

**SYLLABUS FOR
BACHELOR OF ARCHITECTURE (B.Arch.,)
UNDER CHOICE BASED CREDIT SYSTEM**

SCHEME OF INSTRUCTION, EXAMINATION AND SYLLABI



**BOARD OF STUDIES IN ARCHITECTURE
FACULTY OF ENGINEERING**

**ANDHRA UNIVERSITY COLLEGE OF ENGINEERING (A)
COURSE STRUCTURE BACHELOR OF ARCHITECTURE
To be implemented w.e.f. academic year 2020-21**

Vision:

To train and educate the student to become successful professionals in the field of architecture, to sensitize them and make them responsive to their environment and society within which they have to create a sustainable built environment.

Mission:

The mission of the department is to develop the student's ability to harness his creative skills through latest scientific knowledge, design a human built environment that responds to the local context.

Programme Educational Outcomes (PEOs)

- **PEO1** Develop the student's ability to harness his creative skills and knowledge of architectural design, practice and technology.
- **PEO2** To train and develop future architects capable to face challenges posed by modern world due to all round advancement in technology and materials.
- **PEO3** Perform all professional duties independently, as a team member or part of a multi-disciplinary team.
- **PEO4** Retain and preserve rich vernacular architectural values by encouraging use of locally available material technology for a sustainable development.

Programme Outcomes (POs):

- **PO1** The program enables the students with enhanced knowledge in Design process, Technology, and socio-cultural domains to address the emerging challenges in the field of Architecture.
- **PO2** Awareness of traditional technological aspects, socio cultural values and its significances to develop the understanding of the past and respect them.
- **PO3** Develop communication skills through visual, verbal and written representations of architectural propositions and their cultural, professional, and technical implications.
- **PO4** Produce professional standards of technical drawing/documents and visual/graphical presentations.
- **PO5** Be able to utilize freehand drawing, architectural graphics, and building model making skills in the solution of design problems.
- **PO6** Develop an ability to conceptualize and coordinate designs, addressing social, cultural, environmental and technological aspects of architecture
- **PO7** Work in a manner that is consistent with the accepted professional standards and ethical responsibilities while working in the collaborative design studios.
- **PO8** Work in collaboration with and as an integral member of multi disciplinary design and execution teams in the AEC Industry.

- **PO9** Critically analyzes building design, condition and conducts necessary retrofication and post occupancy evaluations.
- **PO10** To establish and nurture in various design competitions with frontline local/ national/ international educational/research institutions for continuously evolving global perspective.

Programme Specific Outcomes (PSOs):

- **PSO1 Design:** (*Basic Design & Visual Arts, Architectural Design, Interior Design, Barrier free Architecture, Urban Design*) Encourage ability to conceptualize, visualize and coordinate design that follows a efficient process of analyzing ideas, theories by evaluating ideas that include parameters on social, cultural, environmental and technological aspects of architecture.
- **PSO2 Materials, Construction & Services:** (*Building Materials & Building Construction, Design of Structures, Building Services, Specification, Estimation & costing*) Exhibit the ability to blend a wide range of variables into an integrated design solution. It is done by applying appropriate building systems, building materials and construction practices on sound research and design decisions across varying scales of systems and levels of complexity.
- **PSO3 Sustainability** (*Climatology, Environmental Studies, Landscape Design & Site Planning, Disaster Resistant Buildings and Management*) Create a sustainable and responsive built environment by responding to the climate of the region, adapt necessary technologies, safeguard environment and landscape to attain a sustainable development for the future.
- **PSO4 Science & Humanities** (*Human Settlements & Town Planning, History of Architecture, Professional Practice, Computer Applications, Architectural Journalism, Soft Skills, Advance Construction*) Understand how history, art and culture have shaped the modern world, through a diverse types of innovative works, human experiences and to raise questions on value and meaning.

(ANNEXURE-I)

Department of Architecture
College of Engineering (A), Andhra University, Visakhapatnam

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Bachelor of Architecture
5-year Undergraduate Degree Course
(With Effective from 2020-2021 Admitted Batch and onwards)

SCHEME OF SYLLABUS

Note: Induction Training: In the first year three weeks of the course, an induction training program is mandatory before the start of formal classes, to orient the students towards architectural aptitude, education and career.

1/5 B.ARCH 1st SEMESTER

Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)
			L	S	W					
ARC1101	PC	Basic Design & Visual Arts	2	5	-	50	50	100	8	5 Hrs.
ARC1102	PC	Architectural Drawing & Graphics-I	1	4	-	50	50	100	6	5 Hrs.
ARC1103	PC	Introduction to Architecture, Art & Culture	3	-	-	30	70	100	3	3 Hrs.
ARC1104	BS &AE	Building Materials & Construction-I	2	3	-	50	50	100	5	3 Hrs.
ARC1105	BS &AE	Structural Mechanics-I	3	-	-	30	70	100	3	3Hrs.
ARC1106	BS &AE	Survey & Site Studies	1	-	3	50	50	100	3	VV
ARC1107	SEC	English (Life Skill Courses)	3	-	-	30	70	100	2	3Hrs.
Sub-Total			15	12	3	290	410	700	30	

1/5 B.ARCH 2nd SEMESTER

Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)
			L	S	W					
ARC1201	PC	Architectural Design-I	2	5	-	50	50	100	9	5 Hrs
ARC1202	PC	Architectural Drawing & Graphics-II	1	4	-	50	50	100	6	5 Hrs
ARC1203	PC	History of Architecture – I	3	-	-	30	70	100	3	3 Hrs.
ARC1204	PC	Carpentry and Model Making Workshop	--	-	3	50	50	100	2	VV
ARC1205	BS&AE	Building Materials- & Construction-II	2	3	-	50	50	100	5	3 Hrs.
ARC1206	BS &AE	Structural Mechanics-II	3	-	-	30	70	100	3	3 Hrs.
ARC1207	SEC	English Language Lab (Life Skill Courses)	--	--	2	50	50	100	2	VV
		Universal Human Values	2	--	--	Self-Learning				
		NCC, NSS, NSO			2					
Sub-Total			13	12	5	310	390	700	30	

L- Lectures	S- Studio	W-Workshop
EE/EJ : End Exam / External Jury	A: Internal Assessment	VV: Viva-Voce

Category	Credits
PC – Professional Core	37
BS&AE – Basic Sciences and Applied Engg.	19
Skill Enhancement Courses / Life Skill Courses	4
Mandatory AICTE Non Credit Course	0
Total Credits of 1 st Year	60

2/5 B.ARCH 1 st SEMESTER											2
Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)	
			L	S	W						
ARC2101	PC	Architecture Design-II	2	6	-	50	50	100	10	10 Hrs.	
ARC2102	PC	History of Architecture-II	3	-	-	30	70	100	3	3Hrs.	
ARC2103	BS&AE	Building Materials & Construction-III	2	3	-	50	50	100	5	3Hrs	
ARC2104	BS&AE	Building Services-I (Water supply & Sanitary Engg.)	3	-	-	30	70	100	3	3Hrs.	
ARC2105	BS&AE	Climatology-I	3	-	-	30	70	100	3	3Hrs.	
ARC2106	BS&AE	Structural Mechanics-III	3	-	-	30	70	100	3	3Hrs.	
ARC2107	SEC	Computer Applications-I (Skill advanced course)	--	--	3	50	50	100	3	VV	
		Ethics	2			Self-Learning					
		NCC, NSS, NSO			2						
Sub-Total			18	9	3	270	430	700	30		

2/5 B.ARCH 2 nd SEMESTER										
Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)
			L	S	W					
ARC2201	PC	Architectural Design-III	2	6	-	50	50	100	9	10 Hrs
ARC2202	PC	History of Architecture-III	3	-	-	30	70	100	3	3 Hrs
ARC2203	BS&AE	Building Materials & Construction-IV	2	3	-	50	50	100	5	3 Hrs.
ARC2204	BS&AE	Building Services-II (Acoustics)	3	-	-	30	70	100	3	3 Hrs.
ARC2205	BS&AE	Climatology-II	3	-	-	30	70	100	3	3 Hrs.
ARC2206	BS&AE	Design of Structures-I	3	-	-	30	70	100	3	3 Hrs.
ARC2207	BS &AE	Environmental Science for Architecture	3	-	-	30	70	100	3	3 Hrs.
		Indian Traditional Knowledge	2			Self-Learning				
Sub-Total			21	9	--	250	450	700	29	

Summer Internship 8 weeks: Every student must complete a mandatory 8-week Summer Internship at any local architectural firm (chief architect of the firm shall have at least 2 years of professional experience) during the summer vacation, and the completion certificate along with portfolio must be submitted in the department at the beginning of the 3rd year of the 1st Semester for oral presentation by the student and evaluation through the departmental committee for awarding a credit.

L- Lectures	S- Studio	W-Workshop
EE/EJ : End Exam / External Jury	A: Internal Assessment	VV: Viva-Voce

Category	Credits
PC – Professional Core	25
BS&AE – Basic Sciences and Applied Engg.	31
Skill Enhancement Courses / Skill advanced course*	3
Mandatory AICTE Non Credit Course	0
Total Credits of 2 nd Year	59

3/5 B.ARCH 1 st SEMESTER											3
Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)	
			L	S	W						
ARC3101	PC	Architecture Design-IV	2	6	-	50	50	100	10	VV	
ARC3102	PC	Human Settlements & Town Planning	3	-	-	30	70	100	3	3Hrs.	
ARC3103	PC	^^Landscape Design & Site Planning	3	-	-	30	70	100	3	3Hrs.	
ARC3104	BS&AE	Building Materials & Construction-V	2	3	-	50	50	100	5	3 Hrs.	
ARC3105	BS&AE	Building Services-III (Electrical and HVAC Services)	3	-	-	30	70	100	3	3 Hrs.	
ARC3106	BS&AE	Design of Structures- II	3	-	-	30	70	100	3	3Hrs.	
ARC3107	*OE-II	*Open Elective-I	3	--	--	30	70	100	2	3Hrs.	
Summer Internship 8 Weeks (Mandatory) after second year (to be evaluated during V semester)									1	VV	
		Personality Development	2	--		Self-Learning					
Sub-Total			21	9	--	250	450	700	30		
*All Open Electives are offered to students of all branches in general. Student shall choose an open Elective from the list in such a manner that he/she has not studied the same course in any form during the Programme.											
^^Community Service Project like botanical survey and documentation should be an integral part of the Landscape Design as an assignment.											

3/5 B.ARCH 2 nd SEMESTER										
Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)
			L	S	W					
ARC3201	PC	Architectural Design-V	2	6	-	50	50	100	10	VV
ARC3202	PC	Working Drawings-I	2	4	-	50	50	100	5	VV
ARC3203	PC	Specification, Estimation & Costing	3	-	-	30	70	100	4	3Hrs.
ARC3204	BS&AE	Building Repairs and Maintenance Services	3	--		30	70	100	3	3Hrs
ARC3205	BS&AE	Design of Structures- III	3	-	-	30	70	100	3	3Hrs.
ARC3206	SEC	Computer Applications-II (Skill advanced course)	3	--	--	30	70	100	3	3Hrs.
ARC3207	*OE-II	*Open Elective-II	3	--	--	30	70	100	2	3Hrs.
		Indian Constitution	1			Self-Learning				
Sub-Total			20	10	--	250	450	700	30	--
Summer Internship 8 weeks: Every student must complete a mandatory 8-week Summer Internship at any local architectural firm (chief architect of the firm shall have at least 4 years of professional experience) during the summer vacation, and the completion certificate along with portfolio must be submitted in the department at the beginning of the 4 th year of the 1st Semester for oral presentation by the student and evaluation through the departmental committee.										
*All Open Electives are offered to students of all branches in general. Student shall choose an open Elective from the list in such a manner that he/she has not studied the same course in any form during the Programme.										

L- Lectures	S- Studio	W-Workshop
EE/EJ : End Exam / External Jury	A: Internal Assessment	VV: Viva-Voce

Category	Credits
PC – Professional Core	35
BS&AE – Basic Sciences and Applied Engg.	17
Skill Enhancement Courses / Skill advanced course*	3
Open Elective Course	4
Summer Internship	1
Mandatory AICTE Non Credit Course	0
Total Credits of 3 rd Year	60

4/5 B.ARCH 1 st SEMESTER										
Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)
			L	S	W					
ARC4101	PC	*Architecture Design-VI	2	6	--	50	50	100	10	VV
ARC4102	PC	Working Drawings-II	2	4	--	50	50	100	5	VV
ARC4103	PC	Urban Design	4	--	--	30	70	100	3	3 Hrs.
ARC4104	BS&AE	Building Services-IV (Advanced Services)	3	--	--	30	70	100	3	3 Hrs.
ARC4105	BS&AE	Structures Design Project	3	--	--	50	50	100	3	VV
ARC4106	PE	Elective-I	3	--	--	30	70	100	3	3Hrs.
		a) Architectural Conservation								
		b) Barrier free Architecture								
ARC4107	SEC	Soft Skills (Skill advanced course)	2		-	50	50	100	2	VV
Summer Internship 8 Weeks (Mandatory) after third year (to be evaluated during VII semester)									1	VV
	^MOOCS-I	Skill Enhancement Certificate Programs								
Sub-Total			19	10	--	290	410	700	30	--
*Community Service Project should be an integral part of the Architecture Design-VI Major Design Project.										
^ Students should choose one MOOC Certificate Course only from the organizations/agencies approved by the BoS. Each of the courses must be of minimum 12 weeks in duration. Students should submit certificate of the course to the department.										

4/5 B.ARCH 2 nd SEMESTER										
Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)
			L	S	W					
ARC4201	PAECC	Practical Training	--	--	--	50	50	100	26	VV
Sub-Total			--	--	--	50	50	100	26	--
Note: 24 weeks of Practical Training in an Architectural Firm Every student must complete a mandatory 24 weeks Internship at any architectural firm (chief architect of the firm shall have at least 5 years of professional experience).										

L- Lectures	S- Studio	W-Workshop
EE/EJ : End Exam / External Jury	A: Internal Assessment	VV: Viva-Voce

Category	Credits
PC – Professional Core	18
BS&AE – Basic Sciences and Applied Engg.	6
Skill Enhancement Courses / Skill advanced course*	2
Professional Elective Course	3
Professional ability Enhancement Compulsory Course / Job Oriented Course	26
Summer Internship	1
Total Credits of 4 th Year	56

5/5 B.ARCH 1 st SEMESTER										
Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)
			L	S	W					
ARC5101	PC	Architecture Design-VII	2	6	--	50	50	100	10	VV
ARC5102	PC	Design Workshop	--	--	3	100	--	100	3	VV
ARC5103	PAECC	Project Management	3	--	--	30	70	100	3	3 Hrs.
ARC5104	PAECC	Architectural Dissertation	--	--	6	50	50	100	6	VV
ARC5105	PE	Elective-II	3	--		30	70	100	3	3Hrs
		a) Green Buildings & Rating Systems, ECBC & Bldg. bye-laws								
		b) Spatial Cognition-I								
ARC5106	PE	Elective-III	3	--		30	70	100	3	3Hrs
		a) Architectural Research Methodology								
		b) Disaster Resistant Buildings and Management								
ARC5107	SEC	Entrepreneurship Skills for Architects / Skill Oriented Course	3	--	--	30	70	100	2	3Hrs
	^MOOCS-II	Skill Enhancement Certificate Programs								
Sub-Total			14	6	9	320	380	700	30	--

^Students should choose one **MOOC Certificate Course** only from the organizations/agencies approved by the BoS. Each of the courses must be of minimum 12 weeks in duration. Students should submit certificate of the course to the department.

5/5 B.ARCH 2 nd SEMESTER										
Code	Category	Course Title	Hours per week			IA	EE/EJ	Total Marks	Credits	Exam (Hrs.)
			L	S	W					
ARC5201	PC	Architecture Design Thesis	3	15	--	50	50	100	21	VV
ARC5202	PAECC	Professional Practice & Legislation	3	--	--	30	70	100	3	3Hrs
ARC5203	PE	Elective-IV	3	--	--	30	70	100	3	3Hrs
		a) Spatial Cognition-II								
		b) Appropriate Technology								
ARC5204	PE	Elective-V	3	--	--	30	70	100	3	3Hrs
		a) Vernacular Architecture								
		b) Environmental Planning								
Sub-Total			12	15	--	140	260	400	30	--

Lectures	S- Studio	W-Workshop
EE/EJ : End Exam / External Jury	A: Internal Assessment	VV: Viva-Voce

Category	Credits
PC – Professional Core	34
Skill Enhancement Courses / Skill Oriented Course	2
Professional Elective Course	12
Professional ability Enhancement Compulsory Course / Job Oriented Course	12
Total Credits of 5 th Year	60

S.No	Category	Code	No. of Credits	% of Credits	Suggested Breakup % Credits by CoA, 2020 Guidelines
1	Professional Core	PC	149	50.50	50
2	Basic Sciences and Applied Engineering	BS&AE	73	24.50	20
3	Professional Elective	PE	15	5.10	10
4	Open Elective	OE	4	1.40	5
5	Professional ability Enhancement Compulsory Course	PAECC	40	13.70	10
6	Skill Enhancement Courses / Life Skill Courses / Skill Oriented Courses	SEC	14	4.80	5
Total			295	100	100

S.No	Category	No. of Courses offered in the Whole Program
1	Open Electives	2 Nos. (As per the University Program and other than architecture discipline)
2	Professional Electives	5 Nos.
3	Life Skill Courses / Skill Oriented Courses	2 Nos.
4	Skill advanced Courses	3 Nos.
5	Summer Internship 8 weeks Each (Mandatory Internships)	2 Nos. (Total 4 Months)
6	Practical Training Internship - 25 weeks (Mandatory Internship)	1 No. (6 Months Duration)
7	Skill Enhancement Certificate Programs	2 Nos.
8	Community Service Project	2 Nos.
9	Environmental Science for Architecture	1 No.
10	Mandatory AICTE Non- Credit Courses	4 Nos.

Department of Architecture
College of Engineering (A), Andhra University, Visakhapatnam

Bachelor of Architecture
5-year Undergraduate Degree Course
(With Effective from 2020-2021 Admitted Batch and onwards)

SYLLABUS

Induction Training

Students entering an institution have diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose.

In this context, in the beginning of the first semester a three-week long induction program is proposed for the students. Regular classes would start after the completion of the induction program. Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature. Introduction of faculty members, discussion with faculty members, visits to various spaces in the department/school, such as climatology lab, computer center, material museum, construction yard, students' works exhibition, etc. The Induction Program is also used to rectify some critical lacuna, like deficiency in comprehension of English language by many students. The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program

Physical Activity

This would involve a daily routine of physical activity with games and sports. It would start with all students coming to the field for light physical exercise or yoga in the morning. There would also be games in the evening or at other suitable times according to the local climate. These would help develop team work. Each student should pick one game and learn it for three weeks. There could also be gardening or other suitably designed activity where labour yields fruits from nature.

Creative Arts

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it every day for the duration of the program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, flow into architectural design later.

Universal Human Values

It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting staff in the hostel and department, be sensitive to others, etc. Need for character building has been underlined

earlier. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and don'ts, but by getting students to explore and think and by engaging them in a dialogue. It is best learnt through group discussions and real life activities rather than lecturing. The role of group discussions, however, with clarity of thought of the teachers cannot be over emphasized. It is essential for giving exposure, guiding thoughts, and realizing values. The teachers must be from within the institute and also from outside of the Institute. Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It is to open thinking towards the self. Universal Human Values discussions and activities could even continue for rest of the semester, and not stop with the induction program.

Besides drawing the attention of the student to larger issues of life, it would build relationships between teachers and students which last for their entire 5-year stay and possibly beyond.

Lectures by Eminent People

Lectures by eminent people, say, once a week would give the students exposure to people who are socially active or are in public life. They could be from any field well known for their integrity.

Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize the students with their city as well as expose them to the world of under privileged.

Familiarization

The students should be told about different methods of teaching and learning being used in the institute and how it is different as compared to school education or coaching. They should also be shown the laboratories, workshops & other facilities and also be introduced to the faculty, administrative staff etc. and whom they should approach for a specific need or issue. They should be told about what becoming an architect means and the importance of the role of architect in society, and in nation building.

ARC1101

BASIC DESIGN AND VISUAL ARTS

Course Objective:

- Basic Design provides the framework for understanding design as a new language by sensitizing students to the conceptual, visual and perceptual issues involved in the design process.
- The Course provides with knowledge of the principles of design and design elements.
- Exercises complement the lectures and ensure that the students learn to develop a series of compositions in two and three dimension.

Course Outcome:

- The student will gain an understanding into the fundamental issues in architectural design and develop the skill to create architectural solutions for simple problems

SYLLABUS

(Freehand drawing)

Introduction to fundamentals of drawings and its practice. Free hand line sketching and drawing of natural and man-made scenes. Study of shades and shadows. Object drawing, simple, natural and geometric forms. Outdoor Sketching of Historic or new built up structures of Architectural importance using different mediums.

(Elements of Design)

Introduction to design: Meaning of design, importance of design. Fundamental elements of design and their definitions-point, line, shape, form, space, texture, colour. Study historic examples.

(Principles of design)

Introduction to the principles of design – Axis , Symmetry , Balance, Contrast, Focus, Emphasis, Hierarchy, Rhythm, Harmony, Datum, Unity, Scale & Proportion, etc. Study of Historic Examples. Application of the Principles in compositions.

(Colour)

Colour theory, colour wheel, primary, secondary, tertiary colours, colour schemes, colour value & intensity.

(Principles of Perception)

Proximity, Similarity, Closure (Gestalt type). Optical illusion

(Form and space)

Understanding properties of form, Articulation and Transformation of form – additive, subtractive and dimensional transformations. Form defining space.

(Visual arts)

Present day trends in visual arts and architecture.

Note:

Sketches and Models to understand basic design principles, elements and their expressive qualities. Creative Exercises of 2D to 3D compositions. Exercise related to positive and negative spaces; Mural, ideogram, 3D Abstract models

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M.

TEXT BOOKS:

- 1) Form Space & Order by Francis, D.K.Ching

REFERENCES:

- 1) Principles of two dimensional designs by Wong Wucius -
- 2) Designer s Guide to Colour by Ikuyoshi Shibikawa and Yumi Takahashi -
- 3) Elements of architecture by Von Mesis
- 4) Architectural Composition by Robkrier -
- 5) Design & Form by Johannes Itten
- 6) Architecture Drafting & Design by Donald E. Helper, Paul I. Wallach -
- 7) The Decorative Design of Frank Lloyd Wright by David A. Hanks
- 8) Principles of Design in Architecture by K.W.Smithies
- 9) Drawing for 3 - dimensional design by Alan pipes

ARC1102 ARCHITECTURAL DRAWING & GRAPHICS -I

Course Objective:

- The course introduces students to fundamental techniques of architectural drawing and develops the appropriate skills for representation.

Course Outcome:

- Students learn to develop drafting skills to facilitate effective visual communication.

SYLLABUS

(Introduction to Drawing)

Introduction to drawing equipment, familiarization, use and handling. Drawing sheet sizes, layouts and composition. Simple exercises in drafting, line types, line weights; dimensioning. Lettering Styles: Roman and Gothic style lettering; freehand lettering, title panels and legends.

(Simple Geometrical Construction)

Constructing simple and complex geometrical shapes involving various drafting technique drawing regular shapes; Special methods of drawing regular polygons; Regular polygons inscribed in a Circle.

(Projections and section of Solids)

Solids of revolution, solids in simple position, Axis perpendicular to a plane, axis parallel to both planes, axis inclined to both planes etc. Section planes, true shape of section, Sections of Prisms, Pyramids, Cylinders, Cones, Spheres etc.

(Advanced geometry)

Intersection of surfaces: Line of intersection, intersection of prism and prism, cylinder and cylinder, cylinder and prism, cone and cylinder, cone and prism, cone and cone, sphere and cylinder or prism. Orthographic Projections- Representation of 3D elements in Plan and Elevations, Study of isometric, axonometric and oblique views, Ionic volute (by Gibbs Rule), Entasis of column, intersection of solids &

(Architectural Symbols)

Representation of building elements, openings, materials, furniture and accessories; human postures; vegetation; vehicles; terminology and abbreviations used in architectural representation.

(Measuring and Drawing to Scale)

Scales and construction of scales, scaled drawings of simple objects, furniture, rooms, doors and windows etc., in plan, elevation and section. Reduction and enlargement of drawings.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

TEXT BOOKS:

- 1) "Engineering Drawing" –Plane and Solid Geometry by N.D.Bhat, V.M.Panchal
- 2) A text book of Geometrical Drawing by P.S.gill
- 3) Architectural Graphics by Francis D K Ching

REFERENCES:

- 1) "Geometrical drawing for Art students" by Moris.I.H.
- 2) Hand book of Architectural & Civil Drafting by Nelson J.A
- 3) Architectural Drafting: Structure & Environment by JohnD.Bies –.
- 4) – Graphic Science & Design by Thoms. E. French.
- 5) – Geometry of Construction by T.B.Nichols and Normal keep.
- 6) Building Drawing by Shah:.
- 7) Drawing architecture by Paul Hagarth
- 8) Drawings by architects by Claudius Conli
- 9) Pencil techniques in modern design by Alkin, Urbelleth and Lione

ARC1103
INTRODUCTION TO ARCHITECTURE, ART & CULTURE

Course Objective:

The course creates awareness about fundamental ideas, methodologies and terminologies in art and architecture in different parts of the world, shedding light on what meanings they communicated, and how they are important to our contemporary society.

Course Outcome:

The Course is intended to provide brief background knowledge of Culture and Art in different parts of the world. It is also intended to serve as an introduction to other more advanced courses within the discipline of art history.

SYLLABUS

(Art and Architecture)

Introduction to Art, Culture, Society, Civilization and Architecture.

(Shelter Forms)

Earlier attempts of man for shelter and shelter forms since the prehistoric period with reference to culture, climate, technology and material.

(Architecture Movements)

Understanding the relationships of art, culture and architecture at different time such as: art, arts & crafts movement etc., and periods in the world history.

(Indian Architecture)

Introduction to Indian Art and Architecture.

(Western Architecture)

Introduction to Western Art and Architecture.

(Ornamentation)

Study of ornament in Architectural Design, different types of ornamentation in buildings and study of historic examples.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

TEXT BOOKS:

- 1) G. K. Hiraskar- The Great Ages of World Architecture.

REFERENCES:

- 1) Indian Art a Concise History by Craven, C. Roy.
- 2) , Pattern Language, by Christopher Alexander New York: Oxford University Press.
- 3) Redefining Designing: From to Experience by Thomas Mitchell.
- 4) A history of architecture by Sir Banister Fletcher

- 5) Introduction to architecture by Stephen Gardner.
- 6) A chronology of western architecture by Doreen Yarwood.
- 7) The great ages of architecture by Bodo Lichy.
- 8) World architecture – an illustrated history by Trewin Copplstone and others

ARC1104 BUILDING MATERIALS & CONSTRUCTION-I

Course Objective:

- The objective of the subject is to enable students to understand the building materials and basic structural systems, their properties and applications, and
- Their intrinsic relationship to structural systems and environmental performance.
- Application of Basic Building Materials in simple situations

Course Outcome:

- With the successful completion of the course student should have capability to:
- Identify and differentiate types of bricks, stones etc.
- Type of foundation and load bearing masonry
- Principles behind lintels and arches and their application
- Analyze a design decision situation and come up with correct material choice and construction specification

SYLLABUS

(BUILDING MATERIALS)

Study of basic building materials like brick, stone, cement, lime, sand and mortar with respect to their classification, composition and general idea about their chemical properties, physical properties, structural strength, aesthetic qualities, manufacturing processes. Introduction to building materials as described in Indian architectural texts. Emphasis should be on developing understanding about making choice of appropriate building materials in a given situation.

(BRICK CONSTRUCTION)

Elementary construction methods explaining basic principles of load bearing structures. Types of bricks, bats and closers etc. English and Flemish brick bonds, stopped ends, quoins, piers, junctions, jambs for various thicknesses. Jointing, pointing and copings.

(STONE WALLS)

Stone masonry, dressing of stones. Types of rubble masonry walls like Random Rubble, Coursed Rubble, Ashlar, etc., stone coping, jointing and pointing.

(FOUNDATION AND PLINTH)

Need for foundations, preliminary design criteria. Details of brick and stone footings for load bearing walls of various thicknesses. Plinth filling details, Damp Proof Course, timbering to trenches.

(ARCHES AND CORBELLING)

Concept of span and its application in creating openings in masonry walls with lintels and arches. Structural difference in the behaviour of lintel and arches. Elementary principles of arch construction, terminology and types of lintels, corbelling and arches with their materials for construction.

TEXT BOOKS:

- 1) W.B. Mc Kay, Building Construction Volume 1 to 4
- 2) R. Barry, Building Construction Volume 1 to 5
- 3) Francis Ching D.K., Building Construction Illustrated
- 4) S.K. Sharma, Civil Engineering construction Materials
- 5) Sushil Kumar, Building Construction

ARC1105 STRUCTURAL MECHANICS-I

Course Objective:

- To study the equilibrium of rigid bodies in static equilibrium and type of forces induced in the members of a truss. Study of basic types of internal forces (stresses) acting in a body and the elastic properties of a material.
- Calculate the cross-sectional properties of standard and built up shapes.

Course Outcome:

- The student will be in a position to calculate the forces acting on a rigid body in equilibrium and the nature of the force in the members of a truss.
- To determine the elastic properties of a material and the nature of internal force (stresses) acting in the body and able to calculate the cross-sectional properties of standard and built up shapes.

SYLLABUS

(INTRODUCTION TO STATICS AND FORCES)

Introduction to Statics, Basic Concepts, Scalars and Vectors, Units, Force Systems, External and Internal Effects, Principle Of Transmissibility, Action and Reaction, Free body diagram, Force Classification, Concurrent Forces: Rectangular Components, Moment of a force, Varignon's Theorem. Parallel forces in a plane: Couple, Force-Couple Systems, Transformation of couple; Resolution of force into force and couple. Resultants of Parallel and Concurrent force systems in a Plane.

(EQUILIBRIUM OF GENERAL CASE OF FORCES IN A PLANE)

Composition of Forces in A Plane, Resultant and Line of Action, Equilibrium of Forces in A Plane, Categories of Equilibrium, Two and Three Force Members. Plane Trusses: Introduction, Types of Plane Trusses, Method of Joints, Internal and External Redundancy, Method of Sections.

(CENTRE OF GRAVITY AND MOMENT OF INERTIA)

Centroids and Centre of Gravity: Centre of gravity of parallel forces in a plane, Centroid and Centre of Gravity of composite bodies, Theorems of Pappus (or Guldinus), Moment of Inertia-Definition, Parallel Axis Theorem, Second Moments of Areas by integration, Moment of Inertia of composite bodies, Polar moment of inertia and Section modulus.

(STRESSES AND STRAINS)

Simple stresses and strains, elasticity, stress, strain, property of elasticity, Hooke's Law, Stress-Strain diagram for mild steel, types of stresses, elastic limit, modulus of elasticity, Stresses due to change in temperature, Elastic constants, linear strain, lateral strain, Poisson's ratio, volumetric strain, relation between Young's Modulus, modulus of Rigidity, and Bulk modulus.

(TORSION OF SHAFTS)

Torsion of solid and hollow circular shafts - introduction to the basic equation $\frac{T}{J} = \frac{f_s}{R} = \frac{G\theta}{l}$. Derivation and Application of the basic equation, Power transmitted.

(SHEAR FORCE AND BENDING MOMENT)

Beams: Types of beams, Types of supports, Types of loads, Shear force and bending moment, Sign convention, Shear force and bending moment diagrams for simply supported beam, cantilever beam and overhanging beams for various loads, Relation between intensity of loading, shear force and bending moment at a section.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M) = 30M.

TEXT BOOKS:

- 6) Analysis of Structures - Analysis, Design and Details of Structures (Vol.1) by V.N. Vazirani and M.M. Ratwani
- 7) Engineering Mechanics by S.P.Timoshenko & D.H.Young
- 8) Mechanics of solids by S.S. Bhavikatti

REFERENCES:

- 1) Elements of strength of materials by S.P.Timoshenko & D.H.Young
- 2) Applied Mechanics by S.Ramamrutham.

ARC1106 SURVEY & SITE STUDIES

Course Objective:

- To develop the knowledge and skills related to surveying and understand working principles of survey instruments and types of errors, obstacles encountered in field and calculations.

Course Outcome:

- The student will be able to learn about basics involved in different types of surveying instruments like tape, compass, levelling and develop surveying skills in measuring of distances, angles, and levelling and to apply error adjustment to the recorded reading to get an accurate surveying output

SYLLABUS

(Basic principles and chain surveying)

Definitions, scales and symbols, sources of error in surveying and theory of probability, measurement of distance, instruments used, ranging of survey lines, chaining a line with examples, chaining on sloping ground, errors in chaining, tape corrections, chain surveying principles, off-sets, field notes, instruments, obstacles in chaining. Plotting chain survey with practical examples.

(Plane table surveying)

Plane table surveying: Introduction-Advantages, Accessories-Working operations such as fixing the table to tripod, leveling-centering-orientation by back-sighting. Methods of plane tabling-Plane table traversing- two point and three point problems, Errors in plane tabling, exercise in preparation of base map of small areas.

(Compass Survey)

Introduction to compass survey, Definitions of Bearing, Designation of bearing – Whole circle bearing(W.C.B) & Reduced bearing(R.B), Conversion of bearings from one systems to the other, Calculation of angles for bearings and vice versa, Magnetic compass, Prismatic compass, Magnetic dip, Temporary and permanent adjustments of compass, Magnetic Declination, Local attraction, Precautions in using compass, Errors in compass survey.

(Levelling)

Introduction, instruments used, Definition of Back Sight(BS), Intermediate Sight(IS), Fore Sight(FS), Height of Instrument(HI), Turning Point(TP), Booking and reduction of levels, classification of levelling, Uses and adjustments of dumpy level, Temporary and permanent adjustments of a dumpy level, Differential levelling, Profile leveling, Longitudinal section (L.S), Cross section leveling (C.S), Reciprocal levelling. Height of Instrument methods, Rise and fall method, Checks, Problems in leveling, Errors in levelling. Contouring: Definitions, Contour Interval, Characteristics of contours, and methods of locating contours-Direct and indirect methods-interpolation of contours-Contour Gradient-Uses of contour maps.

(Theodolite and Traverse Surveying)

Theodolite, types of theodolites, temporary adjustments, measurements of horizontal angle, method of repetition, method of reiteration, uses of theodolites, errors in theodolite or permanent adjustments of a theodolite, trigonometric levelling, elevation of top of the tower in same plane and different plane. Methods of traversing, checks in closed and open traverse, plotting methods of traverse Survey-Closing error-Balancing the traverse.

(Automated surveying (introduction only))

Introduction to Modern surveying and mapping technologies such as total Station, Photogrammetric surveying, Aerial photogrammetry, Digital maps, Digital elevation modelling (DEM), GIS, GPS, etc. Their advantages and disadvantages, errors and limitations. Introduction to the use of total station, G.P.S through demonstrations only.

Site studies:

Site studies: Plot, site, land and regions, size, shape of sites.

Analysis of accessibility: topography, climate, landforms, surface drainage, soil, water bodies and vegetation.

Field Work:

1. Finding the distance between two points and area using chain.
2. Preparation of base map of small area and finding the area using Plane table surveying or Chain surveying
3. Profile leveling
4. Longitudinal and cross section leveling.
5. Closed traverse using Compass surveying or Theodolite.
6. Height of remote point using Theodolite.
7. Preparing Contour map of small area.

Note: Field book and record should to be submitted at the end of the semester.

Assessment:

Continuous assessment will be conducted for all the field studies mentioned in the syllabi for 50 Marks as internal. Student has to submit Field book and record for external viva-voce. The student should attend a practical Exam and Viva-voce conducted by external examiner.

TEXT BOOKS:

- 1) Surveying –Vol.-I by B.C. Punmia, Laxmi Publishers.
- 2) Surveying –Vol.-II by B.C. Punmia, Laxmi Publishers.
- 3) Text book of Surveying by C. Venkatramaiah, Universitie

ARC1107 ENGLISH

Course Objectives

- To make students understand the explicit and implicit meanings of a text/topic;
- To give exposure to new words and phrases, and aid to use them in different contexts;
- To apply relevant writing formats to draft essays, letters, emails and presentations; and
- To adapt oneself to a given situation and develop a functional approach to finding solutions: adaptability and problem solving.

Course Outcomes:

- Students will be able to analyse a given text and discover the various aspects related to language and literature;
- Learn the various language structures, parts of speech and figures of speech;
- Develop one's reading and writing abilities for enhanced communication; and
- Learn to apply the topics in real-life situations for creative and critical use.

SYLLABUS

On the conduct of life: William Hazlitt

Life skills: Values and Ethics

If: Rudyard Kipling

The Brook: Alfred Tennyson

Life skills: Self-Improvement

How I Became a Public Speaker: George Bernard Shaw

The Death Trap: Saki

Life skills: Time Management

On saving Time: Seneca

Chindu Yellama

Life skills: Innovation

Muhammad Yunus

Politics and the English Language: George Orwell

Life skills: Motivation

Dancer with a White Parasol: Ranjana Dave

Grammar:

Prepositions – Articles – Noun-Pronoun Agreement, Subject-Verb Agreement –
Misplaced Modifiers – Clichés, Redundancies.

Vocabulary:

Introduction to Word Formation – Root Words from other Languages – Prefixes and
Suffixes – Synonyms, Antonyms – Common Abbreviations

Writing:

Clauses and Sentences – Punctuation – Principles of Good Writing – Essay Writing –
Writing a Summary

Writing: Essay Writing

Life skills: Innovation

Muhammad Yunus

Prescribed Textbook: *Language and Life: A Skills Approach* Board of Editors, Orient
Black Swan Publishers, India. 2018.

TEXTBOOK:

1. *Language and Life: A Skills Approach* Board of Editors, Orient Blackswan
Publishers, India. 2018.

REFERENCES:

- 1) Practical English Usage, Michael Swan. OUP. 1995.
- 2) Remedial English Grammar, F.T. Wood. Macmillan.2007
- 3) On Writing Well, William Zinsser. Harper Resource Book. 2001
- 4) Study Writing, Liz Hamp-Lyons and Ben Heasley. Cambridge University Press.
2006.
- 5) Communication Skills, Sanjay Kumar and PushpLata. Oxford University Press.
2011.
- 6) Exercises in Spoken English, Parts. I-III. CIEFL, Hyderabad. Oxford University
Press.

ARC1201
ARCHITECTURAL DESIGN-I

Course objectives:

- To study and preparation of measured drawings and design of single unit spaces with emphasis on form including the furniture layout, circulation, clearances, lighting and ventilation, etc.

Course Outcome:

- Student will understand principles of design, and develop the ability to translate abstract principles of design into architectural solutions for small problems

SYLLABUS

Organisation of form and space: Spatial relationship and spatial organisation

Circulation: Path space relationship, elements and form of circulation

Proportion and scale: golden section, classical orders, modular, anthropometry, Understanding of human and visual scale. Understanding of basic human functions and their implications for space requirements; Minimum and optimum areas for various functions, User data-Bubble and circulation diagrams.

The list of suggested topics to be covered as design problems including preparation of measured drawings and design of single unit spaces with emphasis on form

Detailed study of spaces such as living, dining, bedrooms, kitchen, toilet, etc. including the furniture layout, circulation, clearances, lighting and ventilation, etc.

Application in the design of simple household and street furniture At least two design problems Examples such as Design of Bus shelter/ Milk booth, /Security cabin/ATM centre/ Internet centre/ Gateway

Assessment:

Continuous assessment will be conducted for major (30M) and minor (20M) design problems i.e. total marks of (30M+20M) =50M

REFERENCES:

- 1) Time Savers Standards by Joseph De Chiara & John Callender, McGraw-Hill International Edition
- 2) Architect's Data by Ernst Neufert, 3rd edition
- 3) Architects Handbook: Ready Reckoner by Charanjit Shah, Galgotia Publishing Company.
- 4) Architecture: Form Space & order by Francis D. K. Ching, John Wiley & Sons

ARC1202
ARCHITECTURAL DRAWING & GRAPHICS -II

Course Objective:

- The course introduces students to fundamental techniques of architectural documentation and develops the appropriate skills for visual representation by Perspective, sciography and rendering techniques.

Course Outcome:

- Students learn in developing drafting and documentation skills and understanding study of shade and shadows of different geometrical forms and improve in rendering skills to facilitate effective visual communication and architectural presentation.

SYLLABUS

(Perspective)

Introduction to Perspective in one point or parallel perspective, two point or angular perspective, introduction to three-point perspective of different geometrical form, built forms.

(Sciography)

Introduction to Sciography in the study of shade and shadows, points, lines, surfaces, geometrical solids of various forms and groups of forms leading to advanced examples of shades and shadows on buildings or parts of buildings.

(Rendering)

Introduction to the rules of composition and perspective in architectural rendering, color study, values, tones and general approach to rendering. Various colour schemes, water colour and poster colour rendering, pencil rendering and monochrome and wash rendering etc. treatment of sky, clouds, landscape elements, human figures, foreground and surroundings, shadow projections in renderings

(Architectural Documentation)

Detailed measured drawing and documentation of any interesting building – preparation of maps, plans, elevations, sections, views etc.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

TEXT BOOKS:

- 1) “Engineering Drawing” –Plane and Solid Geometry by N.D.Bhat, V.M.Panchal.
- 2) Architectural Graphics by Francis D K Ching.

REFERENCES:

- 1) Perspective – space and design by Lance Bowen Bellings.
- 2) “Geometrical drawing for Art students”. byMoris.I.H.
- 3) Hand book of Architectural & Civil Drafting by Nelson J.A.

- 4) A text book of Geometrical Drawing by P.S.gill
- 5) Architectural Drafting: Structure & Environment by JohnD.Bies.
- 6) Graphic Science & Design by Thoms. E. French.
- 7) Geometry of Construction by T.B.Nichols and Normal keep.
- 8) Building Drawing by Shah.
- 9) Drawing architecture by Paul Hagarth
- 10) Drawings by architects by Claudius Conli
- 11) Perspective by H. Pranchlay
- 12) Pencil techniques in modern design by Alkin, Urbelleth and Lione
- 13) Perspective: space and design by Lance Bowen Bellings.

ARC1203 HISTORY OF ARCHITECTURE-I

Course Objectives:

- To study development of building forms, ornamentation, structural solutions, construction methods, plans and building facade, organization in relation to aesthetic/ religious/social philosophy and environmental factors in history. The study should focus only on the general trends.

Course Outcome:

- Acquire knowledge to identify the common characteristics among the monuments of a particular style. Acquire graphic skills to present a building, analyse its elements and explain the composition. Acquire knowledge on good practices of architecture in the past.

SYLLABUS

(The Ancient Civilizations)

Architectural development in the ancient civilizations in Egypt and Mesopotamia, study of pyramids, temples, mastabas, ziggurats, etc.

(Classical Period)

Architecture in the classic Greek and roman periods, temples, agoras gateways, circuses, amphitheatres, basilicas, etc.

(Early Christianity)

Architecture in the early Christian, Byzantine.

(The Age of Church Building)

Romanesque, gothic periods in Europe and rest of the world excluding Asia.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

TEXT BOOKS:

- 1) A History of Architecture by Sir Banister Fletcher, CBS; 20 edition (2002)

REFERENCES:

- 1) World architecture – an illustrated history by Trewin Copplstone and others
- 2) Introduction to architecture by Stephen Gardner.
- 3) A chronology of western architecture by Doreen Yarwood
- 4) The great ages of architecture by BodoLichy
- 5) Meaning in western architecture by Christian Noberg Schulz

ARC1204 CARPENTRY AND MODEL MAKING WORKSHOP

Course Objective:

- To Train the students in basic skills of carpentry work and to develop ability to appreciate the three dimensional.
- To prepare the students for better eye- mind- hand coordination and equip them with various model making techniques.

Course Outcome:

With the successful completion of the course student will be able to

- Review various tools and techniques for model making and design model for real life situation

SYLLABUS

(BUILDING MODELS AND CARPENTRY)

Introduction to model making and its need. Role of scale-models in design. Essentials of model making such as understanding of various tools and machines employed. Survey of various materials available for model making such as papers, mount boards, wood, plastics, films, plaster of Paris, acrylic, Styrofoam, wax, metals, glass, etc. and exploring their potential in model-making.

Introduction to the use of different types of tools and different types of joints used in carpentry, Joinery details which are commonly used in timber construction.

Assessment

Three carpentry joinery models (Maximum 25 Marks) and two three dimensional building blocks models for 25M, total marks of (25M+25M) =50M

REFERENCES:

- 1) Criss. B. Mills, Designing with Models
- 2) Wenninger, Spherical Models
- 3) John W. Mills, The Technique of Sculpture
- 4) Carpentry and Joinery by Peter Brett · 2005, Nelson Thornes publishers

ARC1205
BUILDING MATERIALS & CONSTRUCTION-II

Course Objective:

- The objective of the subject is to enable students to understand aspects of materials and construction components/elements for building envelop and interiors

Course Outcome:

With the successful completion of the course student should have capability to:

- Identify and differentiate types of timber, their joinery, finishes, etc.
- Understand the properties and uses of manmade and natural materials.
- Understand and differentiate between various types of openings
- Analyse a design decision situation and come up with correct material choice and construction specification.

SYLLABUS

(Timber as Building Material)

Timber as a building material, its physical properties and uses, defects, seasoning, decay and preservation. Industrial timbers such as ply wood, hard board, block board, particle board, etc. with their properties and uses. Introduction to timber as described in Indian architectural treatises.

(Metals and man-made Building Materials)

Use of Iron in building industry such as pig iron, wrought iron and cast iron their properties and uses. Steel as building material, its definition, properties, Manufacture, casting, heat treatment, mechanical treatment process of steel, market forms of steel, corrosion ant treatment.

Aluminium and aluminium alloys their manufacturing, properties, durability, and uses. Study of aluminium products and other non-ferrous metals such as copper, lead, zinc etc. Study of protection to non-ferrous metals and products such as anodizing, powder coating, painting, chromium plating, varnishing, melamine treatments, etc.

Paints and surface finishes their composition, properties and methods of application of different types of paints such as oil, synthetic enamels, acrylic and other plastic emulsions and formulations, interior and exterior grade paints. Cement based paints.

(Timber joinery)

Carpentry and joinery: Terms defined, mitring, ploughing, grooving, rebating, veneering, various forms of joints in wood work, such as lengthening joints, bearing joints, halving, dovetailing, housing, notching, tusk and tenon, etc. Jamb-casing. Timber joints as described in Indian architectural treatises.

(Doors)

Types of doors based on operation such as swing door, revolving door, sliding door, sliding-folding door. Details of Wooden Doors their definition of terms, types of doors such as ledged, ledged and braced, panelled, flush doors, glazed doors etc. Hinged, single and double shutters. Z section doors, pressed steel and box section doors. Rolling shutters, collapsible gates. Complete aluminium swing, Sliding, sliding folding, and revolving doors. PVC / UPC Doors.

(Windows)

Types of windows based operation and location– fixed window, Casement window, Sliding window, pivoted window, louvered window, bay window, clerestory window, corner window –gable and dormer window, etc. Details of Timber windows and ventilators such as ordinary casement, top and bottom hung, pivoted and sliding sash with fixtures, locks, hinges, fastenings, etc. Z section window, pressed steel and box section windows. Aluminium casement and sliding windows. PVC / UPC windows.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

TEXT BOOKS:

- 6) W.B. Mc Kay, Building Construction Volume 1 to 4
- 7) R. Barry, Building Construction Volume 1 to 5
- 8) Francis Ching D.K., Building construction illustrated
- 9) S.K. Sharma, Civil Engineering construction Materials
- 10) Sushil Kumar, Building Construction

ARC1206 STRUCTURAL MECHANICS-II

Course Objective:

- To study the bending, shear stress distribution and combined stresses in beams for different symmetrical and unsymmetrical sections.
- The relation between slope, deflection and curvature and deflection of statically determinant beams for different loadings. Analysis of statically in determinant beams and Three-Hinged arches.

Course Outcome:

- The student will be in a position to calculate/access the variation of internal forces in a beam along the section of a beam for different cross-section; the deflection limits in a member.
- The variation of shear force and bending moment along the length of the continuous beams. The behaviour of three hinged arches subjected to different loadings.

SYLLABUS

(THEORY OF SIMPLE BENDING)

Theory of simple bending; $\frac{M}{I} = \frac{f}{y} = \frac{E}{R}$, application of flexural formula.

(BENDING STRESSES IN BEAMS)

Bending and Shearing stresses distribution in beams for different sections. Combined stresses (direct and bending stresses) of symmetrical and unsymmetrical sections-beams only.

(DEFLECTION OF BEAMS)

Deflection of beams (with supports at the same level): Relation between slope, deflection and curvature, Deflection of cantilever beam and simply supported beam with uniformly distributed load and point loads only using double integration method and moment area method.

(PROPPED CANTILEVER BEAMS)

Propped cantilever beams (with supports at the same level): Shear Force and Bending Moment diagrams of propped cantilever beams with uniformly distributed load and point loads only.

(ANALYSIS OF BEAMS AND FRAMES)

Analysis of beams and frames (with supports at the same level): Bending Moment (BM) & Shear Force (SF) diagrams for fixed beams and Continuous beams with uniformly distributed load and point loads only. Application of Clapeyron's theorem of three moments, Moment distribution method for continuous beams, Kani's method of analysis for structural frames (single storey single bay) including sway with uniformly distributed load and point loads only.

(THREE HINGED ARCHES)

Three Hinged Arches (with supports at the same level): determination of horizontal thrust, radial shear, normal force, and axial thrust. Shear force (SF) and bending moment (BM) diagrams for three-hinged arches.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be $(20M+10M) = 30M$

TEXT BOOKS:

- 1) Analysis of Structures - Analysis, Design and Details of Structures-Vol.-1 by V.N. Vazirani and M.M. Ratwani and S.K. Duggal
- 2) Analysis of Structures - Theory, Design and Details of Structures-Vol.-2 by V.N. Vazirani and M.M. Ratwani and S.K.Duggal

REFERENCES:

- 1) Basic structural analysis by C.S. Reddy
- 2) Intermediate Structural analysis by C.K.Wang
- 3) Theory of Structures by S. Ramamrutham and R.Narayanan
- 4) Elements of strength of materials by S.P.Timoshenko & D.H.Young

ARC1207
ENGLISH LANGUAGE LAB

Introduction

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of the English language in everyday situations and contexts.

Course Objectives

- To make students recognize the sounds of English through Audio-Visual aids.
- To help students build their confidence and help them to overcome their inhibitions and self-consciousness while speaking in English. The focus shall be on fluency.
- To familiarize the students with stress and intonation and enable them to speak English effectively.

Course Outcomes

- Students will be sensitized towards recognition of unique English sound pattern and the fluency in speech will be enhanced.
- A study of the communicative items in the laboratory will help the students become successful in the competitive world.
- Students will be able to express themselves fluently and accurately in social as well professional context.
- Students will be able to participate in group activities like roleplays, group discussions and debates.

(UNIT-I)

Introduction to Phonetics: The Sounds of English (Speech sound – vowels and consonants)
- Stress and Intonation - Accent and Rhythm.

(UNIT-II)

Listening Skills: Listening for gist and specific information - listening for Note taking, summarizing and for opinions - Listening to the speeches of eminent personalities.

(UNIT-III)

Speaking Skills: Self-introduction - Conversation Skills (Introducing and taking leave) - Giving and asking for information - Role Play - Just A Minute (JAM) session - Telephone etiquette.

(UNIT-IV)

Reading and Writing skills: Reading Comprehension–Précis Writing - E-Mail writing - Punctuation.

(UNIT-V)

Presentation skills: Verbal and non-verbal communication - Body Language - Making a Presentation.

DISTRIBUTION AND WEIGHTAGE OF MARKS

The practical examinations for the English Language Lab shall be conducted as per the University norms prescribed for the core Engineering practical sessions.

For the Language lab sessions, there shall be a continuous evaluation during the semester for 50 sessional marks and 50 semester-end Examination marks.

For the 50 sessional (Internal) marks, 30 marks shall be awarded for day-to-day performance and for completing activities in the lab manual, 20 marks to be awarded by conducting Internal Lab Test(s).

For the 50 semester- end (External) marks, 30 marks shall be awarded for written examination (dialogues, the sounds of English and stress) and 20 marks for External Examiner viva-voce.

REFERENCE BOOKS:

- 1) Ashraf Rizvi. *Effective Technical Communication*. Tata McGraw Hill Education Private Limited, New Delhi.
- 2) *Speak Well*. Orient Blackswan Publishers, Hyderabad.
- 3) Allan Pease. *Body Language*. Manjul Publishing House, New Delhi.

UNIVERSAL HUMAN VALUES

(Non-credit mandatory courses)

The objective of the course is four fold:

- Sensitization of student towards issues in society and nature.
- Understanding (or developing clarity) of nature, society and larger systems, on the basis of human relationships and resolved individuals.
- Strengthening of self-reflection.
- Development of commitment and courage to act.

Course Outcomes:

- At the end of the course, students are expected to become more aware of their surroundings, society, social problems and their sustainable solutions, while keeping human relationships and human nature in mind.
- They would have better critical ability. They would also become sensitive to their commitment towards what they believe in (humane values. humane relationships and humane society).
- It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

The focus is on understanding society and nature on the basis of self and human relationships

- Ideas of self, pre-conditioning, and natural acceptance.
- Harmony in the self. Understanding human being as co-existence of self and body. Identifying needs and satisfying needs of self and body. Self-observations. Handling peer pressure.
- Nine universal values in relationships. Reflecting on relationships in family. Hostel and institute as extended family. Real life examples.
- Teacher-student relationship. Shraddha. Guidance. Goal of education.
- Harmony in nature. Four orders of nature – material order, plant order, animal order and human order. Salient features of each. Human being as cause of imbalance in nature. (Film “Home” can be used.)
- Human being as cause of imbalance in nature. Depletion of resources – water, food, mineral resources. Pollution. Role of technology. Mutual enrichment not just recycling.
- Prosperity arising out of material goods and understanding of self. Separation of needs of the self and needs of the body. Right utilization of resources.
- Recapitulation on society. Five major dimensions of human society. Fulfillment of the individual as major goal. Justice in society. Equality in human relationships as naturally acceptable. Establishment of society with abhaya (absence of fear).
- Ethical human conduct. Values, character and naitikataa.
- Professional ethics. Conduct as an engineer / architect / scientist.
- Holistic human being through holistic education in just order.

The mode of conduct would primarily be through group discussions in small groups. There would be no formal lectures in the course. In some group discussion sessions, the faculty mentor would introduce a topic and initiate the discussion. While analysing and discussing the topic, the faculty mentor’s role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students focus on the important or critical elements. In other group discussion sessions, there would be more “speaking out” and sharing by students.

While discussing different topics, the mentor encourages the student to connect with one’s own self and do self-observation. Scenarios may be used to initiate discussion. The student is encouraged to take “ordinary” situations rather than “extra-ordinary” situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting. It would be preferable to conduct the course in the mother tongue of the student. This helps connect with the student much better, and also because the Indian languages are much richer than English while describing and discussing the “self”.

Experiments or practical are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included.

The group discussions would also provide support to a student in performing actions commensurate to his/her beliefs. Hopefully, this would lead to development of commitment, namely behaving and working based on one’s beliefs (or values).

REFERENCE BOOKS:

- 1) *R R Gaur, R Sangal, G P Bagaria, Human Values and Professional Ethics*
- 2) *A Nagaraj, Jeevan Vidya: Ek Parichaya*
- 3) *A.N. Tripathi, Human Values*
- 4) *Life and Philosophy of Swami Vivekananda*
- 5) *Swami Vivekananda on Himself*
- 6) *Dharampal, Rediscovering India*
- 7) *Mohandas K. Gandhi, Hind Swaraj or Indian Home Rule*
- 8) *Maulana Abdul Kalam Azad, India Wins Freedom*
- 9) *Paramhansa Yogananda, Autobiography of a Yogi*

ARC2101

ARCHITECTURAL DESIGN II

Course objectives:

- This Course is designed to develop the skills of creative design synthesis for a single use, small span, single storey building.
- To study theory of Architecture; principles of design & its process; analytical classification of spaces for different uses and their relation to one another;
- Study of horizontal circulation in buildings
- Understanding of the bye-laws and codes involved in the design of the building typology prescribed for the course

Course Outcome:

- The student will be able to understand the iterative process of the architectural design of defining the problem, collecting information, analysing towards developing a solution after acquiring a feedback revisiting the design to improve.

Course content:

The design issues to be addressed include:

- Functions and their spatial implications.
- Maximum and optimum areas for various functions.
- Anthropometrics, furniture layout and horizontal circulation.
- Interior volumes and material qualities.
- Lighting and ventilation.
- Integration of form and function.

The list of suggested topics to be covered as design problems including:

Child care center, Kindergarten School, Primary Health Centre, Doctor's Clinic, Cafeteria, Village Post Office, Bank (branch office). Police Station, Beauty parlor/Salon Architect's Office, Department Store, School Gymkhana & Youth Club, or any other building of single storey.

The topics not covered as design problems could be covered by the Studio faculty members through lecture/slide to enhance their knowledge base and approach towards design issues and process.

At least one major exercise and two minor design/time problems should be given. The final submission shall necessarily include a model.

Assessment

Continuous assessment will be conducted for major (30M) minor (20M) design time problems i.e., total marks of (30M+20M) =50M.

References:

- 10) Time savers standards of Building Types-Joseph de chiara & others.
- 11) A History of Building Types-Nikolays Pevsner.
- 12) Architect's Data-Ernst Neufert.
- 13) Architect's Hand book-Charanjit. Shah
- 14) Doctor's offices & Clinics-Paul Hayden Kirk, Engene D. Sternberg.
- 15) A History of Building Types-Nikolays Pevsner. Architect's Data-Ernst Neufert
- 16) National Building code

ARC2102
HISTORY OF ARCHITECTURE -II

Course Objective:

To enable students to understand:

- How different architecture solutions were evolved within the restraints imposed by prevalent social and cultural setup, available building materials, climate and geography of particular region.
- Insight of the evolution of architecture in Indian subcontinent and orient.

Course Outcome:

- Student will gain knowledge on various Indian architecture styles as a response to the political and socio-cultural conditions in India at different time periods. The course sensitizes the analogy and appreciation of the then architectural, structural manifestations.

SYLLABUS

(Harappan and Vedic Architecture)

Architecture and town planning of Harappan civilization such as towns of Lothal, MohenjoDaro, Dholavira, Kalibanga etc. Understanding of Vedic architecture, and settlements.

(Buddhist and Jain Architecture)

Architectural examples of Mahayana and Hinayana Buddhism; Rock-cut and free standing. Study of caves, stupas, and viharas of places like Sanchi, Amravati, Karle, Ajanta etc. Medieval Jain temple architecture of western India.

(Hindu Architecture)

Elements of Hindu Temple. Development of temple form from example like Ladh Khan, Temple at Deogarh, Bhattargaon Temple.

(North Indian Temple Architecture)

Architectural character of Gupta Temples - Architecture style of Orissan temple with examples. - Khajuraho group of Temples, and - Architectural character of Gujarat Temples.

(South Indian Temple Architecture)

Pallava, Chola, Pandyas, Madura and Vijayanagar style with examples.

(Indo-Islamic Architecture)

Special features of Mosque and Tomb Influences of Indo-Islamic Architecture in India Use of arches, vaults, domes, squinches, pendentives, jaalis, minarets, etc. Special features: use of landscape, water bodies and gardens. Ornamentation in structures with interplay of materials such as stones, mosaics, gildings.

(Sultanate Architecture & Provincial Styles of Sultanate Period)

Sultanate Architecture: Slave Dynasty, Tughlaq Dynasty, Lodhi Dynasty. Provincial Styles of Sultanate Period: Punjab, Bengal, Jaunpur, Gujarat, Malwa, Bijapur and Golconda with examples.

(Mughal Architecture)

Mughal Style prevalent during the reign of a) Babur; b) Humayun; c) Akbar; d) Jahangir; e) Shah Jahan.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Textbooks:

1. Indian Architecture by Percy Brown. (Buddhist and Hindu period)
2. Indian Architecture by Percy Brown (Islamic Period).
3. The Architecture of India by Satish Grover. (Buddhist and Hindu period)
4. The Architecture of India by Satish Grover (Islamic Period).

References:

1. Art Architecture of India by Benjamin Rowl.
2. The history of Architecture in India by Christopher Tadgell.
3. Vistara: The Architecture of India, The festivals of India, Tata Press Limited 1986.
4. Nath – History of Mughal Architecture
5. Banister Fletcher, History of Architecture

ARC2103
BUILDING MATERIALS & CONSTRUCTION-III

Course Objective:

- The objective of the subject is to enable students to understand the building materials and basic Sub structure and Super Structure structural systems
- PCC and RCC material components and construction specifications and steps.
- Indian standards for RCC work, reinforcement detailing etc.

Course Outcome:

With the successful completion of the course student should have capability to:

- Understanding the method of executing of framework, shuttering and scaffolding.
- Understand what type of details would be needed for a particular RCC/PCC work and
- Understand planning and execution of staircase
- Analyse a design decision situation and come up with correct material choice and construction specification

SYLLABUS

(BUILDING MATERIALS)

Concrete; types, grades, mixing and setting process, workability and other tests, admixtures and additives. Plain and reinforced. Steel section, steel bars, properties, manufacturing process, Indian standards, strength, joining, fabricating.

(FOUNDATION AND COLUMN)

Functions of Foundations, requirements and types of foundations, Site investigations, SBC test for Design of Foundations, Foundations in Special Situations (for very Low SBC Values, Foundations Close to Existing Building, Foundations required in water logged areas etc.,). Reinforcement, spacing, RCC Grade mix details for all types of foundations. Reinforcement details of R.C.C. square, rectangular and circular columns.

(BEAM, SLABS, LINTELS)

Introduction to beams, Slabs and Lintels, Standard Sizes, Spacing, Grade mix details as per Latest IS Codes, Reinforcement and details for lintels and projections (Chajja). Reinforcement and details of R.C.C. beams: simply supported, rigid, continuous and cantilevered. Reinforcement and details for one-way and two-way slabs with fixed continuous and cantilever end conditions.

(STAIRCASE)

Introduction, terminology used in staircases, requirements for good staircase, Types of staircases, calculations for riser and treads, reinforcement and details for various types of staircases. NBC Code

(FORMWORK, SHUTTERING, SCAFFOLDING)

Formwork for square, rectangular and circular columns. Scaffolding. Shuttering and centring beams, slabs and staircase. Shoring such as raking shores, flying shores and dead shores. Underpinning.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for assignment (Including Drawing assignments) and continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

TEXT BOOKS:

- 9) W.B. Mc Kay, Building Construction Volume 1 to 4
- 10) R. Barry, Building Construction Volume 1 to 5
- 11) Francis Ching D.K., Building Construction Illustrated
- 12) S.K. Sharma, Civil Engineering construction Materials
- 13) Sushil Kumar, Building Construction
- 14) Building Construction , SS Bhavikatti
- 15) Building Construction , PC Varghese

ARC2104 BUILDING SERVICES-I (Water Supply & Sanitary Engineering)

Course Objective:

The objective of the subject is to enable students to understand and apply

- To understand the need for and importance of building services.
- Fundamentals of water supply, drainage, sewerage system and solid waste disposal.
- Water distribution systems and its requirements at different scales such as building, site, neighbourhood, etc.
- Sanitation and its layout requirements at different scales such as building, colony and neighbourhood.
- Calculations and disposal of rainwater and solid waste disposal.

Course Outcome:

With the successful completion of the course student should have capability to:

- Interact technically with water supply and sanitation experts.
- Design efficient water supply layouts with detail calculations.
- Design sanitation layouts.
- Design rain water disposal and rain water disposal drawings.

SYLLABUS

(IMPORTANCE OF BUILDING SERVICES)

The need and importance of building services. Historical overview of water supply, plumbing and sewerage systems in India and worldwide.

(WATER SUPPLY)

Sources of water, Quality of water, impurities in water and its treatment. qualities of potable water. Water demand calculations; norms and standards. Water storage, overhead tank, and sump.

Water distribution system at city/ neighbourhood overview. Water treatment plant. Types of water distribution networks. Water pipe materials, apparatus, joints, fixtures, and valves. Guidelines for laying of water mains, distribution.

Cold & hot water lines in buildings, Water supply to high rise buildings: problems encountered & systems adopted.

(BUILDING SANITATION)

Principles of sanitation, collection, and disposal of various kinds of refuse from buildings. Methods of carrying refuse, systems of refuse disposal, their principles.

Plumbing definitions and related terms, building sanitation systems (separate, combined, single stack, one pipe and two pipe, etc.), House drainage system, Drainage of sub-soil water. Design calculations of septic tank, soak-pits, cesspools, aqua-privy, leeching pits etc. Study of details of types of traps and chambers (inspection chamber, disconnecting chamber, intercepting trap, S-trap, P-trap, gully trap, grease trap etc; and sanitary fixtures (washbasins, WCs, bathtubs, urinals, flushing cistern, etc. Types of pipes and joints. Design principles of sanitary layout (location and ventilation of chambers, traps, fixtures).

(STORM WATER DISPOSAL SYSTEM)

Surface area division for rain water disposal. Details of collection point/Khurra. Conveyance network for rain water (catch basin, gully traps, etc.). Calculation for rain water quantity, gradients, section of drains etc. Concepts of rainwater harvesting.

(DRAWING AND MARKET SURVEY)

Market survey for pipes, fittings and fixtures, traps etc. To prepare water supply and sanitary design project for a small building such as residence, primary school etc. Output for water supply design will be in the form of water quantity calculations, flow calculations and pipe diameter calculations. Water supply layouts from municipal supply to storage tank. Also design network for hot and cold water supply in the selected building in the form of plans and sectional elevations. Output for Sanitary design will be in the form of gradient and pipe diameter calculations. Layout design with details of all chambers and traps for building and site in the form of plans and sectional elevations.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for assignment and continuous assessment i.e. total marks will be (20M+10M) =30M.

TEXT BOOKS:

- 1) Rangwala, Water Supply and Sanitary Engineering
- 2) Kshirsagar, Water Supply and Sanitary Engineering
- 3) Shah, Water Supply and Sanitation
- 4) Patil, Plumbing Engineering
- 5) Indian Code Council, International Plumbing Code
- 6) P.N. Khanna, Indian Practical civil Engineers' Handbook

ARC2105 CLIMATOLOGY-I

Course Objective:

- It is Science that explores aspects of human comfort and energy efficiency in built environment for sustainable habitat. Tools, data, standards, methods and principles for design of climate responsive built environments, are dealt particularly for tropical climates found in India.

Course Outcome:

- It equips the student with the basic understanding of climatic types in India and initiatives of Sustainable Habitat mission; introduces basic science of human comfort and energy efficiency in buildings; familiarize with the data, methods, principles, standards and tools for planning and designing for climate responsive built environment and human comfort.

SYLLABUS

(Introduction to Building Climatology)

Global climatic factors, Elements of climate and graphic representation of climatic data, macro and micro climate, Climate control elements of building, Climate and built form interaction, Mahoney Tables.

(Tropical Climates)

General classification of tropical climates, Indian classification of climate, Characteristics of different climatic zones and design considerations, Traditional built forms with respect to climatic and cultural conditions.

(Human Comfort)

Elements of heat exchange between man and environment, Physiological and sensory responses, Biophysical effects of environmental factors, Thermal and visual comfort factors, indices/charts.

(Building Envelope)

Heat flow through buildings, Periodic heat flow, Elements of building related to control of solar radiation and ventilation, Thermo physical properties of different materials, Principles of light and Day-lighting, Elements of building related to daylight.

Note:

Understanding climate data, its analysis and method of presentation, Study of traditional/vernacular architecture in relation with culture and climate of the study region, Study of conventional building envelope to assess comfort factors and undertake retrofitting/redesign for given parameters.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for assignment and continuous assessment i.e. total marks will be (20M+10M) =30M.

TEXT BOOKS:

- 1) Manual of Tropical Housing and Building by Koenigsberger, Ingersoll, Mayhew, Szokolay.
- 2) Man, Climate and Architecture by B. Givoni,
- 3) GRIHA Manuals Volume 1-5, Ministry of New and Renewable Energy, Govt. of India
- 4) Energy Conservation Building Code, Bureau of Energy Efficiency, India

REFERENCE BOOKS:

- 1) Design for Hot Climates by Konya Allan,
- 2) Tropical Architecture by Kukreja, C.P.,
- 3) Buildings, Climate and Energy by Markus T.A., Morris E.N,
- 4) Solar Control and Shading Devices by Olgyay A., Olgyay V.,
- 5) Sun, Wind and Light by Brown G.Z.,
- 6) Climate Responsive Architecture by Arvind Krishnan, Nick Baker, SimosYannas, S.V. Szokolay,
- 7) Website: <http://www.gsa.gov/portal/category/21049>

ARC2106
STRUCTURAL MECHANICS -II

Course objectives:

- To study the theory and behaviour of columns for axially loaded and biaxially loaded columns for symmetrical and unsymmetrical sections.
- The variation of shear force and bending moment at a point for moving loads.
- types of forces acting on a retaining wall under different field conditions.
- Plastic analysis of beams and frames for different loading conditions.

Course outcome:

- The student will be in a position to estimate/access the minimum dimensions of columns required for a building and the stresses induced in a column section subjected to axial and biaxial loading.
- Understanding the effect of point load, uniformly distributed load on shear force and bending moment at a particular point on a beam.
- Behaviour of retaining walls due to different forces under different field conditions.
- Application of Plastic analysis to limit state design of beams subjected to bending in steel structures.

SYLLABUS

(COLUMNS AND STRUTS)

Columns and struts: Buckling and crushing failures, types of end conditions, Euler's theory & equivalent length and slenderness ratio. Rankine's equation and IS code formula for critical load on columns.

(DIRECT AND BENDING STRESSES-COLUMNS)

Direct and bending stresses, eccentricity about both axes, symmetric and unsymmetrical sections-Columns.

(INFLUENCE LINE DIAGRAMS)

Influence Line Diagrams of statically determinate beams only.

- a) A single concentrated load
- b) uniformly distributed load (UDL) longer than the span
- c) uniformly distributed load (UDL) shorter than the span

(RETAINING WALLS)

Retaining walls, Types of retaining walls, Active Pressure, Passive Pressure, State of equilibrium in soil, Theories of Earth Pressure, Rankine's theory, Coloumb's theory, Earth pressure on retaining walls due to submerged soil (with horizontal backfill, horizontal surcharge only). Stability analysis of gravity type and Cantilever type retaining walls only.

(PLASTIC ANALYSIS OF STRUCTURES: INTRODUCTION)

Plastic Analysis: Introduction to Plastic analysis, Plastic bending of beams, Plastic Hinge, Moment curvature relationship, Shape factor and Load factor. Determination of shape factor for standard cross sections: Rectangle, Triangle, Diamond and Circle and Numerical problems for symmetric and unsymmetrical sections.

(PLASTIC ANALYSIS OF STRUCTURES: PLASTIC ANALYSIS)

Fundamental conditions for Plastic analysis, Mechanism, Upper and Lower bound theorems, Uniqueness theorem, Static method and Kinematic method, Plastic analysis of simply supported, fixed, continuous beams and Frames (single bay single storey) for point load, UDL and unsymmetrical point load.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be $(20M+10M)=30M$

TEXT BOOKS:

- 1) Analysis of Structures - Analysis, Design and Details of Structures-Vol.-1 by V.N. Vazirani and M.M. Ratwani and S.K.Duggal
- 2) Analysis of Structures - Theory, Design and Details of Structures-Vol.-2 by V.N. Vazirani and M.M. Ratwani and S.K.Duggal

REFERENCES:

- 1) Limit State Design of Steel structures by S.K.Duggal, Publishers: McGraw-Hill Education.

ARC2107 COMPUTER APPLICATIONS-I

Course Objective:

The objective of the subject is to enable students to understand and apply

- Basic CAD skills to create simple and complex two dimensional geometric forms.
- CAD skills to create technically correct and presentable drawings.
- Skills to create technically correct and presentable three dimensional building models.
- Skills to render and animate building models.

Course Outcome:

With the successful completion of the course student should have capability to:

- Grasp 2 D CAD drafting
- To transform sketches and manually drafted drawings into CAD drawings.
- Prepare presentation drawings with the help of computer software's.
- Visualize building / transform sketches and 2 dimensional CAD drawings to 3 dimensional building models and walkthrough.
- Execute photo realistic rendering of the building project.
- Prepare walkthroughs.

SYLLABUS

(INTRODUCTION TO 2D DRAFTING & 2D DRAFTING TOOLS)

Introduction to computer aided 2-D drafting. To develop and understand basic set up and menu bars for computer aided drafting. Screen Layout- status bar, tool bar, graphics area, labelled buttons, drawing editor, file handling commands (utility commands). Setting units and scale.

Drafting simple and complex geometric shapes such as squares, circles, triangles, lines, curves, poly lines and their combinations etc. Application of various toolbars and their sub tools including draw, edit, modify, view, file, dimension, parametric, etc.

(2D DRAFTING OF BUILDING & 2D PRESENTATION DRAWINGS)

Preparation of two dimensional architectural drawings (including plans, elevations and sections) incorporating layers, line-weights, texts, scale, dimensioning and formatting of drawings for taking prints and plots.

Preparation of two dimensional architectural presentation drawings (including plans, elevations and sections) incorporating human figures, plants, car etc. Preparation of two dimensional architectural presentation drawings (including plans, elevations and sections) incorporating grid, column, dimensioning, legend and architectural elements details with proper line weight etc.

Practical Work: Making 2-dimensional architectural plan, elevation and sections for any one of the architectural design assignments studied in previous semesters with submission in the form of printouts in scale.

(3D MODEL OF BUILDING & PHOTO REALISTIC RENDERING)

Understanding and converting plan, elevation and section of drawing to three-dimensional building model using three dimensional tools (Ex: Sketch up or 3D MAX). Creating building models using building elements and then converting model to orthographic projections.

Making models photorealistic using materials, lighting, texture, background, etc. Creating new materials and environment attributes.

(WALK THROUGH OF INTERIOR/EXTERIOR)

Create interior walkthroughs for small spaces such as bedroom, office etc. by adding scenes, furniture, texture, finishes with lighting effect and camera angles. Create building exterior walkthroughs by adding scenes, trees, human figures, cars, sun light effect and camera angles.

Practical Work: Making Three- dimensional photorealistic rendered architectural models for any one of the architectural design assignments completed in previous semesters and to create walkthrough of the same.

Software for References

- 1) AutoCAD Student Version
- 2) Autodesk Revit
- 3) Sketch-Up
- 4) Paint 3D
- 5) 3D Max
- 6) 3D Home architect
- 7) Archi-Cad
- 8) Maya

ETHICS

Course Objectives:

- To help students regulate their behaviour in a professional environment as employees.
- To make students aware of the impact of taking non-ethical engineering decisions.
- To understand that mind and desire control is needed for being ethical.
- To understand organizational culture and to adapt to varying cultures without compromising ethical values

Course Outcomes:

On completion of this course, students should be able

- Realize the importance of human values.
- Understand that excessive desires of the mind make a person unethical and restless, while fewer desires lead to peace and professional progress.
- Assess different types of risks involved in unethical practices. Know various means of protesting against unethical practices.
- Assess the benefits of restraining from unethical practices like bribery, extortion, nepotism, nexus between politicians and industrialists.
- Summarize case studies of ethical violations in Chernobyl meltdown, Challenger disaster, Ford Pinto design, Kingfisher Airlines financial misappropriation.

(Introduction To Terminology in Ethics)

Integrity, Honesty, Courage, Empathy, Personality, Character, Self-Confidence, Respect for Others –Work culture, social responsibility, Responsibilities as a citizen, Cooperation and commitment –Religion vs. Spirituality, Philosophy, Customs and practices –Self-interest, Fear, Deception, Ignorance, Ego, Uncritical acceptance of authority.

(Mind And Its Mysteries)

What is Mind? Mind and body, Mind and food Mental faculties– Theory of perception, Memory, Imagination, Thought–Culture, Desires– Cultivation of Virtues, Control of Senses and Mind– Concentration, Meditation and Enlightenment.

(Risk And Safety in Engineering)

Estimating risk –What is acceptable risk? –Architects liability, Changing legal rights of the employees by non-participation, by protest– Environmental laws and judicial intervention in related matters.

(Non-Ethical Practices in Vogue)

Conflict of Interest, Occupational crime– How multinational corporations influence government decisions, public policy–Architects as managers, advisors and experts, Architects as moral leaders–Problem of bribery, extortion, grease payments, nepotism –Nexus between politicians and industrialists. Case Study: Chinese Minister Sentenced to Death for Corruption.

(Case Studies –Variety of Moral Issues In Profession)

Chernobyl nuclear disaster, Fukushima reactor meltdown, Challenger blow-up, Ford Pinto design, Highway safety, Kingfisher Airlines financial misappropriation.

TEXT BOOKS:

1. Charles E Harris, Micheal J Rabins, Engineering Ethics, Cengage Learning Pub.
2. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill Pub.
3. Swami Sivananda, Mind, Its Mysteries and Control, Divine Life Society

ARC2201 ARCHITECTURAL DESIGN II

Course objectives:

This Course is designed to develop an Understanding design issues, formulating concepts and the skills of creative design synthesis for a small scale multi_ use buildings and more than a single floor building.

- To understand the design issues like Functions and their spatial implications
- Analytical classification of spaces for different uses and their relation to one another;
- Anthropometrics, furniture layout and horizontal and vertical circulation; Interior volumes and material qualities;
- Lighting and ventilation and Integration of form and function.
- Understanding of the bye-laws and codes involved in the design of the building typology prescribed for the course.

Course content

The design issues to be addressed include:

- Functions and their spatial implications in a multi-use building.
- Anthropometrics, furniture layout and horizontal and vertical circulation.
- Understanding the interior volumes ,material qualities and integration of form and function.
- Bye-laws and codes of the buildings that are taken up for design project sensitizing them towards inclusive design and the norms followed.

The list of suggested topics to be covered as design problems including:

Motels/ Hotel, Hostels, Police station, Office building, Apartments, and another building that is multi use and more than one floor buildings.

At least one major exercise and one minor design/time problems should be given. The final submission shall necessarily include a model for the main problem.

Assessment

Continuous assessment will be conducted for major (30M) minor (20M) design problems i.e., total marks of (30M+20M) =50M

Course outcome:

The student will be able to acquire the design skills such analysis, synthesis, conceptualisation.

REFERENCES:

- 1) Time savers standards of Building Types-Joseph de chiara & others.
- 2) A History of Building Types-Nikolays Pevsner.
- 3) Architect's Data-Ernst Neufert.
- 4) Architect's Hand book-Charanjit. Shah
- 5) National Building code

ARC2202
HISTORY OF ARCHITECTURE -III

Course Objective:

To enable students to understand:

- Significant developments in Modern Architecture with the advent of steel, Glass and Ferro-concrete;
- Different schools of thought along with understanding of various architectural philosophies and works of 20th century contemporary architects in India and abroad.

Course Outcome:

The student will gain an in-depth knowledge of

- Modern Architectural philosophies in the evolution of innovative architectural forms and advent of new modern building materials.
- Indian architecture styles as a response to the political and socio-cultural conditions in India at different time periods.
- The course sensitizes the analogy and appreciation of the then architectural, structural manifestations.

SYLLABUS

(Introduction, Advent of Steel, Glass and Ferro-Concrete)

Late Renaissance and development of open spaces Advent of Steel and Henry Labrouste Great Exhibitions of 1851 and 1889 and their contributions Gustave Eiffel Development of Ferro concrete: Auguste Perret, Tony Garnier.

(Development of 'New Art & Architecture)

Le Art Nouveau movement and Victor Horta H.P. Berlage, H. H. Richardson and 'True Construction' Balloon Frame Structure and Plane Surfaces in America.

(Chicago School & Organic Developments)

Chicago School: Louis Sullivan
Organic Architecture: Frank Lloyd Wright

(Programmatic Functionalism)

Walter Gropius and Bauhaus, Le Corbusier

(Development of International Style)

Mies van der Rohe, Philip Johnson, Louis I Kahn

(20th Century World Architecture)

Works of some master architects like, Eero Saarinen, Alvar Aalto, Oscar Niemeyer, Richard Neutra, Norman Foster, Antonio Gaudi, Frank O. Gehry, I. M. Pei, Kenzo Tange

(INDIAN ARCHITECTURE)

Revival of Indian Architecture under British patronage - Architecture in Colonial India. Indian architecture since independence, B. V. Doshi, Charles Correa, Raj Rewal, A. P. Kanvinde , Laurie Baker.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for assignment and continuous assessment i.e. total marks will be (20M+10M) =30M.

TEXTBOOKS:

- 1) Introduction to Indian Architecture by Binda Thapar
- 2) Modern Architecture, Vol 2 of History of World Architecture by Manfredo Tafiri and Franscesco Dal Co
- 3) Makers of Modern Architecture, Vol II, from Le Corbusier to Rem Koolhaas by Martin Filler
- 4) Modern Architecture in India by Sarabjit Singh Bagha

REFERENCES:

- 1) History of Modern Architecture by Leonardo Benevolo.
- 2) Space, Time and Architecture: The growth of a New Tradition by Sigfried Giedion.
- 3) Contemporary Architecture by Ann Lee Morgen and Colin Mayer.
- 4) After the Masters by Vikram Bhatt.
- 5) Architecture of Independence by John Lang, Mickey Desai, Madhavi Desai.
- 6) Post-Independence Architecture by S.S.Bahga.
- 7) The language of Post-Modern Architecture by Charles Jencks.
- 8) The Architecture of the City by Aldo Rossi.

ARC2203

BUILDING MATERIALS & CONSTRUCTION-IV

Course Objective:

The objective of the subject is to enable students to understand:

- Large span truss components and construction details.
- Use of materials like steel, aluminium, glass, gypsum in interiors and exteriors; their construction and to enable them to represent same through technical drawings.

Course Outcome:

With the successful completion of the course student should have capability to:

- Make a decision which type of construction detailing will be required for a given type of roofing depending on interior and exterior situation and make drawings for the same.
- Understand design and execute false ceiling with different materials.
- Understand and execute glass as material.
- Understanding different wall treatments and prepare detail drawings.

SYLLABUS

(STEEL TRUSSES & ROOFING)

Types and fixing details of steel trusses–saw tooth, roof truss with north light glazing, simple trusses in steel, and ways of fixing and connections (to foundations, steel stanchions, and beams etc.). Space frames (single, double & triple layered tubular space frames with globe connections). Types of materials and details of industrial buildings, warehouse, and other building typologies.

(PARTITIONS, GRILLS AND PANELS)

Study of various types of aluminium and wooden partitions, its extrusions, and fixing details. Different types of wooden, aluminium panels, cladding components for various types' of buildings and structures. Aluminium, glass, and steel grill modules.

(FALSE CEILINGS)

Types and fixing details of various materials for suspended ceilings and false ceilings using aluminium and other material sections). Construction details for providing thermal insulation in cold storages. Types of insulation materials and fixing details of materials like glass wool, insulating boards, gypsum boards, plaster of paris, and various kinds of perforated boards.

(GLASS)

Various techniques to use glass and glass blocks with fixing details (structures like pavilions, greenhouses, staircases, multi storied buildings–curtain walls, roofing, panels).

(WALL TREATMENTS AND FINISHES)

Types and fixing details of sound absorbing materials such as acoustic plastic, acoustic tiles, wood, partition board, fibre board, cork, quilts and mats spun glass foamed glass, cork, gypsum, plaster of Paris, hydride gypsum properties, its properties (porous, baffle and perforated materials) and applications (vapor barriers, rigid insulations, blanket, poured and reflective insulation). Study of relevant IS codes, Study of damp-proofing materials such as Bitumen felts, etc. chemicals for W.P.C. &O.P.C etc.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M) =50M

TEXT BOOKS:

- 1) S.P. Arora & Bindra, A Textbook of Building Construction
- 2) J. Jha & S.K. Sinha, Building Construction
- 3) M.S. Shetty, Concrete Technology
- 4) Dr. B.C. Punmia, A Textbook of Building Construction
- 5) T.D. Ahuja and G.S. Birdie, Fundamentals of Building Construction
- 6) S.P. Arora and S.P. Bindra, A Textbook of Building Construction

ARC2204
BUILDING SERVICES-II
(ACOUSTICS)

Course Objective:

- To study Basic laws and terminologies related to Acoustics, Acoustical requirements of a given activity, its calculations and designing of the space.
- Urban noise control and its application at site and building level.

Course Outcome:

- Understand the basics of acoustics.
- Develop capability to apply the fundamentals of acoustics in the design of building.
- Communicate with technical accuracy in a professional and an academic environment.

SYLLABUS

(INTRODUCTION TO ACOUSTICS)

To understand the need for and importance of acoustics in various building typologies, the history of acoustics, works of pioneers. Understanding of terminologies, definitions of key concepts such as propagation, reflection, absorption, diffusion, velocity, intensity, and intensity levels etc. Introduction to properties of sound, decibel scale, directionality and sound sources, hearing noise effects, diffraction and reflection resonance, echo, and reverberation. Classification of Sound Waves. Sensibility of human ear. Free field conditions and Inverse Square Law for noise reduction with distance.

(ACOUSTICS FOR AN ENCLOSURE / BUILDING DESIGN)

Reverberation Time and its importance for acoustical performance of an enclosure. Sabin's Equation and its application for designing new auditoriums and correcting RT of existing ones. (Classroom exercise)

Acoustical defects in an auditorium and their remedies. Acoustical design of auditorium and other acoustically sensitive enclosures meant for speech, music, lecture, etc. Properties of materials and their application for acoustical treatment, shape analysis for different enclosures.

Designing enclosures for variable RT's. Sound Amplification Systems.

(NOISE ISOLATION AND CONTROL)

To understand noise, its transmission (air borne and structure borne), insulation and transmission loss. Understanding of psychological and physiological effects of noise. Identification of various sources of indoor noise and methods of sound insulation for control of mechanical noise and vibrations and its control measures. Speech privacy and noise control in specific situations. Sources of outdoor noise such as traffic noise levels and planning and design for outdoor noise.

(ACOUSTICAL DESIGN PRINCIPLES AND FACTORS)

Case studies and at least one design exercise of an auditorium or other sensitive enclosures which require acoustical sensitivity meant for speech, music, lecture, etc. Selection criteria for cases and design exercise - Site selection and planning, shape, dimensions, occupancy and seating arrangements, treatment of interior surfaces, desired reverberation time and amplification systems. Exercise output would be in the form of plan, section, construction details and calculation sheets.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for classroom exercises and continuous assessment i.e. total marks will be (20M+10M) =30M

TEXT BOOKS:

- 3) David Egan, Architectural Acoustics
- 4) A.B. Wood, A Textbook of sound.
- 5) Yarwood, T.M., Acoustics.

REFERENCES:

- 5) Catalogues of leading Audio equipment's companies.
- 6) Kandaswamy, Architectural Acoustics and Noise Control
- 7) J.E. Moore, Design for Good Acoustics and Noise Control
- 8) National Building Code 2005
- 9) Templeton, D., Acoustics in the Built Environment.

ARC2205 CLIMATOLOGY-II

Course Objectives:

- Methods and techniques to predict the effect of elements of climate on built spaces. Design of climate responsive and energy efficient built environment through Green building concepts for sustainable habitat.

Course Outcome:

- To equip student with the principles of climatic control and to design sustainable habitat; Familiarize them with the green building concepts and rating system; Introduce them with building energy-simulation program.

SYLLABUS

(Solar Radiation and Day Lighting)

Solar geometry and charts, Sun control through various elements of building, Day lighting prediction techniques, Fenestrations with focus on skylight, north light etc.

(Natural Ventilation and Air Movement)

Principles and dynamics of air movement and ventilation, Effect of built environment on air movement and ventilation, Fenestrations and other elements to control air movement and ventilation.

(Passive and Mechanical Controls)

Passive methods of cooling, dehumidification, evaporative cooling etc., Substitutes of mechanical devices using renewable energy sources for cooling, dehumidification, evaporative cooling etc.

(Green Buildings and Energy Simulation Programs)

Background of different rating systems, Relevance of rating system and GRIHA rating system, Introduction to building energy simulation program, Different simulation program software.

Assignments:

- Calculation and design of elements of building for a project done in Architectural Studio the previous semester. Self-assessment of green rating system as per GRIHA specifications for their design project. To run CFD simulation for a small block the elements of building that the student designed.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

TEXT BOOKS:

- 1) Manual of Tropical Housing and Building by Koenigsberger, Ingersoll, Mayhew, Szokolay.
- 2) GRIHA Manuals Volume 1-5, Ministry of New and Renewable Energy, Govt. of India.
- 3) Energy Conservation Building Code, Bureau of Energy Efficiency, India
- 4) CFD online tutorials .

REFERENCE BOOKS:

- 1) Design for Hot Climates by Konya Allan,.
- 2) Tropical Architecture by Kukreja, C.P.,.
- 3) Buildings, Climate and Energy by Markus T.A., Morris E.N.,
- 4) Solar Control and Shading Devices by Olgyay A., Olgyay V.,
- 5) Sun, Wind and Light by Brown G.Z.,

ARC2206
DESIGN OF STRUCTURES-I

Course objective:

- To study the stress strain behaviour of steel and concrete; the concept of limit state method.
- The basic idea of analysis and design different reinforced concrete members from substructure to superstructure of a reinforced concrete building.

Course Outcome:

- The student acquires knowledge on the concept of limit state method of design for different reinforced concrete members from substructure to superstructure of a reinforced concrete building.

SYLLABUS

(Introduction to RCC Design)

Introduction to RCC, Working stress method, Ultimate load method, Limit state method, Characteristic strength, Characteristic load, Partial safety factor, Type of loads, Factored loads, Stress-strain relationship for steel and concrete. Introduction to IS 456:2000.

(Flexural Analysis and Design of Beams and Slabs)

Types of Beams, Moment of resistance, Neutral axis; balanced, under & over reinforced sections. Design of singly reinforced beams, doubly reinforced beams and T-beams, Design of lintels, cantilever beams, Types of Slabs, Behaviour of Slabs, General Considerations for Design of Slabs, Design of one way slab, two way slab and cantilever slabs (solid slabs only)

(Design for Shear and Bond)

Behaviour of Reinforced Concrete Beams under Shear, Factors Affecting Shear Strength of Concrete, Local or Flexural Bond Stress, Anchorage Bond, Bond Behaviour, Development Length, Design of beams for shear & bond.

(Design of Columns)

Types of Columns, Behaviour of Short Columns, Effective length of columns, Design of axially loaded columns, Design of columns subjected to axial load and uniaxial bending moment only.

(Design of Footings)

Types of RCC footings (isolated, square, rectangular, combined, pile and pile cap), Soil Pressure under Footings, Analysis and design of isolated Square and rectangular footings only.

(Design of Staircase)

Types of Staircases, Loads on Stair Slabs, Design of Dog-Legged staircase and Single Flight staircase only.

Note: Design of reinforced concrete structures conforming to IS 456:2000

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M

TEXT BOOKS:

- 1) Design of R.C.C. structures by S. Ramamrutham, Publishers: DhanpatRai
- 2) Reinforced Concrete Limit State Design by A.K.Jain, Publishers: Nem Chand & Brothers.

REFERENCES:

- 1) Limit State Design of Reinforced Concrete by P.C.Varghese, Publishers: Prentice-Hall of India Private Limited
- 2) Reinforced Concrete Limit State Design by P. Dayaratnam, Publishers: Oxford IBH

ARC2207 ENVIRONMENTAL SCIENCE FOR ARCHITECTURE

Course Objectives:

The objective of the subject is to enable students to have an understanding of:

- Fundamental knowledge about natural and built environment
- Fundamental concepts to understand environmental processes

Course Outcome:

With the successful completion of the course student should develop awareness and sensitivity to environment and ecology.

SYLLABUS

(Fundamentals of Environment & Ecology)

Definitions and concepts; environment, environmental segments, ecosystem, ecology etc. Introduction to types, characteristic features, structure and function of different ecosystems (forest, grassland, desert and aquatic ecosystem). Effects of human activities such as agriculture, housing, industry, mining and transportation activities on environment. Threats to India's and the world's biological diversity.

(India's Bio-Geographic Regions)

India's biological diversity in relation to the physio-geographic regions. Identification of principal bio-geographic zones of India and their description. Eco-regions of India (floristic and physiographic). Distinction on the basis of flora and fauna differences in an eco-region. Evaluation of the importance of biological diversity to all life interconnections between biological diversity and human life –sustenance. Conservation of bio-diversity-In-situ and Exsitu conservation.

(Environmental Degradation and Human Impacts)

Environmental Pollution: Local and Global Issues. Causes, effects and control measures. Engineering aspects of environmental pollution control systems.

Air pollution: impacts of ambient and indoor air pollution on human health.

Water pollution: impacts water pollution on human health and loss of fresh water resources. Soil pollution and its impact on environment. Marine pollution and its impact on blue economy. Noise pollution, thermal pollution, nuclear pollution.

Solid waste management: Important elements in solid waste management- Waste to energy concepts. Management of plastic waste and E-waste.

Complex relationships between the built and natural environments. Impact of pollution on natural and man-made environments; Role of an individual in prevention of pollution.

(Disaster management and climate change)

Disaster management; floods, earthquake, cyclone and landslides. Cause-and-effect relationships between various human, natural and climatic factors that impinge upon ecological systems and their linkages. Understanding of global climate change and impacts with respect to rural/urban communities; increased risk/ vulnerabilities. Environmental Impact Assessment.

(Techniques and Details)

Fundamentals of Sustainable Development- Sustainability Strategies and Barriers -Industrialization and sustainable development. Circular economy concepts in Industrial waste (solid and fluid) management. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people. To understand implementation of ecological architecture at unit level. Rain water harvesting (contour bunds, wells, bunds, etc.). Techniques of waste water management (house level, bio swales etc.). Ecological planting (planting for wildlife, land improvement etc.)

Strategies to transform the built environment to meet the risks of climate change. Bio-mimicry - the study of natural structures and processes- in helping to solve man-made problems and enabling design; Concepts of urban ecology and landscape urbanism; case studies; integration of Renewable Energy Systems in built environment.

Institutions and Governance)

Regulation by Government, Monitoring and Enforcement of environmental regulation, Environmental Acts, Water (Prevention and Control of pollution) act, Air Prevention and Control of pollution) act, Environment Protection act, Wild life protection act, Forest Conservation act, Coastal Zone Regulations, Institutions and policies relating to India, Environmental Governance.

(Conventions)

International conventions: Salient features of International conventions on Environment: Stockholm Conference 1972, Earth Summit 1992, World commission for environmental Development (WCED). Montreal Protocol, Kyoto protocol, Ramsar Convention on Wetlands, Stockholm Convention on Persistent Organic Pollutants, United Nations Framework Convention on Climate Change (UNFCCC).

(Case Studies)

Case studies: Chipko movement, Narmada Bachao Andolan, Silent Valley project, Madhura Refinery and TajMahal, Industrialization of Pattancheru, Nuclear reactor at NagarjunaSagar, Tehridam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – aquaculture, Florosis in Andhra Pradesh, etc.

REFERENCES:

- 1) Miller T.G Jr., Environmental Sciences,
- 2) SC Sharma & MP Poonia, Environmental Studies
- 3) OP Gupta, Elements of Environmental Pollution Control
- 4) SC Sharma, Disaster Management
- 5) Cunningham, W.P. Cooper, T.H. Gorhani, E &Hepworth, Environmental Encyclopedia
- 6) E.P. Odum, Ecology
- 7) Keshav Kant & Rajni Kant, Air Pollution and Control

INDIAN TRADITIONAL KNOWLEDGE

(Non-credit mandatory courses)

Course Objectives:

- To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.
- To make the students understand the traditional knowledge and analyse it and apply it to their day to day life.

Course Outcome:

At the end of the Course, Student will be able to:

- Identify the concept of Traditional knowledge and its importance.
- Explain the need and importance of protecting traditional knowledge.
- Illustrate the various enactments related to the protection of traditional knowledge.
- Interpret the concepts of Intellectual property to protect the traditional knowledge.
- Explain the importance of Traditional knowledge in Agriculture and Medicine

(Vastushastra)

In recent times, 'Vastushastra' has emerged as one of the major fields of discussion in society. The word 'Vastushastra' brings a myriad of reaction from people in general and architects in particular. But technically, Vastu is meant as the Sanskrit equivalent of architecture or as the 'Indian System of Architecture' (Sthapatya). 'Sthapatya' has many aspects or fields of knowledge. It contains verses on planning of towns, villages, design of temples, halls, pavilions, and seats etc. It also has information on material specifications, brickwork, joinery and carpentry. Majority of the text is on architecture and construction. The remaining verses are on astrology, aayadi formulae, mandala diagrams, muhurta and other non-architectural aspects.

(Indian System of Architecture)

The chaos and confusion is mainly due to the prevailing ritualistic / mystic aspects of vastu as hyped by the media. This media hype has not only influenced public in general but also influenced architects to a major extent, as they are unaware about the technical aspects of the Indian System of Architecture. The objective here is to create awareness among architects regarding the Indian System of Architecture and equip them to design buildings as per Sthapatya (in sync with recent market trends & construction technologies).

(Legal framework and TK)

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016.

(Traditional knowledge and intellectual property)

Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge

Assessment:

This is a self-learning non-credit mandatory course. The mode of conduct would primarily be through self-learning, and group discussions in small groups, power point presentation, video lectures, subject movies. One faculty will be nominated as a mentor for this course by the Head of the Department to see that students are actively participating in the course for 2 hrs every week.

TEXT BOOKS:

- 1) Traditional Knowledge System in India, by Amit Jha, 2009.

REFERENCES:

- 1) Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002.
- 2) "Knowledge Traditions and Practices of India" Kapil Kapoor1, Michel Danino2.