrical Services and Its implications on building design; Introduction to Codes and Standards like National Building Code, National Electric Code, IS Rules, State Electricity Board and Chief Electrical Inspectorate Guidelines.
2. **Supply and distribution of electricity to buildings:** Brief introduction to various Sources for Electricity generation. Introduction to Transmission and Distribution system (from generation to Building's main) - Cables–HT/LT, Voltage Levels, Sub-Stations, Ring Main Units, Metering Panels, HT Panel, Transformers.

MODULE 2

Electrical Services - Internal Electrical distribution systems and Renewable Energy Systems

3. **Residential Building internal electrical distribution system & Commercial Building internal electrical distribution system:** Power Requirement, Incoming Power Source Voltage, RMU, Transformers, HT Metering & Sub Metering Panels, LT Panels, Rising Mains, Sub-Mains, Circuit-Mains, Generators, UPS requirements, Server power requirements, Point Wiring, Point Matrix, Utility Loads, Wiring Systems, Wiring Installation systems.
4. **Introduction to Renewable Energy Systems (On-Site and Off-Site)**: Solar, Wind, Bio-Mass, Achieving Net Zero Building design through utilization of above natural resources; Energy Conservation techniques in Electrical systems.

MODULE 3

Electrical Services - Protection Systems

5. **Switchgear & Protection Devices – Fuses, Breakers:** Miniature Circuit Breakers; Earth Leakage Circuit Breakers; Moulded Case Circuit Breakers & Air Circuit Breakers and Protection Relays.

6. **Earthing & Lightning Protection System:** Definition, Purpose; Types of Earthing Systems, Factors affecting selection and system specification - Type of Soil, water table, soil resistivity etc. Brief about new advances in earthing systems; Lightning system design - Factors affecting the system specification, basic rules as per NBC and other relevant codes.

MODULE 4

ILLUMINATION

7. **Fundamentals:** Quality & Quantity of Lighting; Recommended Lux Levels; Type of Lamps – Incandescent, Discharge Lamps, Fluorescent, CFL, LED and OLED. Integration of Day lighting with Artificial Lighting, Control Systems, Laws of illumination.
8. **Techniques, Principles and Applications:** Lighting Methods - Ambient, Task & Accent lighting; Systems of Luminaries - Up-Lighting, Down-Lighting, Spot Lighting etc.; Street Lighting, Façade Lighting, Landscape Lighting, Architectural Typologies; Preparation of Lighting Layout.

MODULE 5

EXTRA LOW VOLTAGE SYSTEMS AND LOAD ESTIMATION

9. **Extra Low Voltage systems:** Telephone; Data & Cable TV Networking; Service provider requirements; Point matrix for Individual residential / Apartment.
10. **Electrical Layout Design and Load Estimation**: Residential Electrical Layout Design (using symbols as per IS codes), Compliance to local building codes; and Electrical Load Calculations.

Case studies: Typical Layouts & Layout Generation for Lighting, Transformers Yards, Generator Rooms, Lighting layouts for shops/clinic.

Site Visits: Sub-Stations, Transformer Yards, Generator Yards and Panel Rooms etc. of Multi-storeyed Residential Buildings/Campus, Hotels, Hospital & IT Buildings etc.

NOTE: For Progressive marks, submissions to contain a) Calculation of required load and preparation of Electrical lay out design for a 3-bedroom house with standard notations (Plan). b) Study Portfolio relating to modules 1, 2, 3, 4 and 5.

REFERENCES:

1. L.Uppal ; Electrical Wiring, Estimating & Costing.
2. Aly. S. Dadras (1995), Electrical Systems for Architects by N.G.A.R.B. McGraw-Hill.
3. Anwari ; Basic Electrical Engineering.
4. National electric Code, Indian Electricity Rules 1956, Energy Conservation and Building Code.
4. Handbook of Lighting Design by Ruediger Ganslandt, Harald Hofmann; ERCO Edition
5. Fundamentals of Lighting by Susan M. Winchip.
6. National Building Code, 2016 – Part 8 (Section 1, 2, 6).
7. Code of Practice for Interior Illumination (IS 3646-1 (1992); Indian Standard - BIS.

18ARC54 – HISTORY OF ARCHITECTURE - V

CONTACT PERIODS : 3(Lecture) per week
THEORY MARKS : 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3 Hrs

OBJECTIVE*: To provide an introduction to the culture and architecture of Islamic and Colonial periods in India and to provide an understanding of their evolution in various stylistic modes, characterized by technology, ornamentation, and planning practices.*

OUTLINE

MODULE 1

1. **Islamic Architecture –** Early phase; It's emergence in 11th century AD in India. General characteristics of Indian Islamic Style.
2. **Early Phase –I :–** Slave and Khilji phase – a) Monumental : Quawat.Ul.Islam, mosque and tomb of Iltumish , Qutb Minar , Alai Minar. b) Civic space: Enlargement of Quwaat Ul Islam Complex and Alai Darwaza.
3. **Early Phase –II :-** Tugluq , Sayyid & Lodi dynasties. – Architectural character- a) Monumental arch : Tomb of Ghia – Suddin Tugluq, Tomb of Firoz shah Tugluq, Shish Gumbad & Mubarak shah Sayyid's tomb. b) Civic Space : Khirkhi masjid Delhi, Firoz Shah kotla – public and private space, madrassa design with Firoz shah's tomb.

MODULE 2

4. **Provincial style – I –** Jaunpur and Bengal – Architectural character a) Monumental arch : Atala and Jami masjid Bengal – Adina masjid Pandua, Ek Lakhi Tomb b) Civic Space : Elements like entrance pylon : Jaunpur, Dakhil – Darwaza at Gaur, space within & outside of examples like Gunmount or Badasona Masjid.
5. **Provincial style – II –** Ahmedabad and Bijapur – Architectural characteristics- a)Monumental arch:Ahmedabad, Vavs of Gujarat: Bijapur- Golgumbaz, Ibrahim Rauza, Jami masjid. B)Civic space: Ahmedabad-Sarkhej complex, Teen darwaza. Bijapur-Ibrahim Rauza, Bauli (Water tank). c) Domestic architecture.

MODULE 3

6. **Provincial style – III-** Bidar and Gulbarga-General Character. a)Monumental: Bidar-Jami masjid. Gulbarga-Jami masjid. B) Civic space: Treatment of space within mosque and enclosed space for gathering at both places. c)Domestic: Bidar-Madrassa of Mond, Gawan.
7. **Moghul Architecture-I** –Architectural Character. a)Monumental arch: Humayun's tomb, Fatehpursikri layout, Jami masjid, Diwan-I-khas, Tomb of Salim chisti. B)Civic space- Buland darwaza, Garden(Humayun's tomb). c)Domestic- Fatehpursikri, Birbal's house, Jodhabai's palace.

MODULE 4

8. **Mughal Architecture-II** - Monumental arch: Akbar's tomb, Taj mahal, Itmaud Daula b)Civic space: Mughal Gardens, Diwan-I-am, Red Fort, Meena bazaar, Red Fort, Guesthouse (Taj mahal complex) c)Domestic: Public elements like 'Serai'-traveler's shelters, Nobles' houses etc.

9. **Colonial Architecture-I** – Early phase-Establishment of forts, warehouses etc-Building typologies and general architectural character of Colonial Indian Architecture.

MODULE 5

10. **Colonial Architecture-II** – Study of Examples a)Monumental- Governor's house, Calcutta, Town hall, Victoria Terminus(Chhatrapati Shivaji Station) Mumbai, Madras Club, Pacchiappa College Chennai, Mayo Hall, Museum, Central College Bangalore.
    Deputy Commissioner's Office, Palace, Mysore, Examples from Hubli and Dharwad, Karnataka. b)Civic spaces: Parade Ground ,MG Road, Bangalore, Civic spaces around Mysore Palace c) Domestic Bungalows from Calcutta, Chennai, Bangalore and Mysore Railway Stations, Administrative Buildings etc

11. **Colonial Architecture-III** – a) Design of New Capital of Delhi- Contributions of Edward Lutyens, Herbert Baker(Rashtrapati Bhavan), Layout of New Delhi, Parliament House, North Block and South Block at Rashtrapathi Bhavan. B) Monumental: Civic space-Rajpath, Janpath, India Gate etc.

12. **Colonial Architecture-IV** – Examples from Goa-Se Cathedral, Cathedral of Bom Jesus (Monumental Architecture). Architecture from Pondicherry-Indian and French Quarters(Domestic Architecture). Brief summary of Dutch and Danish settlements.

    NOTE: *The following are for progressive marks*

    1) A Portfolio containing analysis of spaces, functions, and forms (Individual submission).
    2) Group studies through Photographic documentation of local/ regional examples or study models of the examples.

REFERENCES:

1) Tadgel, C. History of Architecture in India, Phaidon Press, 1990
2) Brown, Percy. Indian Architecture, Islamic Period, Taraporavala and sons, 1987.

18ENG55 – BUILDING STRUCTURES - V

CONTACT PERIODS : 3 (1 Lecture +2 Pract./Tuto./Semi.) per week
PROGRESSIVE MARKS : 75
VIVA MARKS : 75

OBJECTIVE: *Integration of structures with architectural objectives by developing an understanding of building structures and selection criteria for appropriate horizontal systems; conceptual design of long span structures for gravity and lateral wind and seismic loads.*

OUTLINE:

1) **Introduction:** Horizontal or Long Span Structures
2) **Introduction to the Structural design Project:** Design for an Airport terminal building of dimension 75M X 300M using horizontal system. Selection of Horizontal structural systems including load calculation based on Building Codes and Standards(indicative).
3) **Structural Analysis and Design to satisfy Building Codes and Standards:** Determine the general loads to be considered in the design of the structure, based on the type of occupancy specified for each area. a) Gravity loading: Dead and Live load calculation based on IS 875 (Part 1&2) b) Seismic loading: Seismic loading calculation based on IS 1893 Code Static Analysis Procedure c) Wind loading: Wind loading calculation based on Indian Standard I.S. 875 (Part3).
4) **Design of Portal frame Structure System:** Design of two-dimensional rigid frames that have a rigid joint between column and beam. General framing arrangement of Portal frame for 75M X 300M building, basic load path and total structural weight calculation.
5) **Design of Arch and Vault Structures:** Design of curved structural member spanning two points, of masonry, concrete or steel and used as the roofing systems of large span buildings. Design of Arch and Vault arrangement for spanning 75M X 300M building, and basic load path and total structural weight calculation.
6) **Design of Dome Structures:** Domes as polar arrays of curved structural systems in masonry, concrete, steel with glass cladding, their structural strength and properties as roofing systems of large column-free spans. Design of dome(s) for spanning 75M X 300M building, basic load path and total structural weight calculation.
7) **Long Span Planar Truss Design:** Triangular structural system; assembly of simple triangular planar trusses. Planar trusses in roofs and bridges. General framing arrangement of Long Span Truss for 75M X 300M building, and basic load path and total structural weight calculation.
8) **Vierendeel truss design:** Truss design with rectangular or square assembly of members with rigid joints capable of resisting bending moments. General framing arrangement of Vierendeel truss for 75M X 300M building, and basic load path and total structural weight calculation.

9) **Cable and Suspension Structures:** Design for long-span systems using Cable and suspension systems. Design cable suspended roof to span 75M X 300M building, and basic load path and total structural weight calculation.

10) **Space Truss:** Design of three dimensional trusses, their structural properties and strength due to three dimensional triangulation. Design of Space Truss roof for spanning 75M X 300M building, and basic load path and total structural weight calculation.

11) **Concrete Shell structure design:** Design of double curved surfaces formed from warped surface (e.g. hyperbolic parabolic); their properties and strength as light-weight construction for column free large spans. Design of Concrete shell roof to spanning 75M X 300M building, and basic load path and total structural weight calculation.

12) **Fabric Structure:** Design of membrane structures of thin flexible fabric covers that provide light-weight free-form roofing system. Design of Fabric roof to span 75M X 300M building, and basic load path and total structural weight calculation.

NOTE:

a) Minimum one plate on each loading calculation and vertical structural system.
b) This course to be conducted jointly by Structures and Architecture Design Studio faculty.

REFERENCE:

1) Martin Bechthold, Daniel L Schodek , "STRUCTURES"; PHI Learning Private limited
2) Works of Felix Candela
3) Works of Frei Otto
4) Works of Hassan Fathy
5) Works of P.L. Nervi
6) Works of Sir Buckmirter Fuller

18HUM56: SOCIOLOGY AND BUILDING ECONOMICS

CONTACT PERIODS: 2 (Lecture) per week
THEORY MARKS: 100
PROGRESSIVE MARKS: 50
DURATION OF EXAM: 3 Hrs

OBJECTIVE*: To familiarize students with the basic concepts of sociology and economics and their influence on architecture.*

OUTLINE:

MODULE 1

1. **Introduction to Sociology**: Definition of Sociology; Nature, Scope and Utility of Sociology; Branches of Sociology; Relation of Sociology and its branches to architecture and the built environment.
2. **Elements of Society**: Biosocial and Sociocultural associations; Definitions of sociological terms: society, community, family, culture; Difference between society and community; Different family structures and architectural responses to different family types in and outside India (examination of different housing typologies responding to different family types – traditional and contemporary); Relation between culture and built form (exploration of architectural examples.

MODULE 2

3. **Communities**: Origin, growth and nature of settlements and communities. Their characteristics and spatial patterns.
4. **Urban and Rural Communities**: Definitions of the terms "urban" and "rural". The social, economic and spatial characteristics associated with urban and rural settlements. Relation and interdependencies between urban and rural settlements. Urban sociology and rural sociology.
5. **Cities and Society**: Urbanization – definition; causes. Effects of urbanization on rural areas. Impact of growing urbanization on urban life, viz. health, housing, transportation. Different types of migration. The impact of migration on urban form. The origin and characteristics of slums in European, American and Indian cities. Official definition of slums as per Census of India. Governmental and non-governmental approaches to engaging with issues regarding slums in Indian cities.
6. **Social Research**: The need for research; the research process; ethics of social research; scope of social research. Difference between methodology and methods. Types of research methods: qualitative, quantitative, mixed research methods. Sources of research data: primary and secondary sources. Secondary data sources include literature review, official and unofficial documents. Primary data sources use methods such as field surveys, questionnaires, different types of interviews (open-ended / closed / structured / semi-structured), and case study approach.

MODULE 3

7. **Economics**: Definition of economics; Definitions of terms: Goods; Utility, Value, Price and Wealth. The relationship of economics with the built environment and land use.

8. **Economic organization of society**: Different economic systems: capitalism; socialism, communism, mixed-economies. Primary, secondary and tertiary sectors of economy: agriculture, mining, manufacturing, banking, marketing, transport and service sectors. Factors of production: land, labour, capital and entrepreneurship. Relevance of factors of production to architecture and construction practice.

MODULE 4

9. **Economics and the market**: Consumption, wants and needs and their characteristics. Concepts of economics: Opportunity cost; Laws of supply and demand; Laws of increasing, diminishing and constant returns; Standard of living. Analysis of the housing market in Indian cities to understand the dynamics of urban housing supply and demand.

MODULE 5

10. **Urban land values**: Various factors affecting the value of urban land. Difference between land use and land cover. The characteristics of developed land in the city. The Bid Rent theory that defines relationship between location and land value. Theoretical city models based on land use and land value – Burgess's Concentric Zone Theory; Hoyt's Sector Theory; Ullman and Harris's Multiple Nuclei Theory.

11. **Building Costs**: Cost and cost indices. Life cycle costs. Total cost of construction. Time value of money. Different sources of financing buildings.

REFERENCES:

1. Openstax College (2012) Introduction to Sociology. Openstax College.
2. Samuelson, P. and Nordhaus, W. (2010) Economics. Mcgraw-Hill Education.
3. Yin, Robert K. (2014) Case Study Research Design and Methods (5th Ed.). Thousand Oaks, CA:Sage.
4. Groat, Linda N. and David Wang (2013) Architectural Research Methods (2nd Ed.). John Wiley & Sons.
5. Jones, Paul (2011). The Sociology of Architecture: Constructing Identities. Liverpool University Press.
6. Mann, Thorbjoern (1992) Building Economics for Architects. Wiley.

18ARC57 – WORKING DRAWING -I

CONTACT PERIODS : 4 (1 Lecture + 3 Studio) per week
PROGRESSIVE MARKS:100

OBJECTIVE:
Introduction of Working Drawings and Details; Coordination between Architectural, Structural, Services and other disciplines; Preparation of Architectural Working Drawings for a design project.

OUTLINE:

1. Introduction: Overview of Working Drawings; historical perspective; consultants involved in preparation of working drawings, their role and scope; reading, error checking, problems in working drawings.

2. Drafting Conventions: Representation of materials, graphic symbols, line type conventions, grid lines, lettering, color codes, paper sizes, title blocks, office practices, standardization of details.

3. CAD Drawings: Working with layers, blocks, templates, assemblies, libraries, layouts, plot styles, error checking, editing.

4. Project work: Preparation of Architectural Working drawings and details for one of the design projects of medium rise-framed structure, from earlier semester, like Residence, Primary Health Center or School etc. Alternatively, the design of this project may be taken up at the beginning of the semester in a site measuring 30 m x 40 m or less and within B+G+3 floors.

PORTFOLIO:

Drawings to include Site Plan, Marking Plan, Plans at all levels, Terrace Plan; all Elevations; two Cross Sections passing through staircase & lift shaft; Profile Sections; Details to include Toilet, Kitchen, Staircase, Door, Window, Railing, Gate, Sky-light.

NOTE: Same project may be continued for preparation of working drawings w.r.t. structures and services for Working Drawing-II.

18ARC58 - ELECTIVE III

CONTACT PERIODS: 3(Lecture/Studio/Practical) per week
PROGRESSIVE MARKS: 50

a) ALTERNATE BUILDING TECHNOLOGY AND MATERIAL

OBJECTIVE:

1. Introduce students to overall understanding of Building Technology and Material.
2. Introduce details of Building Material and Alternate Techniques of Building.
3. Introduce students with relevant examples.

OUTLINE:

1. Introduction to building material: Soil, types of soil, characteristics of soil, simple tests conducted at site, Bamboo as building construction material, properties, types, joinery details with examples.
2. Masonry wall- SMB (Stabilised Mud Blocks), Hollow clay blocks, Cement blocks – Making of blocks, Properties, Specifications and Applications with examples.
3. Mud wall, Rammed Earth Wall- Making of wall, Properties, Specification and Application with examples.
4. Alternate method for Foundation, Lintel and Chajja. Roof-Dome, Arch Panel Roof, Vault using SMB, Clay blocks with examples .
5. Concept of Ferro Cement structure, Building Components made out of Ferro cement such as Roof, Wall, Staircase with examples.

NOTE: Field visits to be arranged by teachers. Group work could be encourage.

REFERENCES:

1. K S Jagadish, "Building with Stabilised Mud"; IK International Publishing House PVT Ltd.
2. K S Jagadish, B V Venkatarama Reddy, K S Nanjunda Rao, "Alternative Building Materials and Technology"; New Age International Publishers.
3. Jules J A Janssen , "Building with Bamboo-A Handbook".
4. Chris Van Uffelen , "Bamboo Architecture and Design(Architecture and materials)".
5. Laurie Bakers work.
6. Documentation "Earth Architecture", Auroville.
7. Hassan Fathy's work.

b) DIGITAL ARCHITECTURE

OBJECTIVE:

Digital Architecture strategically utilizes digital media in the process of its architectural design.

Provide students with a strong foundation in the process of Digital design.

Training tools to comprehend Conceptual Design through the early design stage, design-development, analysis and representation of architectural spaces.

OUTLINE:
This course uses **theoretical and practical study** to examine how digital tools and processes can be developed and applied to design built environments. Vis-à-vis Architects conventional approach of Architects.

a) Introduction to Digital Architecture:

Exploration of new design process in architecture, Exploration and case study of various available Design process involving digital media.

SESSIONAL WORK:

Cases study of available approaches on utilisation of Design tools leading to presentation of case studies and examining pros & cons and suitability of various Design approaches.

b) Parametric Architectural Geometry

Explore parametric software as a first stage of learning software for replicating ideas in to 2D & 3D forms.

SESSIONAL WORK: Students will be given different small exercises which will be based on the primary stage form development in the parametric software.

c) Geometrical explorations:

Explore the relationships and dependencies of progression concepts and architecture. The exploration will be based on geometrical ideologies to develop relationships and new design process for form generation.

The exercise will explore generative design methodologies through the application progression techniques.

SESSIONAL WORK: Students will work on geometric transformations ad an approach for form generation.

d) Simulation, Visualisation

Explore simulation and visualisation, as a first stage of learning software leading to digital publication.

SESSIONAL WORK: Students will be given small exercises which will be based on the primary stage form development for visualisation & Publication of creative process and outputs with Desktop and Web tools.

Software: Any relevant and appropriate 3D-modelling , visualisation software can be used for sessional work

REFERENCES:

1) Contemporary techniques in Architecture – by Ali Rahim
2) Digital Tectonics, Digital Cities AD: Architectural Design – Prof. Neil Leach
3) Digital to from control to design –by Michael Meredith

c) ARCHITECTURAL LIGHTING DESIGN

CONTACT PERIODS: 3 (Lecture) per week
PROGRESSIVE MARKS: 50

OBJECTIVE: *This course surveys the scope and possibilities of integrating light in architecture*.

OUTLINE:

Architectural spaces are designed for a specific purpose, and are sometimes constructed through a specific theme to create such experiences. The aspect of light in architecture is a crucial element in the fabrication of such spatial experiences as illustrated below:

1. Introduction: Quantitative vs Qualitative aspects of lighting design.
2. Experiencing Architecture: Fundamentals and factors that shape spatial experiences ranging from emotion, memory, imagination, aesthetics, culture etc.
3. Seeing Form-Space Relationships in developing lighting strategies.
4. Relationship between man, light and space.
5. A primer to Place-Making through light in architecture.
6. Light in Architecture – Conceptual proposal of lighting design for an architectural space using Perception Based Approach.

METHODS:

Presentations by staff to introduce the concepts; Student presentations to take the discussions further. Practical understanding in principles of light and perception through visualisations/calculations/mock-ups.

Students will work on related assignments. They will develop ideas and concepts for lighting projects.

ASSESSMENT:

The group/individual assignments will be assessed via mock-ups, presentations and reports.

REFERENCE:

1. Boyce, Peter R.,(2014),"Human Factors in Lighting"; CRC Press, 3rd Edition.
2. Cuttle, Christopher(2015),"Lighting Design: A Perception Based Approach"; Routledge, 1st Edition.
3. Michel, Lou. (1995), "Light: The Shape of Space: Designing with Space and Light"; Van Nostrand Reinhold.
4. Steffy, Gary R.(2008), "Architectural Lighting Design" by Wiley.
5. Tanizaki, Junichiro,(1977), "In Praise of Shadows"; Leete'S Island Books, 1st Edition.
6. Zumthor, Peter(2006), "Atmospheres"; Birkhäuser Architecture, 5th Edition.

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus . The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

18ARC61 – ARCHITECTURAL DESIGN - VI

CONTACT PERIODS: 8 (Studio) per week
PROGRESSIVE MARKS: 150
VIVA MARKS : 150

OBJECTIVE: *To enable the students to integrate design with history, theory, building construction and material science in a more informed way.*

OUTLINE:

To understand the role of built environments of increasing complexity by:

a) Intrinsic factors: Size, volume, levels, functional spaces or zones, structural possibilities
b) External factors: site, approach, traffic, ecology, services
c) Constraints: bye-laws, budget, ideology, attitudes
d) Create an ' Identity' to the Campus through integration of the above.

MODES OF STUDY:

The aim of the studio is to explore STRUCTURING: structuring of a research or a case study, structuring of the program, spatial structuring and informal structuring.

Structuring of research: Case studies, reading material and site studies have to be a directed exercise with the involvement of tutors where visiting the project of concern would be of utmost importance. This studio is also about how one organizes research. It should be mandatory to use analytical models, diagrams to understand the chosen case study in terms of Design Intent, site and spatial structuring. There needs to be emphasis on Graphical consistency and legibility of the study. It is recommended to add a reading list as part of the studio to further enrich this discussion about institutions. Once a week, students could be asked to present the case studies and selected readings to the class.

Structuring program: Studying requirements from various point of views which include relationship between requirements and values, requirements and phenomenology, area of the site and functional area requirements, issues of public and private domains, open and closed spaces, interrelationship between the various components, formal and informal, service requirements, relationship between whole and the part, requirement and climate etc. information resulting from this exercise becomes the individual's program for the project which can then lead to structuring of space.

PROJECTS

a). One major project and one minor/time project to be tackled in the semester. Institutional projects like facilities of higher learning, such as, Engineering college campus, medical college campus, management institute campus, hotel management institute, Law college campus, Dental college campus, Nursing college campus, Juvenile Correction Centre, etc.

b). The minor project could include a case study documentation of the project proposed for the design intervention. This work could be done in a group and as part of its findings shall be an outline program to be a major project.

In view of the current urban contexts where land is precious and resources are scarce, the project could also be institutional buildings on a small urban plot, on multiple levels and still engage with its context and establish an environment within that captures the essential nature of an institution. However, Project selection is left to the discretion of the tutors.

Project work could be done in 5 stages of activity jointly with research and analysis.

1. Introduction to the initial design parameters which include choice of:

    a. Geography/situation (context)
    b. Constraints (bye-laws, budget, ideology, attitudes, etc.)

2. Spatial structuring: To understand spatial structuring as a set of logical operations after an analytical understanding of the site, surroundings, program and intent expressing diversity of program and its resulting spatial variety and the relationship between the built and the unbuilt established through movement systems ,linkages and nodes etc.

3. Informal structuring: Architecture is an integrative discipline. Establishment of a structure enables reverse integration with other subjects where the students look beyond their studio offering a mechanism to observe the surroundings and document it, understand history and theory analytically, integrate design with building construction, climatic, environmental and material science in a more informed way.

4. The design exercise shall focus on ideas of scale, engagement (social, economic, political), hierarchy, public/private space, and challenge the students to reflect on these as part of the design development. The emphasis should be to establishing these larger goals as part of the discussion on the nature of an institution.

5. Goal of the studio shall be to see the architect as *instigator* - defining the nature of engagement with the city, through the articulation of the program and its relationship with the context. Studio must provoke students to define clearly their agenda and to think of architecture as an active, live engagement rather than a passive and inert one. By having students spell out a hypothesis it then doesn't matter what the type is. This prepares the students to frame a series of questions to address the problem at hand.

READING AND REFERENCE MATERIAL:

1) Roger H. Clark and Michael Pause, " Precedents in architecture", 1984, John Wiley & Sons.
2) Geoffrey H Baker , "Le Corbusier an analysis of form", 1996, Van Nostrand Reinhold.
3) Herman Hertzberger,"Lessons for students in architecture", 1991, Delft University.
4) Charles Correa , "A Place in shade", 2010, Penguin India
5) Rem Koolhaas, "Conversation with students", 1996, Princeton Architectural Press

18ARC62 – MATERIALS AND METHODS IN BUILDING CONSTRUCTION–VI

CONTACT PERIODS: 5 (2 Lecture + 3 Studio) per week
THEORY MARKS : 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM - 4 Hrs

OBJECTIVE*: To acquaint the students with construction practices pertaining to structural glazing, Metal Cladding and roofing systems and to study constructional systems and detailing of alternative material doors, windows and partition.*

OUTLINE:

MODULE 1

1) **Glass as a building material:** Glass manufacturing in various types like plate, tinted, decorative, reinforced, laminated glass block, fiber glass, glass murals, partially colored glass, etching of glass and its applications in building industry for both exteriors and interiors. Glass fabrication techniques, fiber reinforced composite materials and products.
2) **Frameless glass doors and windows and partitions:** Fixing and fabrication details.

MODULE 2

3) **Structural Glazing and cladding:** Fixing and fabrication details.
4) **Point supported glazing:** Fixing and fabrication details**.**
5) **Introduction to metal cladding:** ACP, Aluminum louvers; Fixing and fabrication details.

MODULE 3

6) Metal cladding of facades and building envelopes: Fixing and fabrication details.
7) UPVC, PVC & FRP: Doors and windows and partitions (Detailing and study of joinery)**.**
8) Wooden sliding and folding doors and partitions: Principles and methods of construction and detailing.

MODULE 4

9) Steel sliding and folding doors and partitions: Principles and methods of construction and detailing.
10) Aluminum sliding and folding doors and partitions: Principles and methods of construction and detailing.

MODULE 5

11) Skylight in steel and glass: Principles and methods of construction and detailing.
12) Alternative wall technologies: Sandwich panel walls, PUF panels etc.

NOTE : Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of portfolio.

REFERENCES:

1. Francis, D.K. (2008), "Building Construction Illustrated", Fourth Edition, Wiley India Pvt. Ltd.
2. Mackay, J.K. (2015) – Volume 1, "Building Construction", Fourth Edition, Pearson India
3. Roy Chudley (2015) – Volume 1, "Construction Technology" Second Edition, Pearson India
4. Barry R. (1999) – Volume 3 & 4, "The Construction of Buildings", Fourth Edition, East-West Press Pvt. Ltd., New Delhi.
5. Lyons Arthur (2014), "Materials for Architects and Builders", Fifth Edition, Routledge.
6. Varghese P.C. (2015), "Building Materials", Second Edition, PHI Learning Pvt. Ltd.

18ARC63 - BUILDING SERVICES - III
(AIR-CONDITIONING, MECHANICAL TRANSPORTATION and FIRE PROTECTION)

CONTACT PERIODS: 3 (Lecture) per week
THEORY MARKS: 100
PROGRESSIVE MARKS: 50
DURATION OF EXAM: 3 Hrs

OBJECTIVE: *To develop the knowledge and skills required for understanding the mechanical services in buildings and their integration with architectural design.*

OUTLINE:

MODULE 1

MECHANICAL VENTILATION AND AIR-CONDITIONING - Introduction

1) **Introduction to Mechanical Ventilation:** Need for mechanical ventilation for spaces like Basements, Kitchen, Toilets , etc. Guidelines as per NBC / ISHRAE: Types of ventilation systems.

2) **Introduction to Air-conditioning**: Definition, Psychometric processes and requirements, Air & Refrigeration cycles, Basics of Load Calculations, Zoning and Air Distribution, Heating system,

MODULE 2

AIR-CONDITIONING SYSTEMS

3) **Air Conditioning systems:** Window, Split, Packaged, Basics of Centralized Air-conditioning system, Water & Air Cooled Chillers, Air Handling Units, Basics of duct sizing and routing, preferred locations of equipment and Architectural Requirements of various equipment. Illustration of duct layout through a small example.

4) **Specialized Air Conditioning Systems:** Clean Rooms, Server, Hub & UPS Rooms, Operation Theaters etc.

MODULE 3

MECHANICAL TRANSPORTATION SYSTEMS IN BUILDINGS

5) **Elevators:** Types of Elevator systems, design considerations like Peak Handling capacity, Average Waiting Time, Lift speed etc., Architectural Requirements & Details for Elevator shaft - Elevator pit - Elevator Machine Rooms, Automatic Rescue Device for Elevators , Elevator car interiors, Possible Location and arrangements of Elevators in a building. Lift Acts and National Building Code.

6) **Escalators & Travelators:** Applications, Calculation of Traffic capacity, Location and arrangements of escalators and travelators, inclination factor.

MODULE 4

FIRE SAFETY IN BUILDINGS & PASSIVE FIRE PROTECTION

7) **Introduction:** Classification of fire, causes & hazards**;** Grading of structural elements for its fire resistance as per NBC. Classification of building types as per NBC and brief description of characteristics of combustible and noncombustible materials.

8) **Concepts in passive fire protection in buildings**: Escape routes, fire driveways, fire refuge area, fire assembly areas, pressurization, travel distance, fire tower and compartmentation, fire signages etc.

MODULE 5

ACTIVE FIRE PROTECTION AND FIRE SAFETY IN HIGH RISE BUILDINGS

9) **Active fire control:** Basic concepts in fixed firefighting installations, Fire sprinklers, Fire Hydrants, Automatic fire detection and alarm systems.

10) **National Building Code Requirements for Fire Safety**: Rules for Fire Protection and Fire Fighting Requirements for High Rise Buildings in India.

NOTES: Suggested assessments:

A. The subject teacher could arrange for visits to relevant facilities to provide an understanding of the various provisions and integration of air conditioning, vertical transportation and fire safety in buildings. Case study reports could be submitted as group assignments.

B. Conceptual design of air-conditioning systems, mechanical ventilation, mechanical transportation, active & passive fire fighting systems for a high rise building. Ideally the assignment could be integrated with the Architectural Project of ongoing or previous semester.

REFERENCES:

1) Roy J Dossat , "Principles of Refrigeration" 1961, John Wiley & Sons.
2) Manohar Prasad , "Refrigeration & Air Conditioning Data Hand book" 2013, New Age International, 2nd edition.
3) Don Kundwar , "Refrigeration and Air Conditioning", 2016, Dhanpat Rai & Co. (P) Limited.
4) "National Building Code of India (NBC)", 2016, Bureau of Indian Standards
5) Walter T. Grondzik, Alison G. Kwok, "Mechanical and Electrical Equipment for Buildings", 2010; 11th edition, Wiley Publication.
6) Shan K. Wang , "Handbook of Air Conditioning and Refrigeration", 2000, McGraw-Hill Edu.
7) "National Building Code of India (NBC) 2016"; Part 8 Section 3 and 5 & Part 3 & 4, BIS.
8) NFPA 101
9) IS Codes -
- 1391 (Part 1 & 2) : 1992 - Specification for room air conditioners
- 8148 : 2003 - Specification for packaged air conditioners
- 4591 : 1968 - Code of practice for installation and maintenance of escalators
- 14671 : 1999 - Hydraulic lifts
- 14665 : 2000 - Traction lift
- 15259 : 2002 - Home Lifts
- 15330 : 2003 - Lifts for handicapped persons; IS codes for Fire Services

18ARC64 – CONTEMPORARY ARCHITECTURE

CONTACT PERIODS: 3 (Lecture) per week
THEORY MARKS: 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3 Hrs

OBJECTIVE : *To do a critical survey of contemporary architecture from the 1960s to the present, and to provide an understanding and appreciation of contemporary issues and trends in Indian and western architecture in terms of ideas and directions.*

OUTLINE:

MODULE 1

1. **Architecture in India (Pre independence):** The Architecture of the Princely States of Jaipur, Bikaner and Mysore: Their city examples – clock towers, railway stations, public offices, assembly halls, water systems, public hospitals, etc.

2. **Modern Architecture in India-1**: Architecture in India(Post-Independence): Works of public nature in Chandigarh and Ahmedabad (Legislative Assembly Complex including High Court, Legislative assembly and Secretariat, Chandigarh and Mill Owners "Building, Ahmedabad), IIM, Ahmedabad and its significance.

3. **Modern Architecture in India-2:**Ideas and works of BV Doshi (Institute of Indology Ahmedabad, IIM-Bangalore and Gufa, Ahmedabad) and Charles Correa: (RamaKrishna House, Ahmedabad, Kanchen Junga Apartments, Mumbai and MRF Headquarters, Chennai).

MODULE 2

4. **Modern Architecture in India-3:**Ideas and works of Raj Rewal and Uttam Jain (Pragati Maidan, New Delhi and Asian Games Village, New Delhi), Achyut Kanvinde(IIT, Kanpur and Nehru Science Centre, Mumbai), Uttam Jain(Lecture Theatres, Jodhpur and Engineering College, Kota).

5. **Modern Architecture in India-4:**Enrichment of Indian experience- Cost effectiveness and local influences. Lauire Baker and Anant Raje (Centre for Development Studies, Thiruvananthapuram and St. John Cathedral at Tiruvalla) and Anant Raje(IIFM, Bhopal and Management Development Centre, IIM-A).

6. **Parallel trends in Indian architecture:** a) Revivalistic- monumental, Religious b) Experimental-Pondicherry, Belgium embassy, IITB, Sriram Centre Newdelhi c) Vernacular influence-Cost effective concepts.

MODULE 3

7. **Last phase of Modern Architecture: Ideas and works of Richard Meier** (Smith House, Connecticut and Getty Centre, Brent Wood, LosAngeles) and Charles Moore (Architect"s Own House at Orinda and Piazza d"Italia, New Orleans), Bernard Tschumi (Kyoto Railway Station Project and Parc de la Villete, Paris).

8. **Ideas and works of Frank Gehry** (AeroSpace Museum, Santa Monica and Guggenheim Museum, Bilbao).

9. **High-tech architecture or Structural Expressionism-1:** An architectural style that emerged in the 1970s: The High-tech architecture practitioners include British architects Sir Norman Foster(Hong Kong Shanghai Bank and Renault Distribution Centre, Swindon, England), Sir Richard Rogers, Sir Michael Hopkins.

MODULE 4

10. **High-tech architecture or Structural Expressionism-2:** The High-tech architecture practitioners include Italian architect Renzo Piano (Pompidou Centre, Paris and Menil Museum, Houston) and Spanish architect Santiago Calatrava (Lyon-Satolas Railway Station and Olympic Stadium at Athens).

11. **Postmodern Architecture**: Development of Postmodernism with its origins in the alleged failure of Modern architecture from 1950s, and spreading in the 1970s and its continuous influence on present-day architecture. Ideas and works of Michael Graves, James Stirling, Robert Venturi etc.

MODULE 5

12. **Hyper theories of Architecture-1:** Development of postmodern architecture in 1980s is the ideas of Deconstructivism including, Frank Gehry (AeroSpace Museum, Santa Monica and Guggenheim Museum, Bilbao), Daniel Leibskind (Jewish Museum, Berlin and World Trade Centre, New York), Rem Koolhas(Dance Theatre, The Hague and Netherlands Sports Museum).

13. **Hyper theories of Architecture-2:** Ideas of Deconstructivism including, Peter Eisenman, Zaha Hadid (The Peak Club, HongKong and IBA Housing Block 2, West Berlin), Coop Himmelb(l)au, and Bernard Tschumi.

REFERENCES:

1) Morgan, Ann Lee & Taylor Colin , “Contemporary Architecture”.
2) Bahga, Bahga and Bahga , “Modern Architecture in India”, 1993, Galgotia Pub. Co.

18ENG65 – BUILDING STRUCTURES - VI

CONTACT PERIODS : 3 (1 Lecture + 2 Pract./Tuto./Semi.) per week
PROGRESSIVE MARKS : 75
VIVA MARKS: 75
OBJECTIVE: *Integration of structures with architectural objectives by developing an understanding of building structures and selection criteria for appropriate vertical systems; conceptual design of structures for gravity and lateral wind and seismic loads.*
OUTLINE

1 **Introduction of High Rise Structures and case study.**

2. **Introduction to the Structural design Project**: Design for a 10 story building of dimension 30m X 30m [Suggested Dimension], 35 meter height, 10m X 10m column grid and with service core in the central bay. Calculation of building loads load calculation based on the IS 875 and seismic loads and wind loads and design of gravity and lateral systems.

3. **Seismic loading**: Seismic loading calculation based on IS 1893 Code; Static Analysis Procedure **.**

4. **Lateral load resisting systems-Moment resisting frame design:** Design of Moment-resisting 2-dimensional frame assemblies of beams and columns, with the beams rigidly connected to the columns. General moment resisting framing arrangement and sizing and design of beams, columns and slabs for 30m X 30m [Suggested Dimension], 35 meter high building, and basic load path and total structural weight calculation.

5. **Shear Wall System:** Design of Shear walls as lateral load resistance structural systems. Application of lateral loads along the height, transference to the wall by diaphragm slabs in concrete or masonry. General Shear wall framing arrangement and sizing and design of beams, columns/ shear wall and slabs for 30m X 30m [Suggested Dimension], 35 meter high building, and basic load path and total structural weight calculation.

6. **Braced frame**: Design of lateral structural system to resist lateral loads (wind and seismic). Braced frames as vertical trusses with members designed to resist in tension and compression due to triangulation in steel or RCC. General Braced frame arrangement for 30m X 30m [Suggested Dimension], 35 meter high building, and basic load path and total structural weight calculation.

7. **Introduction to underground structures:** RCC retaining walls and water tanks, calculation of forces on vertical walls.

8. **Understanding earthquake and seismology:** Earthquake origin and propagation, earthquake occurance, plate tectonics, faults, causes and classifications of earthquake, seismic waves. Magnitude and intensity of earthquake. Basic terminologies- Focus,

epicenter. Seismological instruments. Earthquake zones of India.

9. **Earthquake effects on building and Earthquake resistant design strategies:** Response of buildings to earthquakes, building forms and seismic effects related to buildings configuration. Material, plan and vertical irregularities. Mass and stiffness distribution, soft story etc. Concept of seismic design, strength, stiffness, period, ductility, damping, centre of mass, centre of rigidity, torsion etc.

10. **Ductile detailing of RC and steel structures:** Considering IS1893-2002 IS: 13920-1993, IS456 and IS800-2007.

11. **Recent techniques:** Introduction to dampers, base isolation and other energy absorbing systems used in earthquake resistant design.

Note:

1) Minimum one plate on each loading calculation and vertical structural systems.

2) This course should desirably be conducted involving consulting engineers and architects.

REFERENCE:

1. Martin Bechthold, Daniel L Schodek, "*Structures*"; 2014, PHI Learning Private limited.
2. Francis D.K. Ching, "*Building Structures Illustrated*", 2nd Edition; 2013, John Wiley & Sons.
3. Francis D.K. Ching, "*Building Construction Illustrated*", 4th Edition; John Wiley & Sons
4. Indian Standard Codes - IS456-2000, IS-875 (Part I to IV), IS-1893; National Building Codes, SP-34 Steel detailing.

18ARC66 – LANDSCAPE ARCHITECTURE

CONTACT PERIODS : 3 (1 Lecture + 2 Pract./Tuto./Semi.) per week
PROGRESSIVE MARKS : 50
THEORY MARKS: 100
DURATION OF EXAM : 3 Hrs

OBJECTIVE:

1. *To introduce the students to the discipline of Landscape Architecture.*
2. *To advance analytical and planning skills for Architectural project sites.*
3. *To develop design skills for small landscape projects.*

Course Outline:
Introduction, design philosophies and contemporary approaches to landscape architecture and design are reviewed through various landscape design projects over time while modules on site analysis, site planning, elements of landscape architecture and landscape design process are supported with theoretical inputs.

Mode of study:

i. **Lecture component:** Various landscape design projects to explain the design philosophies, theoretical aspects of site analysis and site planning, element of landscape architecture and design process will be delivered as lecture component.
ii. **Literature study:** Exercise on 'relating architecture and landscape' may be undertaken as a literature study exercise.
iii. **Studio component:** Studio exercises in site analysis, site planning and a small landscape design project.

Module 1: *Introduction to the discipline of landscape architecture*

a. Landscape as a broad terminology, Natural and Man-modified landscapes.
b. Brief history and the growth of landscape architecture as a design and planning profession from gardens to regional landscapes.
c. Scope and nature of professional work in contemporary landscape architecture, changing priorities of disciplinary approach: ecology, biodiversity and sustainability.

Module 2: *Relating Architecture and Landscape, Site analysis and Site planning*

a. Study of architectural response to landscapes and understanding the relation between architecture and landscape through case examples.
b. The idea of site as part of whole/larger landscape, Site inventory and analysis: physical, biological, social contextual studies and layers of site analysis, site suitability analysis, inferences and response for architectural interventions.
c. Design considerations and approaches to site planning, site program, siting of buildings and open spaces, introduction to grading and land modifications, working with sloping sites.

Demonstration of understanding of site analysis and site planning through studio exercise.

Module 3: *Elements of landscape architecture and their application in landscape design*

a. Primary landscape elements: Landform, water and vegetation, Design considerations and their role in articulating outdoor spatial design.
b. Secondary landscape elements: Street furniture, landscape walls, paving, inert ground covers, trellis, outdoor shading structures, embellishments, etc. Design considerations and their role in spatial design. Hard and soft landscapes.

Module 4: *Works of noted landscape architects and landscape projects*

a. Eastern landscape philosophies: Chinese and Japanese gardens, Asian landscapes: Mughal and Persian gardens, Western landscape designs: Italian and French gardens, English romantic gardens and American parks, Examples in modern landscape: works of Garret Eckbo, Lawrence Halprin and Peter Latz.
b. Examples of contemporary landscape projects: works of Martha Schwartz , Maya lin, Peter Walker & Partners, Hargreaves Associates, Sasaaki, SWA, Michael Van Valkenburgh, Andropogon Associates, Field Operations, Turenscape etc. Landscape projects in India: works of RavindraBhan, Shaheer Associates etc.

Examples should cover various categories of landscape design such as residential, commercial, institutional, public plaza, water/riverfront and other categories. The content of this module should emphasis on design philosophies, the changing styles and changing priorities of the profession over time.

Module 5: *Landscape Design project*

Demonstration of an understanding of landscape design through simple and small design exercise as studio project. Clarity in design process, detail development and representation of the landscape design scheme is to be emphasized.

NOTE: Studio exercises should be introduced after relevant theoretical inputs are delivered utilizing the contact periods.

REFERENCES:

1. **Laurie, M**. *An introduction to landscape architecture*, Elsevier. 1975.
2. **Motloch, J**. *Introduction to landscape design*, John Wiley & Sons, 2001.
3. **Holden, R &Liversedge, J**. *Landscape Architecture: An Introduction*, Laurence King publishing ltd. 2014.
4. **Girot, C**. *The course of landscape architecture: A history of our designs on our natural world*, Thames & Hudson. 2016.
5. **Simonds, J O**. *Landscape Architecture: A manual of site planning and design*, McGraw- Hill, 1997.
6. **LaGro, J**. *Site Analysis: Sustainable site planning and design*, John Wiley & Sons. 2013.
7. **Birksted, J**. *Relating architecture to landscape*, E&FN Spon. 2004.
8. **Shaheer, M &Dua, G.** Landscape Architecture in India: A reader, LA, Journal of landscape architecture. 2010.

18ARC67 – WORKING DRAWING II

CONTACT PERIODS : 4 (1 Lecture + 3 Studio) per week
PROGRESSIVE MARKS: 100

OBJECTIVE: : *Introduction to 'Good for Construction' drawings; Preparation of Structural, Electrical, Water Supply and Sanitary drawings for the project from previous semester; Comprehensive set of drawings.*

OUTLINE:

1. Project Work: Project continued from previous semester; Preparation of structural and services drawings and details.
2. Structural drawings: Conventions & symbols; Foundations, Columns, Beams, Slab.
3. Electrical drawings: Conventions & symbols; Plans at all levels.
4. Water Supply drawings: Conventions & symbols; Plans at all levels.
5. Sanitary drawings: Conventions & symbols; Plans at all levels; Site Plan, Terrace Plan
6. Mechanical drawings: Conventions & symbols; Plans at all levels; Details of Lift.
7. Complete integration of Architectural, Structural and Services drawings and details.

18ARC68 – ELECTIVE IV
CONTACT PERIODS : 3 (Lecture/Studio/Practical) per week
PROGRESSIVE MARKS : 50

a) CULTURE AND BUILT ENVIRONMENT

Objective:
To sensitise students to culture and behavioral sciences and their influence on design and built environment

Culture is a major attribute of humans with deep evolutionary roots. It has an important role in fostering economic, social and environmental dimensions of development. This elective course explores to gather insight into cultural identity, the nature of culture as it relates to the physical environments and how people shape environments, use them and interact with them.

The course needs to address two primary enquiries:

A. Understand the interrelationship between design and behavioral sciences
B. Understand the contributions to the design field that behavioral sciences have made and can make.

Architect Amos Rapport, well-renowned for his seminal contributions to the field of environmental behavioral studies, raises three questions regarding the relationship between culture and the built environment:

1) What biosocial, psychological, and cultural characteristics of human beings, as members of a species, as individuals, an as members of various groupings, influence (and, in design, should influence) what characteristics of the built environment?.
2) What effects do what aspects of what environments have on groups of people, under what circumstances and why?.
3) Given these two-way interactions between people and environments, what are the mechanisms that link them?.

Guided by Rapport's questions, this course examines the role of culture in shaping built environment that varies with the type of environment, over time, for different groups, in different situations and contexts with the help of comparative studies of built environments across Indian subcontinent, South Asia and Latin Americato understand the intersections of cultural practices and the built environment and their influence over one another.

References:

1. Rapoport, "A. *Culture, Architecture and Design"*, Locke Science publication, 2005.
2. Zube, E & Moore, G(Ed.), *"Advances in environment, behaviour and design*", Springer, 1991.

b) GEOGRAPHICAL INFORMATION SYSTEM

Objective:

Geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.

The course is intended to provide students with a foundation for basic GIS techniques which are relevant to architectural analysis and Presentation. The elective is intended to establish a bridge between the conceptual realms - Architecture /Site -Terrain Analysis/ Landscape architecture/Urban planning. Output being digital, online and printed maps.

Outline:

1. **Introduction to GIS:**

   GIS as a Hardware/software/application? GIS data, Vector date, Raster data, attribute data, Data capture & methods, Coordinate reference systems

2. **Introduction to Google Earth**

   An overview of Google Earth & KML, Google Objects, Descriptive HTML in Placemarks, Ground overlays, Screen overlays, Paths, manipulating a path Polygon, taking profiles of site, creating KML files and exporting to GIS format.

3. **Creating & analysing GIS data:**

   Capturing survey data through hand held GPS or mobile application. Traversing boundary of site , bringing routes and way point data into GIS.
   Spatial data, loading raster files, Mosaic raster, Geo referencing raster and vector files, Loading data from OGC web services, databases.
   Creating vector data layers, joining tabular data, Topology errors & tools, Analyzing raster data, Combining raster and vector data, Raster surface through interpolation, leveraging the power of Spatial database, Vector and raster analysis, Vector Spatial analysis (Buffers), Spatial analysis (interpolation).

4. **Terrain Analysis& scientific computing of Raster dataset:**

   Creating Digital elevation model (DEM) from point data, Hill shade, Slope, Aspect

   Creating great Maps: Composing maps: Vector styling, Labelling, Using adobe illustrator for composing multiple vector layers of maps, Designing print maps, Publishing GIS 2D maps on the web

5. **Create 3D maps:**
   3D maps in html format and navigate in the internet browser

References:

1) https://sites.duke.edu/envgis/tutorials/introduction-to-google-earth/
2) Anita Graser , "Learning QGIS" PAKT open source, 2016.
3) GISP Dr. John Van Hoesen, Dr. Luigi Pirelli, GISP Dr. Richard Smith Jr., GISP Kurt Menke, " A refreshing look at QGIS: Mastering QGIS", PACKT Pub., 2016.
4) Displaying and analysing 3D data in Surfer software.
5) **Carson**, Tom, **Baker**, Donna L., "Adobe® Acrobat® and PDF for Architecture, Engineering, and Construction", Springer publication, 2006 ,available as Google Ebook.

c) DESIGN OF HIGH - RISE BUILDINGS

Objective:

The design and construction of skyscrapers involves creating safe, habitable spaces in very tall buildings. The buildings must support their weight, resist wind and earthquakes, and protect occupants from fire. Yet they must also be conveniently accessible, even on the upper floors, and provide utilities and a comfortable climate for the occupants. The problems posed in skyscraper design are considered among the most complex encountered given the balances required between economics, engineering, and construction management. The students may be given a snapshot of this very important typology that gives them an insight into complex world of various services that form the backbone of any skyscrapers.

Outline:

1. Evolution of Skyscrapers
2. Basic design considerations
3. Loading and Vibrations
4. Structural systems for high rise buildings; Trussed tube & X bracing, Bundled tube, etc.
5. Economic rationale
6. Environmental Impact
7. Services in Skyscrapers
8. Fire safety in Skyscrapers
9. Skyscrapers in India

The faculty in-charge should organise inputs by inviting various consultants and visits to few high rise buildings in the area. Students may be given assignments on relevant topics.

References:

1. Basem M.M., "Construction Technology for High Rise Buildings: Handbook", 2014, CreateSpace.
2. Basem M.M., " Mechanical and Electrical Services for High Rise Buildings: Handbook", 2014, CreateSpace.
3. Mark Sarkisian, " Designing Tall Buildings: Structure as Architecture" Routledge, New york, 2012.
4. Johann Eisele & Ellen Kloft, **"** High-rise Manual : Typology and Design, Construction, and Technology" Birkhäuser, 2003.
5. Nigel Clark and Bill Price, ″ Tall Buildings: A Strategic Design Guide", RIBA & BCO, 2016.

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus . The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

18ARC69-STUDY TOUR

PROGRESSIVE MARKS : 50

OBJECTIVE*: To expose students to historical, vernacular and contemporary architecture.*

OUTLINE:

A minimum of two Study tours are to be undertaken before the commencement of 6th semester B. Architecture classes. The study tour may include places of architectural interest in India or Abroad. The choice of places and buildings to be visited is left to the concerned department / college. The students have to submit a study tour report as group work (4 to 6 students per group) within 15 days after the end of the study tour. The two reports are to be assessed by the department / colleges for progressive marks. The department/ college may use its discretion about the choice of places for study tour and suitable time schedule.

18ARC71 – ARCHITECTURAL DESIGN - VII

CONTACT PERIODS : 10 (Studio) per week
PROGRESSIVE MARKS : 150
VIVA MARKS : 150

INTRODUCTION/OVERVIEW:
Post six semesters of architectural training, from introduction to architecture: design of public buildings, in concurrence with allied subjects, the student is expected to have developed a worldview with which he/she is able to analyse a given design brief. The objective of this semester is to activate that critical mind, with an underlying emphasis on performative/responsive architecture. The studio has two main themes, of which any one can be proposed for a studio.

OBJECTIVES:

1. *To understand the subject of Architecture as an integrated field which works in tandem with Technology, Design, Economy, Ecology, Geography and Sociology etc*
2. *To rethink architecture as a man-made ecosystem, which is self-contained and sustainable*
3. *To be able to identify and Augment the right set of knowledge kit (from the learnt courses and electives) that will steer the approach to the brief in a strong direction.*

OUTLINE:

Each of the two themes approach sustenance in different ways, one which looks at traditional wisdoms of sustainability and the other which address the same through technology, digital media and evaluating efficacy in design.

Note: Relevant theoretical and technical inputs need to be part of the studio to facilitate architectural design

1.Meta Architecture: The work in question will strongly root for itself. It will search meaning, solutions, and best practices from principles of regional/vernacular architecture and reincarnate itself as embodiment of contemporary expression instilled with traditional wisdom. The identity of the building will be an outcome of the interplay between the older principles and newer materials. Articulation of the building character through details will remain a primary motive of the studio. Although drawn from the traditional principles, the nature of the buildings remains current. An architectural vocabulary could be built by extending the exercise to service design, furniture design and facade development. The Program will utilize both active and passive energy efficient methods in its climatic design.

Case study practices: David Adjaye architects, ke're' Architecture, Morphogenesis, CnT Architects, Small projects, Matharoo associates, Roger Anger houses, Popo Pingel architecture, Aga khan architecture

Case study concepts: Aqua ducts, Step wells, Wind towers, Solar chimneys, Water coolant systems, HVAC systems etc

Program: Office/commercial complexes, Community center, Institutions, Public Library etc

Suggested References:

- Elizabeth M. Golden, "Building from Tradition: Local Materials and Methods in Contemporary Architecture", 2018, Routledge.
- Paola Sassi, "Strategies for sustainable Architecture", 2006, Taylor and Francis Group.

2. Performative Architecture: It is the architecture, in which building becomes a living, breathing, consuming, excreting organism. Its Facade i.e, skin of the building will simultaneously resolve the structural, aesthetic, climatic requirements of the building. Its architectural expression, shall not be a static response to its context, but a dynamic one.

The engineering aspect of the building typically continues into its internal function. From foundation to form, performative architecture, rethinks the formulaic approach to building design. The program will consider the forces of nature such as Sun, Wind, Water, and its absence as controlling parameters of its function. In order to extract maximum design mileage, the program shall be situated in regions with extreme weather conditions.

Case study practices: Arup associates, Atelier Jean Nouvel, Heatherwick Studio, SOM, Calatrava Architects, Toyo ito architects, Grimshaw architects, Thornton Tomasetti, Renzo Piano architects

Case study concepts: Responsive facades, dynamic facades, exoskeletal structures, Kinetic structures, etc

Program: Office/commercial complexes, Community center, Institutions, Public Library etc

Suggested References:

1. Lisa Iwamoto, "Digital Fabrications: Architectural and Material Techniques", 2009, Princeton Architectural Press.
2. Jesse Reiser, " Atlas of Novel Tectonics", 2006, Princeton Architectural Press.
3. Russell Fortmeyer, Charles F. Linn, " Kinetic Architecture: Designs for Active Envelopes", 2014, The Images Publishing Group.
4. Michael Fox, " Interactive Architecture: Adaptive World", 2016, Princeton Architectural Press.

OUTCOME:

I. In depth understanding of Green concepts, be it Vernacular, active energy efficient methods or projective models. Case study work should be presented as knowledge sharing exercise, through models, 3d models and explanatory diagrams.
II. Building simulation models should be a mandatory output of the studio, to utilize software technology as an effective analytical and design management tool.
III. The complexity of the project can be broken down into components and treated as one/two minor projects and one major component.

Note:

The suggested directions can be altered and evolved to suit the expertise of the studio faculty, keeping in mind that the studio shifts to a explorative (concept driven) path from a program driven model.

18ARC72 – MATERIALS AND METHODS IN BUILDING CONSTRUCTION VII

CONTACT PERIODS : 4 (1 Lecture + 3 Studio) per week
PROGRESSIVE MARKS : 75
VIVA MARKS : 75

OBJECTIVE: *To familiarize students with construction techniques in interior spaces and to provide an introduction to prefabrication design, analysis and manufacture processes.*

OUTLINE:

MODULE 1

1. **Introduction to wood products as building material:** Plywood, block board, particle board, hard board, laminates, MDF, HDF, HDPE wood wool, etc.
2. **Interior residential construction:** Detail of wardrobes and show cases in wood, ferro cement and stone.

MODULE 2

3. **Interior residential construction:** modular kitchens and cabinet shelves.
4. **Interior office construction:** book selves, file cabinets and work stations. Partition systems: wall and ceiling using plywood, PVC, marble, granite, aerated concrete blocks, gypsum board, glass etc.

MODULE 3

5. **False ceiling systems**: Fiber board, plaster of Paris, particle board, wood wool, metals, straw and any other materials introduced in the market including acoustic ceiling.
6. **Pre stressing and post tensioning**: Introduction to pre-stressing and post tensioning of building components especially floor slabs and beams.

MODULE 4

7. **Introduction to Advanced foundation:** Mat foundations, Pile foundations; different types of piles, precast piles, cast-in-situ piles in wood concrete and steel.

8. **Pile foundation construction:** method of driving piles, Sheet piling, pile caps, etc.

9. **Earth retaining structure:** Selection, Design, Construction of retaining structures including gravity, cantilever, sheet pile, and anchored earth and mechanically stabilized earth (reinforced earth) walls.

MODULE 5

10. **Bamboo Construction:** detailing of walls, wall panels, doors, windows and roof in Bamboo.

11. **Prefabrication in India:** Advantages and relevance in the Indian context. Prefabrication: Design, analysis and manufacture processes. Study of one example.

12. **Introduction to advanced methods of Building construction:** CAD /CAM fabrication and 3D printing.

Note:
Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of portfolio.

REFERENCES:

1. Chudley, “Construction Technology”
2. Barry, “Construction of Buildings”

18ARC73- BUILDING SERVICES – IV(ACOUSTICS AND NOISE CONTROL)

CONTACT PERIODS : 3 (Lecture) per week
PROGRESSIVE MARKS : 50
DURATION OF EXAM: 3 Hrs
THEORY MARKS : 100

OBJECTIVE: *To explore the role and capacity of sound in all its variations and to enhance aural experience in built environment- within and without.*

OUTLINE:

MODULE 1 (Introduction to Sound and Room Acoustics)

1) **Introduction to Sound:** Origin and nature of sound, its characteristics and measurement– Amplitude, frequency, period, wavelength, velocity of sound, sound pressure, sound intensity, decibel scale, sound and distance – inverse square law. human hearing, auditory range for humans (Frequency and Intensity – threshold of audibility and pain), pitch (association with frequency), tone, loudness (association with amplitude and intensity), Phon.

2) **Room Acoustics**: Reflection - Nature of reflection from plane, convex and concave surfaces, diffraction, Absorption, Echoes, focusing of sound, dead spots, flutter echo. Room resonances, Reverberation - reverberation time (RT) calculation using Sabine's and Eyring's formulae. Effect of RT on speech and music.

MODULE 2 (Acoustical Tools, Measurements and Materials)

3) **Acoustical Tools and Measurements:** Use of SLM (Sound Level Meter), AI (Articulation Index), STI (Speech-Transmission Index), Speech Intelligibility. Sound Attenuation. Absorption coefficients of acoustical materials, NRC value, NC Curves for various spaces.

4) **Acoustical Materials:** Porous materials, panel absorbers, membrane absorbers, acoustical plasters, diffusers, cavity or Helmholtz resonators. Role of functional absorbers, Adjustable acoustics and variable sound absorbers. Acoustical correction and retrofits to existing spaces.

MODULE 3 (Acoustical Design)

5) **Acoustical Design of Auditoriums - Multipurpose Halls:** History of Greek, Roman theatres. Use of IS code 2526 - 1963 for design and detailing of Auditoriums - Cinema Halls - Multi-purpose Halls - Halls for speech and music.

6) **Acoustical Design and Detailing of Other Spaces** – Open air theatres, Halls for Indoor Sports, home theatres, recording studios, open plan offices, etc. Need and use of sound reinforcement systems, sound masking systems and speech privacy.

MODULE 4 (Noise reduction and Control)

7) **Introduction to environmental noise control:** Noise, its sources and its classification - outdoor and indoor, airborne and structure borne, impact noise, noise from ventilation system, community and industrial noise. Noise transmission, Mass law and transmission loss. Maximum acceptable noise levels. Design Principles – reduction at source, reduction near source, etc.

8) **Constructional measures of noise control and sound insulation -**Enclosures, Barriers, Sound insulation (AC Ducts and plants), Vibration isolation – control of mechanical noise, floor, wall, ceiling treatment. Sound Isolation. Construction details of composite walls, double walls, floating floors, wood-joist floors, plenum barriers, sound locks, etc. STC (Sound Transmission Class) ratings.

MODULE 5 (Noise reduction and Control-II)

9) **Industrial noise: Sources of industrial noise -** impact, friction, reciprocation, air turbulence and other noise. Methods of reduction by enclosures and barriers.

10) **Introduction to Urban Soundscape –** Introduction to Urban noise, Noise sources - Air traffic, Rail traffic, Road traffic, Seashore and inland. Traffic planning against outdoor noise. Noise reduction and control by Site planning, Town planning and Regional Planning consideration. Role of Architects / Urban Planners in shaping the urban soundscape. Sustainable design strategies in building acoustics.

NOTES:

Suggested Assignments:

A. The subject teacher could arrange for visits to acoustically designed and treated multipurpose halls - general purpose halls used for both speech and music, cinema theatres, Industrial Buildings, etc.

   Case study reports could be submitted as group assignments.

B. Design of a multipurpose hall - rooms for speech and music for optimum acoustics - drawings and construction details of acoustical treatment.

REFERENCES:

1) M.David Egan , "Architectural Acoustics".
2) Leslie L. Doelle , "Environmental Acoustics".
3) Vern O.Knudsen and Cyril M.Harris , "Acoustical Designing in Architecture".
4) Peter H. Parkins and H. R. Humphreys , "Acoustics, noise and buildings".
5) F.Alton Everest and Ken C. Pohlmann , "Master Handbook of Acoustics".
6) A.B. Wood, “A Text book of Sound”.
7) T.M. Yarwood, “Acoustics”.
8) Duncan Templeton , “Acoustics in the Built Environment”.
9) J E Moore , “Design for good Acoustics and noise control”.
10) T. E. Vigran , “Building Acoustics”.
11) W.J. Cavanaugh, C.T. Gregory and J.A. Wikes, “Architectural Acoustics: Principles and Practices” 2nd Edition, Codes and standards–
    - National Building Code of India (NBC) 2016; Part 8 Section 4
    - IS 1950: 1962 Code of practice for sound insulation of non-industrial buildings
    - IS 3483: 1965 Code of practice for noise reduction in industrial buildings
    - IS 4954: 1968 Recommendations for noise abatement in town planning
    - IS 11050 (Part 1) 1984: Rating of sound insulation in buildings and of building elements: Part 1 Airborne sound insulation in buildings and of interior building elements
    - IS 11050 (Part 2)1984: Rating of sound insulation in buildings and of building elements: Part 2 Impact sound insulation
    - IS code 2526: 1963Code of practice for acoustical design of auditoriums and conference halls

18ENG74 – SPECIFICATION, QUANTITY AND COSTING OF BUILDINGS

CONTACT PERIODS : 3 (1 Lecture + 2 Pract./Tuto./Semi.) per week
PROGRESSIVE MARKS : 50
DURATION OF EXAM: 3 Hrs
THEORY MARKS : 100

OBJECTIVE: *To develop the necessary skills for establishing and writing specifications based on proposed materials for the preparation of Bill of Quantities leading to cost estimation of proposed architectural works.*

OUTLINE:

MODULE 1

1) **Introduction to Estimation**: Need for estimation, relationship between choice of materials, their specifications, Bill of Quantities (BOQ), project costing, project quality/cost/ time management.
2) **Specifications:** How to arrive at abstract and detailed specifications for various materials leading to 'items of work' used in construction?. Including influence and impact of local and national building codes on specifications.

MODULE 2

3) **Bill of Quantities (BOQ)**: Why and how to build flexibility, resilience and redundancy in BOQ.
4) **Mandatory tests & Safety Measures in Specifications**: Procedures, frequency and submission of results as part of specifications and their inclusion in the BOQ for different materials document. Integrating workers' safety and material security into specifications.

MODULE 3

5) **Introduction to Costing:** Why do rates vary? - study of government rates (CPWD/ Karnataka PWD Schedule of Rates) and market rates. Concept of inflation and its effect on costing.eg. escalation clause, extra items, variations
6) **Detailed rate analysis of building**: Basic knowledge of items as per current schedule of rates (CSR) of local PWD. Percentages (based on thumb rule calculations) of various bulk materials used in construction like cement, steel, rubble, metal, sand, brick, tiles etc.

MODULE 4

7) **Introduction to sequence of construction activity:** Project time/ labor /materials costing and impact of delay in project on costing.
8) **Term project 1**: Detailed specifications writing and estimation of Bill of Quantities (BOQ) for an RCC framed house with an attached temporary shed.
9) **Term project 2**: Detailed specifications writing and estimation of Bill of Quantities (BOQ) for an office interior work.

MODULE 5

10) **Term project 3**: Detailed specifications writing and estimation of Bill of Quantities (BOQ) for Water supply and sanitary works including overhead tanks and Sump tanks.

11) **Term project 4**: Detailed specifications writing and estimation of Bill of Quantities (BOQ) for a typical residential layout plan with roads, culverts, pavements, etc.

12) **Billing requirements:** Role of the architect in monitoring the specifications follow-up for quality control, the measurement book (MB), RA bills, interim and final checking and certification of works on site based on the BOQ and terms of contracts.

REFERENCES:

1. Dutta B.N ,Estimating and Costing in Civil Engineering- Theory and Practice, UBS Publishers, 1993.
2. Rangwala, Estimating, Costing and Valuation, Charotar Publishing House.

18ARC75 - URBAN DESIGN

CONTACT PERIODS : 3 (Lecture) per week
PROGRESSIVE MARKS : 50
DURATION OF EXAM: 3 Hrs
THEORY MARKS : 100

OUTLINE

1. To introduce theoretical aspects of Urban Design
2. To understand the changing attitude toward Urban form/Space and Architecture
3. To familiarise Urban Design theory through traditional and contemporary examples

Theoretical aspects of urban design are through following approach:

MODULE-1

Behavioural /Perceptual approach: City as visual experience– walking, observing, documenting/recording and interpreting city/ and its elements –such as neighborhood, street, block, building, architectural elements.
Sub module: Theories works of Gordon Cullen, Kevin Lynch.

MODULE-2

Social cultural Approach: study of social and cultural layer that influence urban design and architecture.
Sub Module: Theories / approach by Jane Jacob, Kevin Lynch

MODULE -3

Morphological approach: built and un-built, relation with scale, size and influence of byelaws and regulation. Example showing transformation quality of space and form
Sub Module: Theory and works of Collin Rowe - Street, public square facade. Notion of Collective Memory by Aldo Rossi

MODULE-4

Functional and Temporal approach: formal and informal urban environment and readability differences,
Sub Module: Approach by Kevin lynch through good city form, critical study by Charles Correa & Indian example such as Connaught place, church gate, Ballard estate, Gate way of India etc.

MODULE-5

Environmental approach: relationship with physical activity and built environment, human activity and building as environment
Sub Module: study by Charles Correa & Indian example

REFERENCES :

1. Aldo Rossi, "Architecture of the City", Oppositions Book, The MIT Press

2. Christopher Alexander, "A Pattern Language ", Oxford University Press, 1977.
3. Rob krier, " Street, public square facade"
4. Kamu Iyer, "Boombay: From Precincts to Sprawl", Popular Prakashan Ltd; 2014.
5. Kevin Lynch, "The Image of the City", MIT Press, 1960.
6. Kevin Lynch, " Good City Form", MIT Press, 1981.
7. Gordon Cullen, " The Concise Townscape", Architectural Press, 1971.
8. Charles Correa, " Housing and Urbanisation: Building Ideas for People and Cities", Thames & Hudson Ltd, 2000.

18ARC76 – INTERIOR DESIGN

CONTACT PERIODS: 4 (1 Lecture + 3 Studio) per week
PROGRESSIVE MARKS: 100

OBJECTIVE: *This course aims to introduce the students to the discipline of Interior Design and to develop skills required for handling interior design projects. The course shall equip the students with theoretical, conceptual, practical and creative aspects of Interior Design along with its allied fields with particular emphasis on* ***commercial, habitat [residential & hospitality], educational*** *and* ***public space interiors.***

OUTLINE:

- **INTRODUCTION:**
  Definition and process of interior design; difference between interior design and decoration; vocabulary of interior design through elements in interior design like color, materials, furniture, lighting; aspects of interior design related specifically to typology and function, difference between themes and concepts in interior design.

- **OVERVIEW:**
  Overview of history of Interior Design in the Western, Asian and Indian context through the ages relating to contemporary design; theories and design movements in Interior Design; evolution of space planning concepts and design ideas; influence of the vernacular, folk arts and crafts of a region on its Interior Design; role of activity and anthropometrics in Interior Design; design psychology and perception through color, light, scale, proportion, enclosure and fenestration.

- **COMPONENTS OF INTERIOR DESIGN:**
  Functional, aesthetic and psychological aspects of interior space components; design, material choice, method of construction, treatment and finishes of components such as floors, ceilings, walls, partitions, fenestrations; fixtures in relation to space design and construction technology.

- **INTEGRATION OF INTERIOR SPACE WITH SERVICES:**
  Addressing user specific needs and scope of design of services as fundamental aspects of interior design; enhancement of space experience with integration of supporting services like climatic comfort, air conditioning, plumbing and sanitation, electrical, lighting, air conditioning and acoustics.

- **ALLIED FIELDS – FURNITURE DESIGN & PLANTSCAPE:**
  Role of furniture, ergonomic factors of furniture design and materials used; Design and types of furniture based on its style, characteristics and functional application, barrier free and inclusive design; design for the specially abled; materials and methods of construction of furniture, design trends, innovations and ideas of furniture for specific types of interiors; integration of interior landscaping elements like plants, water, paving, artifacts, etc. and their physical properties and effects on spaces.

- **ALLIED FIELDS – LIGHTING DESIGN:**
  Concepts and perceptions in interior lighting design; modulation of lighting [artificial and natural lighting] to develop strategies for interior space and element relationship; quantitative vs qualitative aspects of lighting design; emphasis of design features like focal points in interior design using lighting; different types of interior lighting fixtures - their effects and suitability in different contexts.

- **DESIGN PROJECT – MINOR AND MAJOR:**
  Interior design is a user centric approach where both the function and aesthetics get their due consideration. The understanding of all the above listed aspects related to interior design will be explored, designed and detailed through two design projects [Minor and Major]. The project will delve into interior design through function, user and aesthetic based space planning and visualizations, material specification and detailing, colors, textures, furniture design and lighting design along with interior landscaping if needed. Design will be explored as a wholistic approach of plan, section, details, materials, technology, services integration and views.

METHODS:

- Presentations and discussions on various concepts and components of interior design, integration of services with interior design and allied fields like furniture design and lighting design.
- Interactions with industry experts like interior designers, lighting designers and service consultants to share their experience and perspective on interior design.
- Visit to interior construction sites to understand the process of construction and prototyping and lighting product manufacturing factory visits.
- Material sample and specification compilation along with vendor input to augment the understanding of material detailing with latest technology.
- Design ideation, desk feedback / crits and juries for design projects that incorporate all the learnings.

ASSESSMENT:

The design projects will be evaluated as assignments done individually. The assessment will be through presentations, concept / story board, all relevant drawings like plans, sectional elevations, reflected ceiling plans, flooring plans, wall sections, services layout, construction details, views, models, material samples and specification boards.

REFERENCES:

1. Pile, John.F, “Interior Design”, Pearson; 4 edition (2007)
2. Ching, Francis D.K., “Interior Design Illustrated”, John Wiley & Sons; 3 edition (2012)
3. Panero, Julius and Zelnik, Martin, “Human Dimension and Interior Space: A Source Book of Design Reference Standards”, Watson-Guptill; New edition (1979)
4. DeChiara, Joseph, Panero, Julius and Zelnik, Martin “Time Saver’s Standards for Interior Design”, McGraw-Hill Professional (2001)
5. Rengel, Roberto J, “The Interior Plan: Concepts and Exercises”, Bloomsbury Academic USA; 2nd Revised edition (2016)
6. Mitton, Maureen, “Interior Design Visual Presentation: A Guide to Graphics, Models and Presentation Techniques”, John Wiley & Sons; 4 edition (2012)
7. Pile, John.F, “A History of Interior Design Hardcover”, John Wiley & Sons Inc (2000)
8. Kurtich, John & Eakin, Garret, “Interior Architecture”, John Wiley & Sons (1995)

18ARC77 – ELECTIVE -V

CONTACT PERIODS: 3 (Lecture/Studio/Practical) per week
PROGRESSIVE MARKS : 50

a) CRAFT IN ARCHITECTURE:

OBJECTIVE:

- *Awareness of rich traditions of Architectural craft*
- *Ways of imagining the potential of existing systems*
- *Broaden the mind beyond available construction systems*
- *Explore possibilities in Crafting of Architecture*

COURSE CONTENT:

- Introduction
- Case Studies
- Field Trip , Research to identify potential area of interest for participants to focus further on
- Interaction with Craftsmen to understand the function, material and technique
- Design Exercises focusing on crafting certain elements / parts of a Building or the overall

COURSE METHODOLOGY:

- Lecture Sessions,
- Case Studies,
- Discussions,
- Research,
- Field Trips,
- Short Design Exercises.

COURSE OUTCOME:

- Appreciate finer nuances of making of Architecture into a reality.
- Overview towards the wealth of traditional / existing practices.
- Insight to potential direction of evolution of making of Architecture.
- Attempts to take forward existing systems.
- Introduction of systems form across the border of the discipline.
- Develop ability to craft making of Architecture.

REFERENCES:

1. Peter Davey, "Arts & Crafts Architecture", 1997, Phaidon Press**,** London.
2. Maureen Meister, " Arts & Crafts Architecture", 2014, University Press of New England.
3. Miriam Delaney, "Studio Craft & Technique for Architects", 2015, Laurence King Publishing , London**.**
4. Brian Mackay-Lyons, "Local Architecture: Building Place, Craft and Community", 2014, Princeton Architectural Press, New York**.**

b) ARCHITECTURAL WRITINGS AND JOURNALISM

OBJECTIVE:

This course aims to introduce writing on architecture as a method to study and interpret the built environment through analysis, criticism and review. The course shall equip the students with the fundamentals, relevant skills and techniques of various genres of architectural writing and journalism.

OUTLINE:

Introduction: Overview and objectives of role of writing and journalism in architecture; Writing and Journalism skills: research, writing, editing and criticism.

Creative Writing: 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.

Analytical Writing: Techniques and methods of researching, analyzing and critiquing architecture through forms of analytical writings such as research papers, journal writings and critical essays.

Documentation and Technical Writing: Techniques and methods of recording, authenticating and examining architecture through documentation and technical writings.

Architectural Journalism: Introduction, scope and constraints of print, audio and visual architectural journalism in the context of newspapers, radio, film, and television. Roles of an architectural journalist as a reporter, reviewer, cartoonist, interviewer, feature writer and specialist writer.

Contemporary Architectural Writing and Journalism: Issues and Potential:
Role of an architect as a writer and journalist in scripting the narrative of architecture; Topics relevant and needed in an architectural journals and current issues; Mass Media and Public Opinion – critique of architecture through new age journalism and technology; Issues of code of ethics, copyright, royalty, publishing rights and policies; Citation and plagiarism.

METHODS:

- Presentations on the techniques of writing different genres
- 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
- Visit to Publication / Media house to understand the process of publishing

Assessment:
The individual assignments will be assessed via presentations, writings and term paper.

REFERENCES:

1. Wiseman, Carter (2014), "Writing Architecture: A Practical Guide to Clear Communication about the Built Environment", Trinity University Press
2. Lange, Alexandra (2012), "Writing About Architecture: Mastering the Language of Buildings and Cities", Princeton Architectural Press

3. Schmalz, Bill 92014), “The Architect's Guide to Writing: For Design and Construction Professionals”, Images Publishing Dist Ac
4. Sykes, A. Krista (2007), “The Architecture Reader: Essential Writings from Vitruvius to the Present”, George Braziller Inc.
5. Musa, Majd, Al-Asad, Mohammad (2007), “Architectural Criticism and Journalism”, Umberto Allemandi & Co
6. Edward Jay Friedlander and John Lee (2000), “Feature Writing for Newspapers and Magazines”, 4th edition, Longman.

c) BIOMIMICRY:

OBJECTIVE:

1. *To understand 'Boimimicry' and 'Biophilia'*
2. *Reconnect with nature: learning to observe nature by function*
3. *To understand and explore how biology can be integrated with design*
4. *To examine how the 'biomimicry approach' can influence sustainable designs and innovations*

COURSE CONTENTS:

a) Understanding Biomimicry : theory and case studies
b) Reconnect with Nature (including a field trip)
c) Patterns of Biophilia
d) Life's principles: the universal principles all of life follows to be sustainable
e) Integrating Biology in Design: the design process along with design exercise to realize the process of discovering biological inspiration and its application

METHODOLOGY:

The course would follow the following modes of teaching:

1. Lectures sessions interwoven with games and activities to understand biomimicry concepts
2. Field trip & outdoor exercises to reconnect and seek inspiration from nature
3. Discussions & presentations
4. Library/ web research & reading
5. Interviewing scientists/ biologists
6. Design exercises

LEARNING OUTCOME:

The course aims to educate and equip students in the following way:

a. Appreciate and understand cross disciplinary design practice of Biomimicry
b. Understanding of Biomimicry and biophilia & its relevance in design
c. Appreciate the importance of 'reconnection/ connection' with nature
d. Understanding Life's overarching Principles & how this can inform sustainable solutions
e. Understanding and being able to 'integrating biology in design'

REFERENCES:

1. Michael Pawlyn, "Biomimicry in Architecture", 2011, RIBA Publishing, London**.**
2. Dora Lee, "Biomimicry: Inventions Inspired by Nature", 2011, Kids Can Press, Toronta, Canada.
3. Stephen R. Kellert, "Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life**,** 2011, John Wiley & Sons, New Jersey.
4. Stephen R. Kellert, "Nature by Design: The Practice of Biophilic Design", 2018, Yale Univ.Press**.**
5. Benjamin R. Krueger, "Biomimicry: Nature as Designer", 2016, CreateSpace Independent Publishing Platform

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus . The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

18ARC81 – ARCHITECTURAL DESIGN - VIII (ARCHITECTURE IN URBAN CONTEXT)

CONTACT PERIODS : 10 (Studio) per week
PROGRESSIVE MARKS : 150
VIVA MARKS : 150

INTRODUCTION:

In an increasingly urbanized world, architecture plays a vital role in shaping and influencing complex urban environment (the design of cities) and creating meaningful places that enrich the lives of people. It is important to understand the many scales at which architecture can engage with the urban context, from building on the unique local character/form to enhance public spaces to urban development projects (infrastructure/transport interchanges/terminals) that impact larger geographic region beyond the city. The Studio intent is to introduce the discipline urban design (interdisciplinary premise, scope, techniques and best practices) and understand architecture as a part of implementing urban design projects, from gathering insights into urban fabric to understanding how communities use spaces.

OBJECTIVES:

(a) To introduce the key components, terms, actors, processes and aspects of urban environment and their inter-relationships; to explore specific themes/issues such as public spaces, physical infrastructure, socio-cultural aspects (heritage, gender, urban growth, informality, place identity, collective memory, walkability, livability, zoning regulations) and the role of architecture in shaping the urban fabric

(b) To learn basic methods/techniques to read, analyze and interpret (mapping, diagramming and theoretical premise) the dynamics of urban environment.

(c) To create/design architecture that responds to the specific demands of the urban context; understand the processes that impact architecture and the implications of design decisions on the larger context.

OUTLINE:

The studio will be divided into two components

(a) Rigorous, directed and brief study of an urban context (techniques mapping, diagramming) that will lead to clear understanding of dynamic networks, issues affecting the area and design strategies that build on the strength and opportunities to create meaningful spaces for communities. Various case studies (literature/site visits) will be analyzed at various stages

(b) Suitable design intervention addressing concerns such as the need to create public realm as extension of the private domain of buildings; the impact and relationship of buildings to the larger context. The key ideas informing the selection of the design projects are multi- functional spaces, public access to majority of spaces, large gathering and event spaces which can be extended to immediate urban context. The probable architectural design projects include urban infill, revitalization and renewal of urban fragments, adaptive reuse, urban waterfront development, transportation nodes/interchanges, multi-use urban complexes including museums, performing arts centers.

OUTCOME/OUTPUT:

(a) Study of an Urban Context/ Precinct compiled and presented as drawings, models and report explaining the intent and inferences from the study undertaken (25% grade)

(b) Detailed and resolved Architectural Design Project with analog or digital drawings and models explaining the various iterations and final design (75% grade)

Note:

(a) The design shall be sensitive to the needs of differently abled, aged people and children.
(b) One major project and one minor/ time problem to be tackled in semester.
(c) Detailing of public space and selected architectural features of the major project like entrance lobby, skylights and staircases shall be attempted.

REFERENCES:

(a) Donald Watson , "Time Savers Standard for Urban Design", 2005, McGraw Hill.
(b) Jon Lang , "Urban Design: A Typology of Procedures and Product", 2005, Routledge.
(c) Edmund Bacon , "Design of Cities", 1976, Penguin Books.
(d) Gosling and Maitland , "Urban Design", 1984, St. Martin's Press.
(e) Kevin Lynch , "Site Planning", 1967, MIT Press, Cambridge.

18ARC82 – MATERIALS AND METHODS IN BUILDING CONSTRUCTION VIII

CONTACT PERIODS: 4 (1 Lecture + 3 Studio) per week
THEORY MARKS : 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM - 4 Hrs

OBJECTIVE: *To study contemporary building construction systems, as an integrative discipline, connecting across various technology areas impacting the construction industry. The focus to be on methods, materials and technology prevailing in the industry, with case study examples.*

OUTLINE:

MODULE - 1

Innovations in Construction industry:

1. New directions in Construction Industry: Impact of Automation, Information, Prefabrication, Modular Construction, New Materials, Equipment and Environmental concerns on Building Construction.

2. Special Constructions: Under water constructions, underground constructions, kinetic constructions

High Rise Buildings:

3. Form work in High-rise buildings: Issues and Constraints. Materials used; some examples like Maivan, Doka. PERI

4. Enclosure Systems: Types, properties and materials

5. Special and Light Weight materials, eg. Concretes, plastics

MODULE - 2

Technology integration:

Influence of Informatics in construction Industry: Big Data, Cloud Collaboration, Information Management, Modeling, Simulation, 3D Printing
Construction Equipment: New advances in Construction Equipment

MODULE - 3

Retrofit and Repairs:

Life Cycle concept of buildings and materials.
Repairs: Types of damage to buildings; Types of Repairs used
Retrofit: Reuse of buildings, Renovations

MODULE - 4

Green Building Concepts:

Green Building Concepts, Construction, Materials
Zero Energy building Concepts

MODULE - 5

High Performance Materials:

Smart Materials: Properties of Smart Materials, Applications in Building Industry
Nano Materials: Introduction to Nano technology in building materials, Applications in Building Industry

REFERENCES:

1. Andrew Watts, "Modern Construction Handbook", : 4th Edition
2. Andrew Watts, "Modern Construction Case Studies: Emerging Innovation in Building Techniques", Birkhauser Basel.

18ARC83 – THESIS SEMINAR

CONTACT PERIODS: 3 (Pract./Tuto./Semi.) per week
PROGRESSIVE MARKS : 50

INTRODUCTION/OVERVIEW:

The Thesis Seminar course is designed to discover, frame and develop a Proposal for 18ARC91 Architectural Design Project (attempted in the X Semester). The objective of the Thesis Seminar is to expand the scope and focus of the student by introducing diverse topics in architecture (allied disciplines) and to nurture design/research projects that can make creative and technically competent contributions to the field of architecture. Every undergraduate student is required to undertake Thesis Seminar during their penultimate year.

The intent of the Thesis Seminar is to encourage new ideas/ research avenues/ design experimentation in architecture (allied disciplines); to provide a larger framework (structure) within which systematic research on a chosen topic can be undertaken; to develop a proposition, narrative and methodology for the chosen topic which can be tested through design in X Semester.
The Thesis Proposals can be developed from important issues on architecture (inter-disciplinary), hypothetical scenarios connected with architecture (theoretical premise) or live/ current projects proposed by government or other organizations.

OBJECTIVES:

(a) To outline the larger focus and relevance of the Thesis topic (design/research), its architectural implications and projected design results.
(b) Alternatively to conceptually formulate an architectural proposition, explore and articulate ideas through research and critically evaluate the feasibility of the Thesis Proposal. This includes determining the Project, context where it shall be explored and its significance to architecture.
(c) To encourage students to pose relevant questions on the discipline (theoretical/design); to undertake self- directed study with inquisitiveness, rigor and demonstrate a depth of inquiry in exploring the chosen topics.
(d) To focus on innovation, experimentation (theoretical premise/ tectonics/modes of representation/other) as some of the learning outcomes and draw inspiration/build on the various Electives/ Design Studios proposed/taken through the undergraduate Program

OUTLINE/ DESCRIPTION:

The Thesis Seminar can be conducted as a combination of interactive workshops, presentations/ seminar, key lectures and focused discussions with individual students on chosen topics. Each topic should be studied using extensive literature reviews including readings in relevant critical theoretical/ philosophical premise; case studies (site visits); focused meetings with external subject/ topic experts and design research methods. The Thesis Seminar should be seen as an opportunity to engage with a topic/ question on the discipline architecture through reading, writing, drawing, diagramming and modelling ideas.

The role of the Tutors / Thesis advisors is to introduce the students to issues relevant to architecture (allied disciplines), significant design research methodologies and discuss the new research directions

in the discipline through readings, exercises and workshops. The Tutor/ Thesis advisors shall also critique student ideas/ research and help formulate/ shape a design/ research method. The dedicated discussion sessions on each topic should clarify the intent, type of project, location, scope and limitations.

OUTCOME:

The final outcome shall include a formal submission of

(a) Written Synopsis (key ideas on the topic including premise, description/ justification and conclusion) and Thesis Proposal Document (booklet) clearly highlighting/explaining the Project type; architectural Proposition/ Premise; Site/ Location; Scope and Limitations; Program (includes basic documentation with drawings, images or photographs of context, case studies, citations to various sources)
(b) Portfolio of presentations, critical readings, drawings/ models produced by the student on the chosen topic (urban issue/ conservation/ sustainability/ digital architecture/ other)

The grading shall consider the participation and depth of inquiry presented by each student and the various submissions/ reviews on each topic organized through the term.

Note:

a) The students are encouraged to continually read, discuss, clarify further and engage with their chosen topics through IX Semester (Professional Training)
b) Professional Training in the IX Semester should be seen as an opportunity to bring in new learning from the field/ industry into the chosen topic and be applied during designing and detailing in the Architectural Design Project in the X Semester.

SUGGESTED REFERENCES:

- All references will be project specific and will include a wide range of subjects (history, theory and criticism; services; material and construction) from architecture and allied fields addressed through critical papers, essays, documented studies and books.
- Linda Grant and David Wang, Architectural Research Methods, John Wiley Sons, 2002
- Iain Borden and Katerina Rüedi, The Dissertation, Architectural Press, 2000

18ARC84 – PROFESSIONAL PRACTICE

CONTACT PERIODS : 3 (Lecture) per week
PROGRESSIVE MARKS : 50
DURATION OF EXAM: 3 Hrs
THEORY MARKS : 100

OBJECTIVES: *To understand the responsibilities & liabilities of the Profession. To appreciate the attitude of professionalism.*

OUTLINE:

MODULE 1

1. **Profession**: Idea of profession; differences between profession, trade and business.
2. **Profession of architecture:** Types and extent of services offered by architects, scale of fees, stages of payment, and contract between client and architect.
3. **Practice**: Types of Architectural firms, proprietorship, partnership, associate ship and private limited firms; advantages and disadvantages of each type of firm; building clientele and projects.
4. **Office Management:** Administration of Architectural firms; basic accounting procedures.

MODULE 2

5. **Code of Professional Conduct**: Architects Act of 1972, role of Council of Architecture, Indian Institute of Architects in functioning of the Profession.
6. **Architectural competitions:** guidelines of COA, procedure of conduct of competitions.

MODULE 3

7. **Tender**: Tender document and its content. Types of tenders, advantages and disadvantages of each type; suitability to various projects. Tender notices, opening, scrutiny, process of selection and award.
   Architect's role in tender process.
   Earnest Money Deposit, Security Deposit, Retention Amount, Mobilization Amount and Bonus & Penalty Clauses.
   Issues arising out of tendering process and the role of an architect.
8. **Contract**: General Principles, types of contract; Contract document.
   Contract Management: Architect's role in Contract Management.
   Conditions and Scope of Contract; role of an architect in ensuring completion of contract.

Issues arising in Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and architect's role in certification of variations, ix) Prime cost, provisional sum.

Supervision and Contract Administration: Site visits, site meeting, co-ordination with various agencies, site book, site instructions, clerk of works and site office.
Bill checking, quality auditing, handover procedures and final certification.
Disputes in contract and architect's role in resolving disputes. Case studies from practice highlighting disputes in contract and methods adopted to solve such disputes.

MODULE 4

9. **Byelaws**: Building byelaws, National Building Code, floor area ratio, floor space index, floating FAR, zoning regulations.
   Overview of Master Plan/CDP of relevant cities.
10. **Arbitration**: Arbitration and conciliation; arbitrator, umpire, order of reference, selection of arbitrators, powers and duties of arbitrators, arbitration award and implementation of award.
11. **Valuation and Dilapidation**: Definitions and architect's role in preparation of valuation and dilapidation reports and certifications; Physical and Economic life of buildings.
    Introduction to Valuation, essential characteristics, classifications and purpose of classifications. Methods of valuation, standard rent and cost of construction.

MODULE 5

12. **Building Industry**: General overview of the industry; various participants and dimensions of building industry.
    Role of architect, employer, and contractor.
    Types of insurance necessary during contract; fire insurance
13. **Easements**: easement rights, architect's role in protecting easement rights.
    Laws related to Property and Land: Land tenure, types of land holdings, land registration, easement rights, covenants, trespass and nuisance etc.
14. **General Law**: Overview & definition of common law, statute law, equity, criminal law, civil law etc., Role of courts in dispensing various types of cases.
    Overview of recent Bills and Acts: Real Estate (Regulation and Development) Act 2016; Land Acquisition Act, Rehabilitation Act and Resettlement Act 2013; Consumer Protection Act. FDI in real estate, goods & service taxes and other taxes applicable in architecture practice and construction industry.

REFERENCES:

1) Namavathi, Roshan, Professional Practice for Architects and Engineers, Lakhani Book, New Delhi, 2001.
2) Krishnamurthy K G and Ravindra S V, Professional Practice, S V Ravindra, 2009, Bangalore.

18ENG85 – CONSTRUCTION AND PROJECT MANAGEMENT

CONTACT PERIODS : 3 (1 Lecture + 2 Pract./Tuto./Semi.) per week
PROGRESSIVE MARKS : 50
DURATION OF EXAM: 3 Hrs
THEORY MARKS : 100

OBJECTIVE: *To enhance the professional ability of the student to manage a construction project by exposing the students to the currently prevalent techniques in the planning, programming and management of a construction project.*

OUTLINE:

MODULE 1
(Introduction to Construction Project Management & Construction Organization)

1. **Introduction to Project, its Stages and Construction Project management**: Project, Organisation, need for management of building/construction projects, Principles and Objectives of Project Management, brief understanding about study areas in Project Management. Types of Construction Projects, Life Cycle Stages of a Project (Construction Project).

2. **Construction Organisation**: Types of construction firms/ companies. Types of organization, study of organizational structures suitable for building and construction projects, the roles of the various members of a typical construction organization, qualities of an ideal construction organization, ethics in construction industry.

MODULE 2
(Decision Making & Role of Project Managers)

3. **Decision making and Feasibility Study**: Involvement and Roles of Consultants and Contractor in decision making at various stages. Basic understanding of decision making principles and tools (e.g. Decision Tree, SWOT Analysis, Cost-Benefit Analysis), Value Engineering, Investment Criteria, Project Feasibility Study.
   Computer applications in Project Management: Introduction to use of computers for solving inventory, scheduling and other issues related to construction and management.

4. **Roles of Project Manager:** Roles & Responsibilities of Project/ Construction Managers,
   Scope Management in Construction: Scope Planning, Definition, Verification and Control
   Project Management Stages: Project planning, project scheduling and project controlling.

MODULE 3
(Construction Management Techniques: Project Planning & Scheduling)

5. **Time, Cost and Resource Management in Construction:** Activity definition, Activity Sequencing, Estimation of Resource Requirements, Time & Cost for an Activity, Schedule Development, Budgeting, Schedule control, Cost Control.
   Construction Management Techniques: Project Planning – Work Breakdown Structure;

6. **Construction Management Techniques: Project Scheduling** – Bar Chart, Milestone Chart, Network Theories (CPM and PERT analysis) - Event, activity, dummy, network rules, graphical guidelines for network, numbering of events;
   Project Cost analysis (Indirect project cost, direct project cost, slope of the direct cost curve, total project cost) & brief understanding of about time, cost and resource optimization; Project Crashing (using CPM).

MODULE 4
(Construction Management Techniques: Project Monitoring and Control)

7. **Construction Management Techniques: Project Monitoring and Control** – Role of the project manager in monitoring the specifications, Follow-up for quality control, the measurement book (MB), RA bills, interim and final checking and certification of works on site based on the BOQ and terms of contracts. Project updating, Progress Curves.

8. **Quality Management in Construction:** Quality Planning and Quality Control. Technical Specifications and Procedures. Codes and Standards.
   Construction Health and safety and management: Safety Measures and management: Integrating workers' Health and Safety into management.

MODULE 5
(Use of Construction Equipment)

9. **Construction Equipment**: The role of equipment/machinery in construction industry, factors affecting selection of construction machinery, standard versus special equipment, and understanding of the various issues involved in owning, operating and maintaining of construction equipment, economic life of equipment.

10. **Types of Construction Equipment:** earth moving (JVB, tractors, excavators, dragline, trenching equipment, etc.,) transporting (various types of trucks), spreading and compacting (motor graders and various types of rollers) and concreting equipment (including concrete mixers, transporting and pumping equipment), hoisting machines, form work, shoring material etc.

REFERENCES:

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1) Dr. B.C.Punmia et al. "*Project planning and control with PERT and CPM", Laxmi Publications*, New Delhi
2) S.P.Mukhopadyay, "*Project management for Architects' and civil Engineers*", IIT, Kharagpur, 1974
3) Jerome D.Wiest and Ferdinand K.Levy, *"A Management Guide to PERT/ CPM"*, prentice Hall of India Pub, Ltd.,New Delhi, 1982
4) R.A. Burgess and G.White, *"Building production and project Management"*, The construction press, London,1979.
5) A Guide to Project Management Body of Knowledge; 5th ed. – An American national standard – ANSI/PMI 99 – 001-2004
6) Krishnamurthy K. G., Ravindra S. V., *"Construction and Project management for Engineers, architects, planners and Builders",* CBS Publishers
7) Codes and standards –
   - NBC 2016 – Part 7
   - IS 3696 Safety code for scaffolds and ladders:

  - (Part 1) : 1987 Scaffolds
  - (Part 2) : 1991 Ladders
- IS 3764 : 1992 Code of practice for excavation work (first revision)
- IS 4082 : 1996 Recommendations on stacking and storage of construction materials and components atsite (second revision)
- IS 4130 : 1991 Safety code for demolition of buildings (second revision)
- IS 4912 : 1978 Safety requirements for floor and wall openings, railing and toe boards (first revision)
- IS 5121 : 2013 Code of safety for piling and other deep foundations (first revision)
- IS 5916 : 2013 Safety code for construction involving use of hot bituminous materials (first revision)
- IS 7205 : 1974 Safety code for erection of structural steel work
- IS 7969 : 1975 Safety code for handling and storage of building materials
- IS 8989 : 1978 Safety code for erection of concrete framed structures
- IS 13415 : 1992 Safety code for protective barrier in and around buildings
- IS 13416 Recommendations for preventive measures against hazards at work places:
  - (Part 1) : 1992 Falling material hazards prevention
  - (Part 2) : 1992 Fall prevention
  - (Part 3) : 1994 Disposal of debris
  - (Part 4) : 1994 Timber structures
  - (Part 5) : 1994 Fire protection
- IS 13430 : 1992 Code of practice for safety during additional construction and alteration to existing buildings
- IS 15883 (Part 1) : Guidelines for construction project management: Part 1 General2009
- IS 16601 : 2016 Guidelines for habitat and welfare requirements for construction workers

18ARC86 – URBAN PLANNING

CONTACT PERIODS : 3 (Lecture) per week
PROGRESSIVE MARKS : 50
DURATION OF EXAM: 3 Hrs
THEORY MARKS : 100

OBJECTIVE: *To familiarize students with the origins and basic concepts of urban planning.*

OUTLINE:

MODULE 1

1. Evolution, origins and growth of settlements:- Characteristics of Rural and Urban settlements; Urban form based on different determinants – Natural (climate, topography, resources, geography) and Man-made (cultural, economic, religious, administrative, political).

2. Planning efforts and impacts on historical cities - Ancient civilizations (Mesopotamia, China, Egypt, Indus Valley, Mayan); Classical cities (Greek, Roman, Medieval, Neoclassical, Renaissance, Baroque, City Beautiful); Indian cities – (Vedic/Indo-Aryan, Colonial, Dravidian, Mughal).

MODULE 2

3. City Planning in Post-Industrial Revolution Era: - Responses to impacts of industrialization in cities: Legislative reforms to public health, work and living conditions; Spatial responses to Poor Living Conditions (Railroad tenements, Dumbbell plan); Utopian visions - Model Towns (Robert Owen, J.S. Buckingham, George Cadbury), Tony Garnier (*Cité Industrielle)*.

4. Pioneers in planning theories - Ebenezer Howard (Garden City), Soria Y.Mata (The Linear City), Patrick Geddes (Outlook Tower, Valley Section, Folk-Work-Place, Civic Survey), Le Corbusier (*Ville Contemporaine*), Frank Lloyd Wright (Broadacre City), Ludwig Hilberseimer (Decentralized City), Constantinos A Doxiadis (Ekistics), Clarence Arthur Perry (Neighbourhood Unit); Clarence Stein (American Garden Cities).

5. Planned and Built Cities: - Brasilia (Oscar Niemeyer), Chandigarh (Le Corbusier), Islamabad (Constantinos A Doxiadis), Tel Aviv (Patrick Geddes).

6. Alternate visions for cities: – Arcosanti (Paolo Soleri), New Urbanism (Peter Calthorpe, Andres Duany, Elizabeth Plater-Zyberk).

MODULE 3

7. Urbanization in India: - Trends in urbanization in post-independence India; Planned cities in Post-Independence India (Bhubhaneswar, Gandhinagar, Jamshedpur); Census classification of Indian cities (based on population size); Growth, issues and management of Metropolitan cities; Slums (official definitions and slum statistics)

8. Urban housing typologies – City Development Authority layouts, Public Sector Townships, Affordable housing, Slum Rehabilitation Projects.

MODULE 4

9. Urban Structure: - Internal spatial structure of the city: Concentric Zone theory; Sector theory; Multiple Nuclei Theory; Characteristics of Central business district, Urban nodes (Origin and/or destination of trips, location of major transport nodes, interfaces of local/regional transport), Suburbs, Peri-urban areas.

10. Land use and Zoning: - Land use categories and representation; Relationship between Land use and Zoning; Zoning Types: Euclidian Zoning, Performance Zoning, Form-based Codes, Incentive Zoning, Height Zoning, Open Space Zoning.

MODULE 5

11. Planning Processes and Tools: - Urban Redevelopment: Renewal, Rehabilitation, Conservation; Scales of Planning: Masterplan/Comprehensive Development Plan, Area Plan, Regional Plan, Perspective Plan, URDPFI Guidelines; Steps of urban planning.

REFERENCES:

1. Kostof, S., Castillo, G., & Tobias, R. 1992. The city assembled: The elements of urban form through history. London: Thames and Hudson
2. Eisner, Simon; Gallion, Arthur; Eisner, Stanley. 1993. The Urban Pattern. Wiley.
3. Greed, Clara. 1993. Introducing Town Planning. Longman
4. Kostof, Spiro. 1993. The City Shaped: Urban Patterns and Meanings through History. Bulfinch.
5. Morris, A.E.J. 1994. History of Urban Form Before the Industrial Revolution. Longman Scientific & Technical.
6. Hall, Peter. 1996. Cities of tomorrow: An intellectual history of urban planning and design in the twentieth century. Oxford, UK: Blackwell Publishers.
7. Sivaramakrishnan, K. C.; Amitabh Kundu; and B. N. Singh. 2005. A Handbook of Urbanization in India: An Analysis of Trends and Processes, Oxford University Press, New Delhi.
8. Rathbone, Dominic. 2009. Civilizations of the Ancient World. Thomas & Hudson.
9. Ministry of Urban Development, GoI. 2014. Urban and Regional Development Plans Formulation and Implementation Guidelines. MoUD Government of India.

18HUM87– CONSTITUTIONAL LAW

CONTACT PERIODS : 2 (Lecture) per week
PROGRESSIVE MARKS : 50

COURSE OBJECTIVES:

1. *To educate students about the Supreme Law of the Land.*
2. *To create an awareness about Civil Liberties.*
3. *To raise awareness and consciousness of the issues related to the profession and discuss the issue of liability of risks and safety at work place.*

MODULE-1

Framing of the Indian constitution: Role of the Constituent Assembly - Preamble
And Salient features of the Constitution of India, Fundamental Rights and its limitations.
Fundamental Duties and their significance.

MODULE -2

Directive Principles of State Policy: Importance and its relevance.
Special Constitutional Provisions for Schedule Castes, Schedule Tribes & Other Backward Classes.
Constitutional provisions for safety and protection of rights of women and children in society and at workplaces.

MODULE -3

The Union Executive – The President and The Vice President, The Prime Minister and the Council of Ministers. The Union Parliament – LokSabha & RajyaSabha.
State Executive – The Governors, The Chief Ministers and The Council of Ministers. The State Legislature – Legislative Assembly and Legislative Council. State High Courts.
Functioning of Judiciary in India.

MODULE -4

Election Commission of India – Powers & Functions – Electoral Process in India.
Methods of Constitutional Amendments and their Limitations.
Important Constitutional Amendments.

MODULE -5

Definition of ethics, Professional ethics as laid down by Council of Architecture, RIBA, Indian Institute of Architects, Institution of Engineers & Valuers etc.

TEXT BOOKS:

1. Merunandan K.B. and B.R. Venkatesh, "An Introduction to Constitution of India and Professional Ethics" , Meragu Publications, 3rd edition, 2011.
2. Phaneesh K. R. , "Constitution of India and Professional Ethics", Sudha Publications, 7th edition, 2014.

REFERENCES:

1. Pylee M. V. , "An Introduction to Constitution of India" , Vikas Publishing, 2002.
2. Martin, W. Mike., Schinzinger, Roland, "Ethics in Engineering" McGraw-Hill, New York 10020, fourth edition, 2005.
3. Ghai K .K. &. RoohiMakol E R , "Constitution of India and Professional Ethics", Kalyani Publishers.1stedition, 2009.

E-BOOK:

1. https://books.google.co.in/books/about/Constitution_of_India_and_Professional_ E.ht ml?id=VcvuVt-d88QC
G.B. Reddy and MohdSuhaib, I.K , "Constitution of India and Professional Ethics", International Publishing House Pvt. Ltd., 2006.

2. http://www.scribd.com/doc/82372282/Indian-Constitution-M-Raja-Ram-2009# scribd
M. Raja Ram , "Indian Constitution", New Age International Pvt. Limited, 2009.

18ARC88– ELECTIVE -VI

CONTACT PERIODS: 3 (Lecture/Studio/Practical) per week
PROGRESSIVE MARKS: 50

a) RESEARCH METHODS:

Objectives:

Introduction to research in architecture – its significance, research design, types of research, literature study, methods of research in architecture (interviewing / visual methods / content analysis); data documentation and analysis, introduction to statistics, presenting the data and reporting the research.

- To increase the student's understanding of the role of research in architecture.
- To increase the student's abilities to interpret and evaluate research.
- To increase the student's abilities to conduct architecture research.
- To increase the student's abilities to present research results.
- To increase the student's understanding of data, information, and knowledge.

OUTLINE:

Unit 1- Introduction: Introduction to "research" and its significance in architecture – meaning of research. Relationship between design and research. Types of research in architecture, areas of research in architecture, qualitative and quantitative paradigms.

Unit 2- Research Design: Components of research design – formulating the research questions, hypothesis, choosing the sample, methods of data collection, analysing the data and inferring from the data. Concepts of dependent and independent variables, unit of analysis. Defining the scope and limitations of a research plan, significance of the research outcome.

Unit 3- Literature Study and Research: Significance of literature study in research, different sources of information such as books, journals, newspapers, internet, magazines, audio recordings, etc. Referencing and documenting the bibliography.

Unit 4- Methods of Research in Architecture: Interview Techniques: Questionnaires /Face to face Interviews / Internet survey. Designing a Questionnaire / Interview schedule. Visual Techniques: Observations (participant / nonparticipant / direct), activity mapping, accession/erosion trace observations, cognitive maps, etc. Content Analysis: Secondary data analysis. Understanding the relative advantages, disadvantages and application of various methods mentioned above and choosing a method appropriate for a research to achieve its objectives.

Unit 5- Data Documentation and Analysis: Understanding the nature of data collected and methods of analysis suitable for that data (graphical / numerical / descriptive). Converting data into numerical form for data analysis.

Unit 6- Introduction to the Statistics: Introduction to the simple statistical methods of analysing numerical data – frequencies / percentages, mean / median / mode, inferring from the data and interpreting the meaning of those inferences. Use of MS Excel for statistical data analysis.

Unit 7- Presentation of the Data: Techniques of presenting the numerical data – graphical (pie charts, bar charts, line graphs etc.), tabulations, verbal qualitative data, architectural drawings / maps.

Unit 8 - Reporting the Research: Different sections of a research report, technical writing and language (tense, voice, etc.), formatting of a report.

REFERENCES:

1. Groat, Linda N. and Wang, David C. 2002. **Architectural Research Methods.** New York: John Wiley.
2. Norman K Denzin and Yvonna S Lincoln (Eds.) **Handbook of Qualitative Research**, Thousand Oaks : Sage Publications, pp. 377392. 1994.

b) PRINCIPLES OF REAL ESTATE DEVELOPMENT:

OBJECTIVE:

To provide students with understanding of fundamentals of real estate practices & development, and enable them widen their professional capabilities.

OUTLINE:

Introduction: Definition of real estate, economic importance of real estate, overview of real estate industry**.**

Characteristics of land / real estate: Economic and physical characteristics, personal property; Tangible and intangible personal property.

Concepts of Ownership: Forms of ownership, physical rights of ownership of land.

Transfer of Title: Voluntary and involuntary transfer of property, types of deeds and legal conveyance.

Real Estate Finance: Sources and techniques

Land use and Control: Public control of private property, zonal laws, enforcement of zonal laws, urban development energing patterns of urban land use.

Role players in real estate development: Stages in real estate development, real estate development process.

REFERENCES:

1. Mike E. Miles, Laurence M. Netherton, and Adrienne Schmitz, "*Real Estate Development Principles and Process*" (5th Edition, 2015) by Urban Land Institute (ULI): Washington, D.C.
2. Richard B Peiser& Anne B. Frej, *"Professional Real Estate Development"* – The ULI guide to the business – (2003), Urban Land Institute U.S.A.
3. Tanya Davis, "*Real Estate Developer's Handbook*", (2007), Atlantic pub company, Ocala, USA.
4. Gerald R Cortesi, "*Mastering Real Estate Principles*" (2001), Dearborn Trade Publishing, NewYork, U.S.A.
5. Donald A. Corb & Richard A. Giovangelo, "*Real Estate Principles*", 2014 , Lee Institute, Inc., Brookline, Massachusetts, USA.

c) ADAPTIVE RE-USE OF BUILT FORM:

Objective: To understand the theoretical and practical background for a systematic process to support adaptive re-use of built environment for sustainable development.

OUTLINE

1. Introduction

- Introduction to the concept of adaptive reuse – history and various theories of adaptive reuse.
- Understanding adaptive re-use of buildings as a key to sustainable development. To explore the relationship between financial, environmental and social parameters associated with the adaptive re-use of buildings.

2. Case studies

- Understanding the application of the concept of adaptive-reuse through various case studies (within the country and abroad). Critical appraisal of the design approach of the case studies.
- Case studies should include examples of domestic, commercial, industrial, ecclesiastical and public building types. Analysis of the case studies should be based on the spatial attributes, structural knowledge and materiality of the existing structures and the strategies and tactics of adaptive reuse in architecture.

3. Design generation processes in Adaptive re-use

- Analysis of the existing structure - Importance of building assessment report – process of documentation and condition mapping in deciding design recommendations.
- Understanding the design logic. Role of various parameters in concept generation.
- Strategies for re-modelling.

4. Adaptive re-use of heritage buildings

- Understanding Adaptive re-use as an important strategy towards conservation of built heritage.
- Appreciation of the various values (architectural, cultural, historical, associational, social, etc.) that is associated with heritage buildings. Developing an ethical approach for adaptive re-use.

Note: The culmination of the elective could be a smaller scale adaptive re-use project done by the students inculcating all the ideas covered throughout the subject.

- Field visits and case studies help on better understanding of the concept of adaptive re-use.

REFERENCES:

1. Liliane Wong, " Adaptive Reuse: Extending the Lives of Buildings", 2016, Birkhauser Architecture, Switzerland.
2. J. Stanley Rabun, "Building Evaluation for Adaptive Reuse and Preservation", 2009, John Wiley & Sons.
3. Robert W. Burchell, "The Adaptive Reuse Handbook", Transaction Publishing , New Jersey.
4. Chris Van Uffelen, "Re-use Architecture", 2010, Braun Publishing, Switzerland.
5. Robert T. Ratay, "Structural Condition Assessment" 2005, Wiley.

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus . The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

18ARC91 – PROFESSIONAL TRAINING

DURATION: ONE SEMESTER(16 weeks)
MODE OF EXAM: VIVA-VOCE
PROGRESSIVE MARKS: 50
VIVA MARKS : 300

OBJECTIVE:

To provide exposure to the various aspects of architectural practice.

OUTLINE:

The student is expected to be exposed to preparation of working drawing, detailing, preparation of architectural models, computer applications in design and drafting, filing system in respect of documents, drawing and preparation of tender documents. Site experience may be given in respect of supervision of the construction activity, observing the layout on site, study of the stacking methods of various building materials, study of taking measurement and recording.

Students should also acquaint themselves with local building byelaw.

Monitoring of Training:

A. Submission of Joining report : To be submitted within one week from the date of joining. Students must report for the training from the day of commencement of 9th semester as notified by VTU.

B. Submission of periodical reports: Students shall maintain a day to day record of their engagement for the period of training. This will be recorded in an authorized diary to be counter signed by the architect at the end of each week and the same diary shall be sent to the training co-ordinator once in a month.

C. Completion certificate: At the end of the training period, a student shall produce a certificate of satisfactory completion of training in duplicate.

Submission of Portfolio:

Students shall present a portfolio containing the following works before the examiners for Viva-Voce Examination:

1) Training Report: This shall contain copies of only such drawings which have been dealt, drafted or designed by student. It shall also contain a brief description of works handled during the training along with photographs, pencil sketches etc.

2) Building Study – This shall include a detailed critical study of a building designed by the architect with whom the student has worked. The study should include of function, aesthetics, context, structure etc., This shall be presented through drawings, photographs, write ups etc.

3) Building Material Study – This shall be a detailed study of a new or relatively new building materials available in the market. A study of its properties, uses, cost, maintenance etc., is expected to be done. Samples of materials shall also be obtained and presented.

4) Detailing study – This shall be a study of interesting details done in the firm where the student has undertaken the training. This shall include sketches and photographs of the detail.

Note:

1. Students shall work only in architectural firms functioning over 5 years and headed by an architect registered with Council of Architecture, New Delhi.
2. In case of an architectural firms abroad, the Principal Architect of the firm should hold the title of architect under the law of that country.

18ARC101 – ARCHITECTURAL DESIGN PROJECT(Thesis)

CONTACT PERIODS: 14 (Studio) per week
MODE OF EXAM: VIVA-VOCE
PROGRESSIVE MARKS: 200
VIVA MARKS : 300

INTRODUCTION:

In principle, the final year Architectural Design Project, positioned at the culmination of multi- year architectural education program, constitutes the threshold between student's academic learning and the profession. It provides an opportunity to do more than demonstrate the accumulated skills and focus on actively engaging with the discipline by contributing new ideas, design solutions or exploring new dimensions to existing or current issues in the field. Ideally, the Architectural Design Project should continue with the Project Proposal submitted during 18ARC83 Thesis Seminar (conducted in the eighth semester) and build/enhance/improve on the architectural narrative that sets the premise for design demonstration.

OBJECTIVES:

a) to demonstrate an ability to comprehend the nature of architectural problem and create a brief which sets the frame work for design.
b) to demonstrate an advanced level design ability to convert the brief set forth earlier into a speculative proposition of design.
c) to articulate and delineate the propositions of design into an architectural solution addressing all the dimensions using diagrams, analog or digital drawings and models.

OUTLINE:

Listed below are a few parameters that could govern, frame and aid in evaluating the projects. These parameters and stages should fine-tuned depending on the resources. It is advised that the projects should be run as a design studio with individual guidance under one or more guides and project coordinator.

(a) Guidelines (scope, scale and limitations):

- All projects should be grounded in some kind of critical enquiry; the depth of enquiry can be extended and the time spent on design can be reduced in a specific case, but such a project should demonstrate clarity in terms of research design. The suggested maximum weightage for study will be 25% in the case of a Study + Design Project.
- Selected projects can be of any scale and size (in terms of built areas) as long as the required rigor and depth is demonstrated by the student to merit consideration as a final project. It is advised not to attempt very large projects that have numerous structures and tend towards repetitive design with minimal variations or very complex projects due to time constraint.
- The scope of the project should firmly be in the purview of architecture even though it can have an interdisciplinary premise. All genre of projects (study or design) should end with a design solution.

(b) Generic studio model highlighting the salient stages

- **Project seminar –** Student shall present a seminar on the project topic which would include the following
  1. Precedents of similar projects, either actual visit to such projects or through literature reviews.
  2. Cultural, contextual, historical, technological, programmatic concerns of the project.
  3. Prevalent or historical models of architectural approach to such projects and a critique of such models
  4. A rhetorical or a speculative statement that would be the basis of further investigation. (For example: Architecture in the information age: Design of libraries in the new virtual reality regime). Documentation which is a part of this presentation shall be taken as completion of "case study" part of the final requirement.
- **Mid Review –** There shall be a review to clarify the conceptual statements and assumptions of the students. Students shall present a clearly articulated design response to context, program and users. Conceptual framework and preliminary architectural scheme using drawings and models shall be the end products of this stage.
- **Final Review –** Final review should consist of all the works which would be presented at the viva. Mode of presentation shall be tentative but the body of work presented should demonstrate the intellectual rigour and skill of the student through the design process and must include various iterations (including study models) and the final design outcome. Number of sheets shall be limited to maximum of 20 plus two case study sheets.

(c) Final output/outcomes:

- The final output or body of work should include a report; detailed and completed analog and digital drawings and presentation model.

(d) Project Report:

- Three copies of the reports shall be submitted for evaluation in the Viva. The report in typed or computer printed form shall provide an overview of the entire process from formulation of the project to the design resolution. It should discuss the program, site- analysis, literature review, case studies, design criteria, concept and include detailed design drawings from all stages and photographs of the models.

Note:

a) The requirements pertaining to the differently abled, elderly people and children are to be addressed in design and detailing.

b) At the time of Viva examination, the student shall show to the jurors the portfolio containing the evolution of his/her design from the beginning to the final output. All the drawings and reports shall be certified by the Principal of the School of Architecture as bona fide work carried out by the student during the semester.

SUGGESTED REFERENCES:

All references will be project specific and will include a wide range of subjects (history, theory, services, material and construction) from architecture and allied fields addressed through critical papers, essays, documented studies and books.