BIRLA INSTITUTE OF TECHNOLOGY
MESRA

RANCHI, INDIA

CHOICE BASED CURRICULUM

FOR

BACHELOR

IN

ARCHITECTURE

DEPARTMENT OF ARCHITECTURE

Effective from academic year 2018 – 2019 onwards

Department of Architecture
Birla Institute of Technology, Mesra, Ranchi - 835215 (India)

Institute Vision

To become a Globally Recognized Academic Institution in consonance with the social, economic and ecological environment, striving continuously for excellence in education, research and technological service to the National needs.

Institute Mission

- To educate students at Undergraduate, Post Graduate Doctoral and Post-Doctoral levels to perform challenging engineering and managerial jobs in industry.
- To provide excellent research and development facilities to take up Ph.D. programmes and research projects.
- To develop effective teaching and learning skills and state of art research potential of the faculty.
- To build national capabilities in technology, education and research in emerging areas.
- To provide excellent technological services to satisfy the requirements of the industry and overall academic needs of society.

Department Vision

The underlying vision for the Department of Architecture is to make the department an academic knowledge hub that will actively contribute in the contemporary domain, by

- Providing innovative professionals who will contribute wholesomely to nation building.
- Providing individuals who can make significant contribution to the advancement of the society.
- Preparing students for leadership roles in the fields of Architecture

Department Mission

The mission of the Department of Architecture is to foster a student-centered educational program in architecture and urban planning. The programmes through its pedagogy which is heuristic and responsive to technological, cultural, and social environments, seeks to offer a diverse, interdisciplinary and rigorous curriculum that will promote personal development and professional excellence. The Department is committed in:

- Imparting strong fundamental concepts to students and motivate them to find innovative solutions to architectural and planning problems independently
- Developing architects and planners with managerial attributes capable of applying latest technology with responsibility
- Creation of congenial atmosphere and excellent research facilities for undertaking quality research by faculty and students

Programme Educational Objective for BARCH

1. To provide high quality education that prepares students to assume professional roles in architecture by imparting sound knowledge in design theories and applications, building technologies, social cultural, environmental factors and applications of computer aided design.

2. To Prepare students to work in multi- disciplinary teams within the building industry by providing knowledge in built environment related disciplines relevant to professional ethics and obligation.

3. Prepare professionals to tackle and manage resource constraints in professional situations through appropriate project management and real estate interventions.

4. Engage in lifelong learning, additional and continual formal education, professional development, research activities and self-study to provide high quality service to the general public, employees, client and other professionals.

Program Outcomes (PO) for BARCH

A graduate shall

a) Be competent in applying basic knowledge of architecture, building science, and technology for the purpose of obtaining solution to a multi-disciplinary problem.
b) Gain skilful knowledge of complex architectural problems and its analysis
c) Be able to design components of the built environment by applying relevant building bye-laws and regulations.
d) Be proficient in arriving at innovative solution to a problem with due considerations to society and environment
e) Be capable of undertaking appropriate research methods to solve an architectural problem to arrive at valid solution based on appropriate interpretations of data.
f) Continually upgrade his/her understanding and become adept at modern architectural knowledge, tools and techniques in order to apply them relevantly.
g) To demonstrate consciousness of societal and environmental issues relevant to professional architectural practice and contribute to sustainable development.
h) Be committed to professional ethics, responsibilities, and economic, environmental, societal, and political norms.
i) Demonstrate appropriate inter-personal skills to function effectively as an individual, as a member or as a leader of a team and in a multi-disciplinary setting
j) Be able to comprehend and write effective reports and design documentations; give and receive clear instructions; make effective presentations and communicate effectively and convincingly on architectural issues with architectural community and with the interest of society at large.
k) Be conscious of financial aspects of all professional activities and shall be able to undertake projects with appropriate management control and control on cost and time.
l) Recognize the need for continuous learning and upgrade their architectural knowledge for growth in their professional career.

STRUCTURE OF BACHELOR OF ARCHITECTURE
(BARCH UG PROGRAMME)

FIRST YEAR [I SEMESTER]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods/ week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
PROGRAM CORE - THEORY SUBJECTS							
AR 101	Principles of Architecture	3	0	0	3	3	PC
AR 102	Primary Building Materials	3	0	0	3	3	PC
AR 103	History of Indian Architecture	3	0	0	3	3	PC
NON-DEPARTMENTAL THEORY SUBJECTS							
MA104	Mathematics for Architects	3	0	0	3	3	FS
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 111	Architectural Design – I	0	0	6	9	6	PC
AR 112	Descriptive Geometry	0	0	6	3	6	PC
AR 113	Construction Technique and Model Making Workshop	0	0	4	2	4	PC
MANDATORY COURSE							
MC 101/ 102/ 103/ 104	Choice of: NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	2	MC
TOTAL CREDIT					**27**		
Total Contact hours						**30**	

FIRST YEAR [II SEMESTER]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods/ week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
PROGRAM CORE - THEORY SUBJECTS							
AR 151	Advanced Building Materials	3	0	0	3	3	PC
AR 152	History of Architecture-Western	3	0	0	3	3	PC
AR 153	Statics & Strength of Materials	3	0	0	3	3	PC
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 161	Architectural Design – II	0	0	6	9	6	PC
AR 162	Building Construction – I	0	0	4	6	4	PC
AR 163	Architectural Rendering Techniques	0	0	4	2	4	PC
MANDATORY COURSE							
MC 105/ 106/ 107/ 108	Choice of: NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	2	MC
TOTAL CREDIT					**27**		
Total Contact hours						**25**	

SECOND YEAR [III SEMESTER]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods/ week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
PROGRAM CORE - THEORY SUBJECTS							
AR 201	Climatology	3	0	0	3	3	PC
AR 202	Building Construction and Codes	3	0	0	3	3	PC
AR 203	Contemporary Architecture	3	0	0	3	3	PC
AR 204	Structural Mechanics	3	0	0	3	3	PC
NON-DEPARTMENTAL THEORY SUBJECTS							
CE 101	Environmental Sciences	2	0	0	2	2	FS
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 211	Architectural Design - III	0	0	6	9	6	PC
AR 212	Building Construction – II	0	0	4	6	4	PC
AR 213	Computer Application in Architecture	0	0	4	2	4	PC
MANDATORY COURSE							
MC 201/ 202/ 203/ 204	Choice of: NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	2	MC
TOTAL CREDIT					**32**		
Total Contact hours						**30**	

SECOND YEAR [IV SEMESTER]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods/ week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
PROGRAM CORE - THEORY SUBJECTS							
AR 251	Building Services – I (Water Supply and Sanitation)	3	0	0	3	3	PC
AR 252	Building Services – II (Electrical & Lighting)	3	0	0	3	3	PC
AR 253	Site Planning and Landscape Architecture	3	0	0	3	3	PC
OPEN ELECTIVE							
	OPEN ELECTIVE I	3	0	0	3	3	OE
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 261	Architectural Design - IV and Academic Field Trip	0	0	6	9	6	PC
AR 262	Building Construction – III	0	0	4	6	4	PC
NON-DEPARTMENTAL SESSIONAL SUBJECTS							
CE 212	Surveying Field Work	0	0	4	2	4	Other Dept L/S
MANDATORY COURSE							
MC 205/206/ 207/ 208	Choice of: NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	2	MC
TOTAL CREDIT					**30**		
Total Contact hours						**28**	
Note 1: Open Elective to be offered by the Department: AR 251 Building Services – I (Water Supply and Sanitation)							

THIRD YEAR [V SEMESTER]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods/ week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
PROGRAM CORE - THEORY SUBJECTS							
AR 301	Acoustics	3	0	0	3	3	PC
AR 302	Building Services – III (Mech. & Fire Safety)	3	0	0	3	3	PC
NON-DEPARTMENTAL THEORY SUBJECTS							
MT 204	Constitution of India	3	0	0	Nil Credit	3	HSS
CE 301	Structural Design - I	4	0	0	4	4	Civil
OPEN ELECTIVES							
	OPEN ELECTIVE II	3	0	0	3	3	OE
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 311	Architectural Design - V	0	0	9	13.5	9	PC
AR 312	Working Drawing-I	0	0	4	2	4	PC
AR 313	Building Information Modelling	0	0	3	1.5	3	PC
TOTAL CREDIT					**30**		
Total Contact hours						**32**	
Note 2: Open Elective to be offered by the Department: AR 302 Building Services – III (Mech. & Fire Safety)							

THIRD YEAR [VI SEMESTER]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods/ week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
PROGRAM CORE - THEORY SUBJECTS							
AR 351	Specification, Estimation and Costing	3	0	0	3	3	DC
NON-DEPARTMENTAL THEORY SUBJECTS							
CE 308	Structural Design II	4	0	0	4	4	Civil
MT 123	Business Communications	3	0	0	3	3	HSS
PROGRAM ELECTIVES- Theory (02 offered; any one to be opted)							
AR 352	Vernacular Architecture	3	0	0	3	3	PE
AR 353	Architectural Conservation and Heritage Management						
OPEN ELECTIVES							
	OPEN ELECTIVE III	3	0	0	3	3	OE
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 361	Architectural Design - VI and Academic Field Trip	0	0	9	13.5	9	Dept L/S
AR 362	Working Drawing II	0	0	4	2	4	Dept L/S
TOTAL CREDIT					**31.5**		
Total Contact hours						**29**	
Note 3: All Architectural Design Sessional Subjects up till V semester must be cleared before registering for VII Semester Architectural Design Sessional.							
Note 4: Departmental/ Program Elective to be offered as Open Elective to students of other departments: AR 351 Specification, Estimation and Costing							

FOURTH YEAR [VII SEMESTER]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods/ week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
PROGRAM CORE THEORY SUBJECTS							
AR 401	Housing and Settlement System	3	0	0	3	3	DC
AR 402	Structural Design and Systems	3	0	0	3	3	DC
AR 403	Energy Efficient Architecture	3	0	0	3	3	DC
PROGRAM ELECTIVES - Theory (02 offered; any one to be opted)							
AR 404	Disaster Management and Resilient Structures	3	0	0	3	3	PE
AR 703	Sustainable City Planning (PG Subject)						
OPEN ELECTIVES							
	OPEN ELECTIVE IV	3	0	0	3	3	OE
PROGRAM CORE SESSIONAL SUBJECTS							
AR 411	Architectural Design - VII	0	0	9	13.5	9	Dept L/S
AR 412	Interior Design	0	0	4	2	4	Dept L/S
TOTAL CREDIT					**30.5**		
Contact hours						**28**	
Note 5: Departmental/ Program Elective to be offered as Open Elective to students of other departments: AR 403 Energy Efficient Architecture							

FOURTH YEAR [VIII SEMESTER] [Architectural Apprenticeship/ Internship]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods/ week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
SESSIONAL SUBJECTS							
AR 461	Architectural Apprenticeship	0	0	0	6	0	Office Training
AR 462	Field Studies	0	0	0	3	0	Office Training
AR 463	Comprehensive Viva & Time Test	0	0	3	3	3	
TOTAL CREDIT					**12**		
Total Contact Hours						**3**	

FIFTH YEAR [IX SEMESTER]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods/ week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
PROGRAM CORE - THEORY SUBJECTS							
AR 501	Urban Design	3	0	0	3	3	DC
AR 502	Human Settlements Planning	3	0	0	3	3	DC
PROGRAM ELECTIVES- Theory (02 offered; any one to be opted)							
AR 503	Theory of Design	3	0	0	3	3	PE
AR 605	Urban Ecology and Environmental Planning (PG Subject)						
OPEN ELECTIVE OR MOOC COURSES							
	MOOC COURSES	0	0	0	2	0	MOOC
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 511	Architectural Design - VIII	0	0	12	18	12	Dept L/S
AR 512	Introduction to Thesis Project & Research Methodology (Dissertation)	0	0	4	2	4	Dept L/S
TOTAL CREDIT					**31**		
Total Contact hours						**25**	
Note 6: Departmental/ Program Elective to be offered as Open Elective to students of other departments: AR 502 Human Settlements Planning							

FIFTH YEAR [X SEMESTER]							
Subject Code	**Subject**	**L (Periods/ week)**	**T (Periods / week)**	**P (Periods/ week)**	**Credit**	**Contact Hrs.**	**Category of Course**
PROGRAM CORE - THEORY SUBJECTS							
AR 551	Professional Practice and Tendering Process	3	0	0	3	3	DC
AR 552	Construction Project Management	3	0	0	3	3	DC
MOOC COURSES							
	MOOC COURSES	0	0	0	2	0	MOOC
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 561	Architectural Design Thesis/ Project	0	0	12	18	12	Dept L/S
TOTAL CREDIT					**26**		
Total Contact Hours						**18**	
Note 7: All sessional subjects and Architectural Apprenticeship/ Internship must be cleared before registering for the AR 561 Architectural Design Thesis/ Project in the X Semester.							

FRAME WORK / CHOICE BASED CURRICULUM SYSTEM (CBCS)

S. No	Category	Credits	Broad Category
1	Programme Core (PC)	69	Department Courses
1.1	Labs/ Departmental Sessiomal	144	
2	Programme Electives (PE)	09	
3	Research project (RP)	22	
4	Open Electives (OE)	12	Other Department Courses - Interdisciplinary
5	Non-Dept. Subjects (Theory + Lab)	18	
6	MOOC	04	UGC Mandate
7	Architectural Apprenticeship + Field Studies + Comprehensive Viva & Test	12	Professional Training/ Internship
8	NCC/NSS/Creative Arts/ PT & Games	04	Mandatory
	TOTAL	**277**	

BARCH PROGRAMME SCHEME - SEMESTER WISE DISTRIBUTION

Recommended scheme of study				
S. No	**Semester**	**Course Category**	**Credits**	**Total**
1	FIRST	03 Programme Core (PC)	9	27
		Progamme Elective (PE)	-	
		Open Elective (OE)	-	
		3 Labs/ Departmental Sessional	14	
		01 Compulsory Non-dept theory subjects	3	
		NCC/NSS/Creative Arts/ PT & Games	1	
2	SECOND	3 Programme Core (PC)	9	27
		Progamme Elective (PE)	-	
		Open Elective (OE)	-	
		3 Labs/ Departmental Sessional	17	
		NCC/NSS/Creative Arts/ PT & Games	1	

3	THIRD	4 Programme Core (PC)	12	32
		Progamme Elective (PE)	-	
		Open Elective (OE)	-	
		3 Labs/ Departmental Sessional	17	
		01 Compulsory Non-dept theory subjects	2	
		NCC/NSS/Creative Arts/ PT & Games	1	
4	FOURTH	3 Programme Core (PC)	9	30
		Progamme Elective (PE)	-	
		1 Open Elective (OE)	3	
		2 Labs/ Departmental Sessional	15	
		1 Non-Departmental Lab	2	
		NCC/NSS/Creative Arts/ PT & Games	1	
5	FIFTH	2 Programme Core (PC)	6	30
		Progamme Elective (PE)	-	
		1 Open Elective (OE)	3	
		4 Labs/ Departmental Sessional	17	
		1 Non-Departmental Theory	4	
		1 Non-Departmental Non-credit Theory	-	
6	SIXTH	1 Programme Core (PC)	3	31.5
		1 Progamme Elective (PE)	3	
		1 Open Elective (OE)	3	
		2 Labs/ Departmental Sessional	15.5	
		2 Non-Departmental Theory	7	
7	SEVENTH	3 Programme Core (PC)	9	30.5
		1 Progamme Elective (PE)	3	
		1 Open Elective (OE)	3	
		2 Labs/ Departmental Sessional	15.5	
8	EIGTH	Architectural Apprenticeship	6	12
		Field Studies	3	
		Comprehensive Viva & Test	3	
9	NINTH	2 Programme Core (PC)	6	31
		1 Progamme Elective (PE)	3	

		1 MOOC Course	2	
		1 Labs/ Departmental Sessional	18	
		Dissertation/ Research Project (Introduction to Thesis Project & Research Methodology)	2	
10	TENTH	2 Programme Core (PC)	6	26
		Progamme Elective (PE)	-	
		1 MOOC Course	2	
		Architectural Design Thesis Project	18	
TOTAL				**277**

BACHELOR OF ARCHITECTURE

PROGRAMME CORE (PC) (*offered in MO session only***)**

S. No	Course Code	Course Title	Pre requisites / Co requisites	Credits
1	AR 101	Principles of Architecture	None	3
2	AR 102	Primary Building Materials	None	3
3	AR 103	History of Indian Architecture	None	3
4	AR 111	Architectural Design – I	None	9
5	AR 112	Descriptive Geometry	None	3
6	AR 113	Construction Technique and Model Making Workshop	None	2
7	AR 201	Climatology	None	3
8	AR 202	Building Construction and Codes	None	3
9	AR 203	Contemporary Architecture	None	3
10	AR 204	Structural Mechanics	None	3
11	AR 211	Architectural Design - III	None	9
12	AR 212	Building Construction – II	None	6
13	AR 213	Computer Application in Architecture	None	2
14	AR 301	Acoustics	None	3
15	AR 302	Building Services – III (Mech. & Fire Safety)	None	3

16	AR 311	Architectural Design - V	None	13.5
17	AR 312	Working Drawing-I	None	2
18	AR 313	Building Information Modelling	None	1.5
19	AR 401	Housing and Settlement System	None	3
20	AR 402	Structural Design and Systems	None	3
21	AR 403	Energy Efficient Architecture	None	3
22	AR 411	Architectural Design - VII	None	13.5
23	AR 412	Interior Design	None	2
24	AR 501	Urban Design	None	3
25	AR 502	Human Settlements Planning	None	3
26	AR 511	Architectural Design - VIII	None	18
27	AR 512	Introduction to Thesis Project & Research Methodology (Dissertation)	None	2

PROGRAMME CORE (PC) (*offered in SP session only*)

S. No	Course Code	Course Title	Pre requisites / Co requisites	Credits
1	AR 151	Advanced Building Materials	None	3
2	AR 152	History of Architecture- Western	None	3
3	AR 153	Statics & Strength of Materials	None	3
4	AR 161	Architectural Design – II	None	9
5	AR 162	Building Construction – I	None	6
6	AR 163	Architectural Rendering Techniques	None	2
7	AR 251	Building Services – I (Water Supply and Sanitation)	None	3
8	AR 252	Building Services – II (Electrical & Lighting)	None	3
9	AR 253	Site Planning and Landscape Architecture	None	3
10	AR 261	Architectural Design - IV and Academic Field Trip	None	9
11	AR 262	Building Construction – III	None	6

12	AR 351	Specification, Estimation and Costing	None	3
13	AR 361	Architectural Design - VI and Academic Field Trip	None	13.5
14	AR 362	Working Drawing II	None	2
15	AR 551	Professional Practice and Tendering Process	None	3
16	AR 552	Construction Project Management	None	3
17	AR 561	Architectural Design Thesis/ Project	None	18

ELECTIVES

Students pursuing Bachelor of Architecture program should complete at least three (*09 credits*) courses each from the Programme Electives and at least 2 Open electives (*06 credits*) listed below.

PROGRAMME ELECTIVE (PE)

S. No	Course Code	Course Title	Pre requisites / Co requisites	Credits
1	AR 352	Vernacular Architecture	None	3
2	AR 353	Architectural Conservation and Heritage Management	None	3
3	AR 404	Disaster Management and Resilient Structures	None	3
4	AR 703	Sustainable City Planning (PG Subject)	None	3
5	AR 503	Theory of Design	None	3
6	AR 605	Urban Ecology and Environmental Planning (PG Subject)	None	3

OPEN ELECTIVE (OE): As offered by other departments

S. No	Course Code	Course Title	Pre requisites / Co requisites	Credits
1				
2				
3				
xxx				

SUBJECTS TO BE OFFERED BY ARCHITECTURE DEPARTMENT AS OPEN ELECTIVE (OE) FOR OTHER DEPARTMENTS

S. No	Course Code	Course Title	Session	Credits
1	AR 251	Building Services – I (Water Supply and Sanitation)	SP	3
2	AR 302	Building Services – III (Mech. & Fire Safety)	MO	3
3	AR 351	Specification, Estimation and Costing	SP	3
4	AR 403	Energy Efficient Architecture	MO	3
5	AR 502	Human Settlements Planning	MO	3

MINOR PRGRAMME: The Department for Bachelor of Architecture Programme will not offer any MINOR programme or Honours Programme

SEMESTER I

COURSE INFORMATION SHEET

Course code: AR 101
Course title: PRINCIPLES OF ARCHITECTURE
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: I
Branch: Architecture
Name of Teacher: Dr.Janmejoy Gupta

Course Objectives

This course enables the students:

A.	Identify different design elements and design principles used in Architectural Building Design and built environment.
B.	Incorporate different design elements and principles in Design exercises.
C.	Developing an in-depth understanding of different factors influencing architecture of a region.
D.	Analyse the role of an architect in implementing the above.
E.	Classify architectural styles through ages.

Course Outcomes

After the completion of this course, students will be:

1.	Define the domain and variety of the functions of an architect.
2.	Analyze the design elements, principles incorporated in the built environment.
3.	Incorporating the above in Architectural Design.

Syllabus

Module 1: Architecture as a profession and role of an architect:

Contribution towards culture and the society, the Architectural Design Process & building process and the Architect's role: How projects get built, need, site, financing, design and design approvals, Architectural services rendered by an architects and disciplines needed to learn by him/her. The structure of Architectural Education-Curricular content, Design, The Design Studio, History and Theory, Technology, Structures, Materials and Methods of Construction, Environmental Controls, Computer-aided Design, Management, Electives.

Module 2: Design Elements & Design Principles:

Understanding Architectural Aesthetics - Exercises to understand the visual properties of two dimensional forms of both geometric and non-geometric surfaces. Basic design elements and their incorporation in visual art and architecture such Line and Shape, Color and Texture, Form and Size, Value, Light. Principles such as Balance, Symmetrical, Asymmetrical, Proportion and Scale, Studies of Principles of Organization of Form & Space, Principles of three-dimensional Compositions, A brief introduction to fractals in architecture and Architecture influenced by nature (Biophilic Architecture and bio-mimicry.

Module 3: Module and its application in design:

Types of Common Grids – Orthogonal and Radial, Brief Introduction to History of Modular Construction in Architecture, (Industrial Revolution and Pre-fabrication of Iron, Steel, Glass and Concrete units), "Building as Machine" concept of Corbusier and Le Modular.

Module 4: Factors influencing architecture of a region:

Climate, material, technology, and socio-cultural forces.

Module 5: Defining and Conceptualizing Architecture:

Concepts and philosophy of some leading architects (Indian and Global) and a few buildings designed by them, Development of Architecture through ages (Broad Architectural Movements starting from Gothic, Renaissance, Neo-Classical etc to Modern, Post-Modern, etc) and Critical Regionalism in Post-Independence Indian Architecture. (Notably Charles Correa and BV Doshi)

Text books:

1. Architect: A Candid Guide to the Profession, by Roger K. Lewis
2. Understanding Architecture: Its Elements, History, and Meaning by Leland M. Roth, West-view Press Place publication.
3. Francis D.K. Ching – Architecture: Form Space and Order; Van Nostrand Reinhold Co., (Canada), 1979.

Reference books: -

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: Nil

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures
Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2 nos. 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	CO1	CO2	CO3
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (2 nos. 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	L	M	L	M	H	L	M	L	M	-	M
2	H	H	H	L	L	H	M	L	H	L	-	L
3	H	H	-	H	H	H	H	M	M	-	L	H

CD	**Course Delivery methods**	**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2
CD2	Tutorials/Assignments	CO2	CD2, CD6
CD3	Seminars	CO3	CD2, CD 3, CD4
CD4	Mini projects/Projects		
CD5	Laboratory experiments/teaching aids		
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1,L2			Contribution towards culture and the society, the Architectural Design Process & building process and the Architect's role.	T1	1		PPT Digi Class/Chalk -Board	
2	L3,L4			How projects get built, need, site, financing, design and design approvals, Architectural services rendered by an architects and disciplines needed to learn by him/her.	T1	1		PPT Digi Class/Chalk -Board	
3	L5,L6			The structure of Architectural Education- Curricular content, Design, The Design Studio, History and Theory, Technology, Structures, Materials and Methods of Construction, Environmental Controls, Computer-aided Design, Management, Electives.	T1	1		PPT Digi Class/Chalk -Board	
4	L7,L8			Understanding Architectural Aesthetics -	T2	2		PPT Digi Class/Chalk -Board	

				Exercises to understand the visual properties of two dimensional forms of both geometric and non-geometric surfaces.					
5	L9			Basic design elements and their incorporation in visual art and architecture such Line and Shape, Color and Texture, Form and Size, Value, Light. Principles such as Balance, Symmetrical, Asymmetrical, Proportion and Scale.	T2	2		PPT Digi Class/Chalk -Board	
6	L10			Studies of Principles of Organization of Form & Space, Principles of three-dimensional Compositions.	T2	2		PPT Digi Class/Chalk -Board	
7	L11			A brief introduction to fractals in architecture and Architecture influenced by nature (Biophilic Architecture and bio-mimicry.	T2	2		PPT Digi Class/Chalk -Board	
8	L12			Types of Common Grids – Orthogonal and Radial.	T3	2,3		PPT Digi Class/Chalk -Board	
9	L13			Brief Introduction to History of Modular Construction in	T3	2,3		PPT Digi Class/Chalk -Board	

				Architecture, (Industrial Revolution and Pre-fabrication of Iron, Steel, Glass and Concrete units)					
10	L14			"Building as Machine" concept of Corbusier and Le Modular.	T2,T3	2,3		PPT Digi Class/Chalk -Board	
11	L15			Climate, and its impact on architecture.	T2,T3	3		PPT Digi Class/Chalk -Board	
12	L16			Material, and its impact on architecture.	T2,T3	3		PPT Digi Class/Chalk -Board	
13	L17			Technology, and its impact on architecture.	T2,T3	3		PPT Digi Class/Chalk -Board	
14	L18			Socio-cultural forces, and its impact on architecture.	T2,T3	3		PPT Digi Class/Chalk -Board	
15	L19,20 ,21,22.			Concepts and philosophy of some leading architects (Indian and Global) and a few buildings designed by them&and a few buildings designed by them	T2,T3	2,3		PPT Digi Class/Chalk -Board	
16	L23-L26			Development of Architecture through ages.	T2	2,3		PPT Digi Class/Chalk -Board	
17	L27-L31			Broad Architectural Movements starting from Gothic, Renaissance, Neo-Classical etc to Modern, Post-Modern, etc.	T2	2,3		PPT Digi Class/Chalk -Board	
18	L32-34			Critical	T2	3		PPT Digi	

				Regionalism in Post-Independence Indian Architecture. (BV DOSHI)				Class/Chalk -Board	
19	L35-37			Critical Regionalism in Post-Independence Indian Architecture. (CHARLES CORREA)	T2	3		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR 102
Course title: PRIMARY BUILDING MATERIALS
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Architecture
Semester / Level: I
Branch: Architecture
Name of Teacher: Anuj Kumar Toppo

Course Objectives

This course enables the students:

A.	To classify the different types of building materials used primarily in building construction work.
B.	To identify the types of materials and their compositions.
C.	To list, label and define the materials.
D.	To illustrate use of materials and ascertain their application.
.E	To identify the specific use and related technique for a required material.

Course Outcomes

After the completion of this course, students will be:

1.	Understand the different types of primary building materials used in building Industry.
2.	Choose proper building material and their application in building Industry
3.	Develop a sense of comparison between different building materials.

Syllabus

Module 1. Brick and Stone
Composition, Sizes, Properties and Classification of bricks, Tests for bricks. Introduction of Brickworks: masonry bonding & ornamental bonding.
Classification of stones. Common building stones used in India. Characteristics and use of stones.Dressing of stone.Artificial stones. Introduction of Stonework: Rubble and Ashlars masonry.

Module 2.Metals and Timber
Pig iron, cast iron, wrought iron – types, properties, steel – properties, types, market form of steel and uses of steel in construction, properties of mild steel and hard steel, defects in steel.
Qualities of timber for construction.Seasoning, Storage and Preservation of timber. Use of different types wood in various parts of building. Industrial timber: veneers, plywood, fibreboard, etc.

Module 3.Cement and Sand
Composition of ordinary cement. Function of cement ingredients. Properties of cement – Fineness, Soundness, Setting times, etc.Grades of cement and different types of cements used in construction.OPC,PPC,PSC. Storage of cement in site.
Sources of Sand, Classification, Test of Sand. Grades of sand and theiruses

Module 4.Moter and Lime
Types of mortar – lime mortar, mud mortar, lime-surkhi mortar, cement mortar. Different

grades of mortar, their compositions and properties. Preparation of cement mortar. Use and selection of mortar for different construction work.Fat and hydraulic lime – properties anduse.

Module 5. Concrete
Compositions and grades of concrete.Various steps in concrete construction – batching, mixing, transporting, compacting, curing, shuttering, jointing. Tests and quality control of concrete. Design Mix of concrete.

Text books:
1. B. C. Punmia; *Building Materials andConstruction.*
2. Bindra&Arora; *Building Materials andConstruction*.
3. Rangwala: *Engineering Materials*
4. W.B. Mckay, '*Building Construction'*, Vol. 1,2,3 Longmans, U.K. 1981.
5. Sushil-Kumar, T. B. (2003).*Building Construction*. 19th Ed. Delhi : Standard Publishers.

Reference books:
1. Khanna: *Civil Engineer's Hand Book*

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: Na

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2 nos 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (2 nos 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –
1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	M	H	H	H	H	M	M	H	H	M
2	H	H	H	M	H	H	H	M	L	L	H	H
3	H	H	H	H	M	H	M	L	M	M	M	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD 1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1,CD2
CD 2	Tutorials/Assignments		CO2	CD2,CD4
CD 3	Seminars		CO3	CD4, CD5 and CD8
CD 4	Mini projects/Projects			
CD 5	Laboratory experiments/teaching aids			
CD 6	Industrial/guest lectures			
CD 7	Industrial visits/in-plant training			
CD 8	Self- learning such as use of NPTEL materials and internets			
CD 9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / Refere nces	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1		1	Introduction and discussion about topics	T1	CO1		PPT Digi Class/Chock -Board	
1	L2-L3			Composition, Sizes, Properties and Classification of bricks	T3	CO1		PPT Digi Class	
2	L4			Tests for bricks	T3	CO1			
2	L5-L6			Introduction of Brickworks: masonry bonding &	T2,R1	CO3			

				ornamental bonding.					
3	L7-L8			Classification of stones. Common building stones used in India.	T1	CO2		PPT Digi Class	
4	L8-L9			Characteristics and use of stones. Dressing of stone. Artificial stones.	T2	CO1		PPT Digi Class	
4	L10			Introduction of Stonework: Rubble and Ashlars masonry.	T2	CO3		PPT Digi Class	
5	L11			Pig iron, cast iron, wrought iron – types, properties	T5	CO3		PPT Digi Class	
5	L12 - L13			steel – properties, types, market form of steel and uses of steel in construction	T5,R1	CO2, CO3		PPT Digi Class	
6	L14 - L15			properties of mild steel and hard steel, defects in steel.	T3	CO2		PPT Digi Class	
7	L16 - L18			Qualities of timber for construction. Seasoning, Storage and Preservation of timber.	T1,R1	CO1		PPT Digi Class	
8	L19			Use of different types wood in various parts of building.	T3	CO3		PPT Digi Class	
8	L20 - L21			Industrial timber: veneers, plywood, fibreboard, etc.	R1	CO3		PPT Digi Class	
9	L21 -			Composition of ordinary	T3	CO2		PPT Digi Class	

	L24			cement. Function of cement ingredients. Properties of cement – Fineness, Soundness, Setting times, etc.					
10	L25 - L27			Grades of cement and different types of cements used in construction. OPC,PPC,PSC. Storage of cement in site.	T3	CO3		PPT Digi Class	
11	L28 - L29			Sources of Sand, Classification, Test of Sand. Grades of sand and theiruses.	T5	CO1, CO2		PPT Digi Class	
12	L30 - L31			Types of mortar – lime mortar, mud mortar, lime-surkhi mortar, cement mortar.	T1,R1	CO1, CO3		PPT Digi Class	
12	L32 - L33			Different grades of mortar, their compositions and properties. Preparation of cement mortar.	T2	CO1, CO2		PPT Digi Class	
12	L34 - L35			Use and selection of mortar for different construction work.Fat and hydraulic lime – properties anduse.	T2	CO1		PPT Digi Class	

13	L36			Compositions and grades of concrete.	T2	CO3		PPT Digi Class	
14	L37 - L38			Various steps in concrete construction – batching, mixing, transporting, compacting, curing, shuttering, jointing.	T5,R 1	CO2		PPT Digi Class	
14	L39 - L40			Tests and quality control of concrete. Design Mix of concrete.	T3	CO3		PPT Digi Class	

COURSE INFORMATION SHEET

Course code: **AR 103**
Course title: **HISTORY OF INDIAN ARCHITECTURE**
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 **L: 3 T:0 P:0**
Class schedule per week: **03**
Class: **B. Arch**
Semester / Level: **I**
Branch: **Architecture**
Name of Teacher: **Ritu Agrawal**

Course Objectives

This course enables the students:

A.	To acquire basic concepts regarding the historical and architectural development in ancient India, and study the chronological evolution and impacts of geographic, climatic, geological and social backgrounds of Indian architectural styles in all ages – in relationship to materials, techniques of construction.
B.	To understand the diverse artistic and architectural expressions with regard to the historical context in which they are developed.
C.	To develop a critical view towards development and expression of Indian architecture
D.	To analyse the diversity of imperial Indian Temple Architecture, Indian Mosques, Tombs, Forts, Cities, etc. including the buildings viewed as architectural masterpieces, and their urban settings.
E.	To apply the materials and patterns of construction and building techniques in each age befitting an application in contemporary times.

Course Outcomes

After the completion of this course, students will be able:

1.	To define and understand the basic principles of elements of historic design elements, materials and patterns of construction and building techniques in each age befitting an application in contemporary times.
2.	To outline and employ critical thinking in the context of historical and architectural development in ancient India.
3.	To explain and utilise visual and verbal vocabularies of Indian Architecture
4.	To interpret and analyse the diversity of imperial Indian Temple Architecture, Indian Mosques, Tombs, Forts, Cities, etc
5.	To apply the materials and patterns of construction and building techniques in historic age befitting an application in contemporary times.

Syllabus

Module 1
Importance of the subject in the profession of architecture; Indus Valley Civilization- the various towns, town planning principles, houseconstruction, drainage systems; Vedic village settlement ; Buddhist architecture – Evolution & golden age;
Rock-cut Architecture –Stupas, Chaitya, Vihara, Pillars, Ajanta, Ellora, Kailasanath, Rathas, etc.

Module 2
Hindu Architecture –Development of temple form from examples like Ladh Khan, Temple at Deogarh, Bhittargaon Temple; North Indian Temple Architecture- Architectural character of Gupta Temples; Orissan temple with examples and Khajuraho group of Temples; Architectural character of South Indian Temple Architecture- Pallava, Chola, Pandyas, Madura and Vijayanagar style with examples.

Module 3
Introduction – Rise of Indo-Islamic Architecture in India; Special features of Mosque with examples; Special features of 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 – stones, mosaics, gildings.

Module 4
Indo Islamic architecture in India- Imperial architecture of Delhi, including - Slave dynasty, Tughlaq and Sayyed/Lodhi dynasties; Provincial Styles of Sultanate Period – Punjab, Bengal, Jaunpur, Gujarat, Malwa, Bijapurand Golconda with examples.

Module 5
Mughal Style prevalent during the reign of Babur; Humayun; Akbar; Jahangir and Shah Jahan; Architecture during the Sher Shah Sur's regime – Tomb of Sher Shas Sur;
Revival of Indian Architecture under British patronage - Architecture in Colonial India - Monumental buildings of - St.Pauls Cathedral, Kolkata, Victoria Memorial Hall, Kolkata; Contribution of Edwin Lutyens & Herbert Baker to the lay-out and Architecture of New Delhi – RashtrapathiBhavan& Parliament House.

Emphasis should be on the use of structural techniques, stones, fine arts, special features, use of landscape, water bodies, and construction methods employed.
Students need to practice sketches and make an album and get it evaluated regularly.

Text books:
1. Brown, P. Indian Architecture (Buddhist Hindu) Vol. I;Taraporevala and Sons, Bombay 1983 & subsequent publications.
2. Brown Percy, Indian Architecture (Islamic Period) Vol. II; Taraporevala and Sons, Bombay, 1983; and subsequent publications.
3. Grover, S. The Architecture of India, Buddhist & Hindu, Sahibabad, 1980.
4. Grover, S. The Architecture of India (Islamic) , Sahibabad, 1980.

Reference books:
1. Asher Catherine, Architecture of Mughal India.
2. Fergusson, J.A. A history of Indian and Eastern Architecture, London 1876, revised 1891.
3. Hardy, A., "Indian Temple Architecture: Form and Transformation", Abhinav Publication, 1995
4. Hillenbrand, Robert,;Islamic Architecture, Form, Function and Meaning, Edinburgh University Press, 1994.
5. Michell,George; The Hindu Temple , London.
6. Michell, George; Architecture of the Islamic World — (its history and social meaning), Thames and Hudson, London, 1978.
7. Sterlin Henry, Architecture of World , India, Germany, ISBN-38228-9658-6.
8. Sterlin Henry, Architecture of World, India (Islamic), Germany ISBN– 38228-9658-6.
9. Tadgell Christopher, The History of Architecture in India, London 1990.
10. Tillotson, G.H.R. – The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures
Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	L	-	-	-	M	-	-	-	-	-
2	H	L	-	-	-	_-	-	-	-	-	-	-
3	L	-	-	-	-	-	-	-	-	L	-	-
4	L	H	L	M	M	L	L	-	-	H	-	M
5	H	H	M	-	M	H	L	L	-	M	-	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1
CD2	Tutorials/Assignments		CO2	CD1
CD3	Seminars		CO3	CD1, CD2
CD4	Mini projects/Projects		CO4	CD1, CD2

CD5	Laboratory experiments/teaching aids		CO5	CD1, CD3
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / Refere nces	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1.	L1, L2, L3		1	Indus Valley CivilizationVedic village settlement; Buddhist architecture – Evolution & golden age;	T1, R7, R9	CO1, CO2		PPT Digi Class/Chalk -Board	
2.	L4, L5, L6			Rock-cut Architecture – Stupas, Chaitya, Vihara, Pillars, Ajanta, Ellora, Rathas	T1, R7, R9	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
3.	L7, L8, L9			Hindu Architecture-Development of temple form North Indian Temple Architecture	T1, R7, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
4.	L10, L11, L12			North Indian Temple Architecture	T1, R7, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
5.	L13, L14, L15			South Indian Temple Architecture	T1, R7, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
6.	L16, L17, L18			Rise of Indo-Islamic Architecture; Influences of Indo-Islamic Architecture; Special	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	

				features – use of landscape					
7.	L19, L20, L21			Islamic Ornamentation;	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
8.	L22, L23, L24			Imperial architecture of Delhi	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
9.	L25, L26, L27			Provincial Styles of Sultanate Period	T2,T 4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
10.	L28, L29, L30			Provincial Styles of Sultanate Period	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
11.	L31, L32, L33			Mughal Style	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
12.	L34, L35, L36			Marble architecture	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
13.	L37, L20, L21			Architecture during the Sher Shah Sur's regime	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
14.	L38, L39, L40			Revival of Indian Architecture under British patronage - Architecture in Colonial India	T1, T2, T4 R8, R9, R10	CO5		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: **MA 109**
Course title: **MATHEMATICS FOR ARCHITECTS**
Pre-requisite(s): Basic Algebra, Basic Calculus
Co- requisite(s): **None**
Credits: 3 **L: 3 T:0 P:0**
Class schedule per week: **03**
Class: **B. Arch**
Semester / Level: **I**
Branch: **Architecture**
Name of Teacher: **Dr. Abhinav Tandon**

Course Objectives

This course enables the students:

A.	Basics concepts of matrices, including rank, eigenvalues and eigenvectors of the matrix
B.	Determination of consistency and inconsistency of system of linear equations using rank of matrices
C.	Application of single variable derivatives and integrals in determining different properties of a curve
D.	Introduction to multi variable functions, partial derivatives and different properties associated with them their
E.	Applications of multi variable calculus in determining maxima – minima and double integrals for two variable functions
F.	Analysis of data using different statistical techniques

Course Outcomes

After the completion of this course, students will be:

1.	To understand the basics of matrices, statistics, differential and integral calculus
2.	To apply the mathematical skills to specific problems arising in architecture
3.	To demonstrate the usage of calculus in determining shape, symmetry, pattern etc. of architectural designs
4.	To gain an understanding to establish connectivity between mathematics and architecture.

Syllabus

Module 1: Matrices

Real and Complex Matrices, Elementary Transformations, Rank of a Matrix, Row – reduced Echelon form, Consistency and inconsistency for system of linear equations using rank method, Characteristic equation, Eigenvalues and Eigen vectors, Cayley – Hamilton Theorem.

Module 2: Single Variable Calculus
Successive differentiation, Leibnitz's Theorem, Indeterminate forms, Concavity, Convexity, Point of Inflection, Taylor and Maclaurin series for functions of one variable, Maxima and Minima for functions of one variable.
Definite Integrals, Reduction Formula, Applications of definite integrals in finding length of curves, area between curves, area of the surfaces of revolution.

Module 3: Multi Variable Calculus - I
Function of several variables, Limit and Continuity for functions of two variables, Partial derivatives, Euler's Theorem for Homogeneous functions, Chain Rules, Total Differential Coefficient, Change of variables.

Module 4: Multi Variable Calculus -II
Jacobian, Properties of Jacobians, Taylors and Maclaurin series for function of two variables, Maxima - Minima for function of two variables, Lagrange's method of multipliers.

Module 5: Statistics
Measures of Central Tendency, Measures of Dispersion, Moments, Skewness, Kurtosis Correlation, Methods to find Coefficient of Correlation, Regression, Linear Regression, Lines of Regression, Regression coefficients, Nonlinear Regression, Curve fitting, Method of Least Squares.

Text Books

a. M.D. Weir, J. Hass and F. R. Giordano: Thomas' Calculus, 12th edition, Pearson Educations, 2008.
b. E. Kreyszig, Advanced Engineering Mathematics, Wiley International, 9th edition, 2006.
c. S.C. Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand Publications, 11th Edition, 2014.

Reference books:

1. M.R. Spiegel and L.R. Stephens, Schaum's outline of Statistics, 5th Edition, 2010.
2. H. Anton, I Brivens, S. Davis, Calculus, 10th Edition, John Wiley and Sons, Singapore Pvt. Ltd., 2013.
3. H. Schneider and G.P. Barker, Matrices and Linear Algebra, Dover's Publications, New York, 1973.

Gaps in the syllabus (to meet Industry/Profession requirements): NA

POs met through Gaps in the Syllabus: Nil

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars

Mini projects/Projects
Laboratory experiments/teaching aids
Industrial/guest lectures
Industrial visits/in-plant training
Self- learning such as use of NPTEL materials and internets
Simulation

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

AssessmentCompoents	**CO1**	**CO2**	**CO3**	**CO4**
Mid Sem Examination Marks	√	√	√	√
End Sem Examination Marks	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√
Assignment	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcomes	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	H	M	L	M	M	L	L	L	L	L	M
2	H	H	M	L	M	M	L	L	L	L	L	M
3	H	M	M	M	M	M	L	L	L	L	L	M
4	H	M	H	H	M	M	L	L	M	M	L	H

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1												
2												

3												

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD 1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1
CD 2	Tutorials/Assignments		CO2	CD1
CD 3	Seminars		CO3	CD1 and CD2
CD 4	Mini projects/Projects			
CD 5	Laboratory experiments/teaching aids			
CD 6	Industrial/guest lectures			
CD 7	Industrial visits/in-plant training			
CD 8	Self- learning such as use of NPTEL materials and internets			
CD 9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1		1		T1, R1	1, 2		PPT Digi Class/Chock -Board	

COURSE INFORMATION SHEET

Course code: **AR 111**
Course title: **ARCHITECTURAL DESIGN I**
Pre-requisite(s): None
Co- requisite(s): None
Credits: 9 **L: 0** **T: 0** **P:6**
Class schedule per week: **06**
Class: **B. Arch**
Semester / Level: **I**
Branch: **Architecture**
Name of Teacher: **Prof. Ritu Agrawal**

Course Objectives:

This course enables the students:

A.	To introduce the fundamentals of design as a basic creative activity, and the basics of Architectural aesthetics.
B.	To learn about the basic elements of visual aesthetics through exercises aimed at experimentation.
C.	To become familiar with visual and verbal vocabularies of architecture and appreciating them.
D.	To develop and understand the basic principles of design in the context, purpose, time and technology.
E.	To **evaluate** the design theory and principles of design in compositions.

Course Outcome:

After the successful completion of the course, student will be able:

1.	To understand the basic principles of design and appreciate design criteria of objects in everyday use.
2.	To analyse, evaluate and make informed judgment on a wide range of visual and verbal vocabularies of architecture.
3.	To comprehend basic elements of visual aesthetics and relevance to design.
4.	To develop and employ critical and analytical thinking skills in the context of aesthetics and compositions.
5.	Toapply the principles of design and design theory in architectural compositions.

Syllabus

1. Introduce the factors of Design regarding elementary forms –
   By Graphical methods, comparison of designed and non-designed objects, Appreciation of design criteria.
   Critically appraise and Design of an object in everyday use like Table, Chair, Stool, Drawing Board, T-Scale, etc. — 02 sheets

2. Exercises in Points & Lines.
   Expressing a given theme in a geometric pattern. — 02 sheets

3. Family of shapes - developing various shapes from a given geometric shape –
   Working out composition with such developed shapes; — 03sheets

Organising large number of identical geometric shapes to express a given theme to obtain symmetrical and asymmetrical patterns.
Combining different geometric shapes and making a unit of bigger/larger shape and using many such units and expressing a design/pattern.
Models with linear members such as match sticks, reeds, etc. to understand geometric form and structure.

4. Introducing value and colour, to give emphasis in the expression of design. 03 sheets
   To achieve focus and center of interest in design using different textural elements.
   Development of geometric pattern by division, subtraction, and addition or overlapping to express them with the use of colours.

5. Study of lines, colour, texture, volume of objects with the sense of contrast, harmony, balance and relative proportions; the inherent visual properties of any physical object or enclosure. 02 sheets
   Visualize techniques of graphic expression to present the innovative design ideas.

Importance should be given on sketching and communicating the design / study through effective two and three-dimensional drawings / sketches and models.
Viva-voce: Final Viva-vice on all the design assignments to be conducted at the end of the semester by experts from the field.

Reference Books:

1. C. D. Joseph and Callender John; Time Saver Standards for Building Types.
2. Christopher Alexander; A Pattern Language.
3. Francis D.K. Ching; – Architecture: Form Space and Order; Van Nostrand Reinhold Co., (Canaa), 1979.
4. AGeorge , Covington & Bruce Hannah," Access by Design", Van Nostrand Reinhold, 1996.
5. Pearce Peter; Structure in Nature – Strategy for Design.
6. Peter Fawcett A.; Architecture Design Notebook. http://www.scribd.com/doc/45018090/Architecture-Design-Notebook
7. Pickering, Ernest; Architectural Design, John Wiley and Sons Inc., Canada, 1949.
8. Marjore Elliott Bevin, "Design through Discovery", Holt Rinehart and Winton,NewYork,1977.
9. Neufert's Architect's Data.
10. Snyder, James C and Catanese, Anthony, J, Introduction to Architecture, Mc-Graw Hill, 1980. V.S. Paramar, Design Fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi – 1973.
11. Von MeissPieree; Elements of Architecture.
12. Francis D K Ching, A Visual Dictionary of Architecture, John Wiley & Sons, Inc.
13. R.W Gill, Manual of Rendering with Pen and Ink (The Thames and Hudson Manuals), W. W. Norton & Co Inc.
14. James C Snyder and Anthony J. Catanese, Introduction to Architecture, McGraw-Hill
    All Books, journals and magazines on Architecture

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors

Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	**CO1**	**CO2**	**CO3**
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1.	M	-	-	L	-	-	-	-	-	-	-	-
2.	H	H	-	-	-	-	-	-	-	-	-	-
3.	H	M	L	-	-	-	-	-	-	-	-	-
4.	H	M	L	H	-	M	-	-	-	-	-	-
5.	H	H	M	M	L	H	-	-	-	-	-	-

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2, CO3,
CD2	Mini projects/Projects	CO2, CO3,
CD3	Laboratory experiments/teaching aids	CO3,
CD4	Industrial/guest lectures	CO2, CO3

Lecture wise Lesson planning Details

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1.	L1, L2			Introduce the factors of Design regarding elementary forms.	R1, R2, R3	CO1		PPT Digi Class /Chalk -Board	
2.	L3, L4			By Graphical methods, comparison of designed and non-designed objects, Appreciation of design criteria.	R1, R2, R3	CO1		PPT Digi Class /Chalk -Board	
3.	L5, L6			Critically appraise and Design of an object in everyday use like Table, Chair, Stool, Drawing Board, T-Scale, etc.	R1, R2, R3	CO1, CO2		PPT Digi Class /Chalk -Board	
4.	L7, L8			Exercises in Points & Lines. .	R1, R2, R3, R11	CO1, CO2		PPT Digi Class /Chalk -Board	
5.	L9, L10			Expressing a given theme in a geometric pattern.	R1, R2, R3, R11	CO1, CO2, CO3		PPT Digi Class /Chalk -Board	
6.	L11, L12			Family of shapes - developing various shapes from a given geometric shape.	R1, R2, R3, R11	CO1, CO4, CO3		PPT Digi Class /Chalk -Board	
7.	L13, L14			Working out composition with such developed shapes.	R1, R2, R3, R11	CO2, CO3, CO4, CO5			
8.	L15, L16			Organising large number of identical geometric shapes to express a given theme to obtain symmetrical and asymmetrical patterns.	R1, R2, R3, R11, R12, R14.	CO2, CO4		PPT Digi Class /Chalk -Board	
9.	L17,			Combining different	R1,R2,	CO2,		PPT Digi	

	L18			geometric shapes and making a unit of bigger/larger shape and using many such units and expressing a design/pattern.	R3, R11, R12, R14.	CO3, CO4		Class /Chalk -Board	
10.	L18, L20			Models with linear members such as match sticks, reeds, etc. to understand geometric form and structure.	R1,R2, R3, R12, R13, R14.	CO2, CO3, CO4		PPT Digi Class /Chalk -Board	
11.	L21, L22			Introducing value and colour, to give emphasis in the expression of design.	R1,R2, R3, R12, R13, R14.	CO2, CO3, CO4		PPT Digi Class /Chalk -Board	
12.	L21, L23			Development of geometric pattern by division, subtraction, and addition or overlapping to express them with the use of colours.	R1,R2, R3, R12, R13, R14.	CO2, CO3, CO4		PPT Digi Class /Chalk -Board	
13.	L24, L25			Study of lines, colour, texture, volume of objects with the sense of contrast, harmony, balance and relative proportions; the inherent visual properties of any physical object or enclosure.	R1,R2, R3, R12, R13, R14.	CO2, CO3, CO4, CO5		PPT Digi Class /Chalk -Board	
14.	L26, L27			Study of lines, colour, texture, volume of objects with the sense of contrast, harmony, balance and relative proportions; the inherent visual properties of any physical object or enclosure.	R1,R2, R3, R12, R13,R14.	CO2, CO3, CO4, CO5		PPT Digi Class /Chalk -Board	

COURSE INFORMATION SHEET

Course code: **AR 112**
Course title: **DESCRIPTIVE GEOMETRY**
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 **L: 0 T: 0 P:6**
Class schedule per week: **06**
Class: **B. Arch**
Semester / Level: **I**
Branch: **Architecture**
Name of Teacher: **Dr. D. J. Biswas**

Course Objectives
This course enables the students:

A	To develop basic understanding of preparing architectural drawings and its application in architectural field.
B	To cultivate student's skills of geometric drawing, develop their capability of ideation of Descriptive geometry along with drawing instrumental sketching.
C	To analyze and solve various problems involving graphics and spatial relationship to represent the possible forms of the same object.
D	To expose the technical understanding of views, along with shades and shadows to represent in graphical presentation

Course Outcomes
After the completion of this course, students will be able to:

1.	Understand the various aspects of preparing architectural drawings
2.	Understand the different methods of representing the same object, with the help of suitable drawing instruments
3	Exposure to technical understanding of preparing views, along with shades and shadows, which will be applied in all architectural projects.

Syllabus / Course Content:

Aspects of the assignments	***A1 size drg. sheet***
Lines & Lettering	1
Dimensioning of different 2D objects	1
Scale drawing of simple shapes, reduction and enlargement of drawings on different scales	1
Projection of planes and solids	2
Study of section of solids to include representation of such groups in these projections	1
Study of development of surfaces, drawing of unfolded surface of 3d objects	1
Techniques of drawing Isometric and Axonometric views of solids	2
Techniques of drawing 1 point, 2 point and multi-point perspective views of blocks and buildings	2
Concept of shade and shadow of objects	1

Reference books:

1. Agarwal, B. and Agarwal, C.M., Engineering Drawing, Tata McGraw-Hill.
2. Bhattacharya, B. and Bera, S.C., Engineering Graphics, I.K. International.
3. Bhatt, N.D. and Panchal, V.M., Engineering Drawing, Charotar Publication.

4. Venugopal, K., Engineering Drawing and Graphics, New Age International
5. Arthur L. Guptill, Watson; Rendering in Pen and Ink,- Guptill Publications, New York.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Explanation by use of boards/LCD projectors
Problem solving in the class
Final presentation, with all drawing sheets at the end of semester, to assess the overall understanding

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	CO1	CO2	CO3
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	L		L		H	L		M	M	L	M
2	H	L		L	L	H		L	M	M		M
3	H		L			H			M			M

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2, CD5
CD2	Tutorials/Assignments		CO2	CD1, CD2, CD5
CD3	Seminars		CO3	CD1, CD2, CD5

CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1, to L6			Lines & Lettering	R1,R2, R3	CO1		PPT Digi Class/Chalk -Board	
2	L7 to L12,			Dimensioning of different 2D objects	-do-	-do-		-do-	
3	L13 to L18			Scale drawing of simple shapes, reduction and enlargement of drawings on different scales	-do-	-do-		-do-	
4	L19 to L30			Projection of planes and solids.	-do-	CO1, CO2		-do-	
5	L31 to L36			Section of solids to include representation of such groups in these projections	T3,T5	CO1, CO2, CO3		-do-	
6	L37, L42			Development of surfaces, drawing of unfolded surface of 3d objects	T1, T5	CO1, CO4		-do-	
7	L43 to L54			Techniques of drawing Isometric and Axonometric views of solids	T2,T5	CO2, CO3, CO4		-do-	
8	L55 to L66			Techniques of drawing 1 point, 2 point and multi-point perspective views of blocks and buildings	T1, T4, T5	CO2, CO4		-do-	
9	L67 to L72			Concept of shade and shadow of objects	T5	CO2, CO3, CO4		-do-	

COURSE INFORMATION SHEET

Course code: **AR 113**
Course title: **CONSTRUCTION TECHNIQUE and MODEL MAKING WORKSHOP**
Pre-requisite(s): None
Co- requisite(s): None
Credits: 2 **L: 0 T:0 P:4**
Class schedule per week: **04**
Class: **B. Arch**
Semester / Level: **I**
Branch: **Architecture**
Name of Teacher: **Prof. Ritu Agrawal**

Course Objectives: This course enables the students:

A.	To introduce the fundamentals of construction and the essentials of Architectural model making.
B.	To learn about the basic elements of visual grammar through exercises aimed at visualizing the form in terms of physical parameters (material, colour, texture, structure).
C.	To become familiar with visual vocabularies of architecture and appreciating them.
D.	To develop and represent the forms in terms of models.
E.	To apply the theory of model making in compositions.

Course Outcome: After the successful completion of the course, student will be able:

1.	To understand the fundamentals of construction and transformation from two dimensions to three dimension forms through model making.
2.	To develop skills in the context of architectural construction and compositions.
3.	To apply the art of model making in architectural compositions.

Syllabus

1. Construction Techniques - Preliminary construction principles -
   Hands-on feel of materials and their applications – soil, cement, brick, wood, etc.
   Laying of brick courses & various bonds of brick with & without mortar.
   Mortar mixing & Mortar preparations of cement mortar for masonry and plaster.
   Timber Joinery details – T-junction, Cross-junction, Tenon &Mortise Joints, Dove-tail Joint, etc.
   (Site visits and 3-D models to understand the topic).

2. Skills to represent ideas and forms through study model -
   Models with linear members such as match sticks, reeds, etc. to understand geometric form and structure.

3. Architectural Model Making with variety of materials such as card board, ivory sheets, plastic & acrylic sheets, glass, timber & plywood.

4. Study of Development of surfaces, drawing of unfolded surfaces of 3-D objects.

5. Site visit report

Text books: Nil

Reference Books:

1. Ching, Francis D K, A Visual Dictionary of Architecture, John Wiley & Sons, Inc.
2. Ching, Francis D K, Barry, S. and Zuberbuhler, D., Building Structures Illustrated – Patterns, Systems and Design, John Wiley & Sons, Inc.
3. Snyder, James C. and Anthony J. Catanese, Introduction to Architecture, McGraw-Hill.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	**CO1**	**CO2**	**CO3**
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1.	H	L	-	-	-	H	-	-	-	-	-	-
2.	L	H	-	-	-	H	-	-	-	-	-	-
3.	M	L	-	-	-	M	-	-	-	-	-	-

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome
CD1	Seminars	CO1, CO2, CO3
CD2	Mini projects/Projects	CO2, CO3
CD3	Laboratory experiments/teaching aids	CO3
CD4	Industrial/guest lectures	CO2, CO3

Lecture wise Lesson planning Details

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
15.	L1			Introduction to Construction Techniques- Hands-on feel of materials and their applications – soil, cement, brick, wood, etc.	R1, R2, R3	CO1		PPT Digi Class /Chalk -Board	
16.	L2			Site visit to study Mortar mixing & Mortar preparations of cement mortar for masonry and plaster.	R1, R2, R3	CO1		PPT Digi Class /Chalk -Board	
17.	L3			Site visit forLaying of brick courses & various bonds of brick with & without mortar.	R1, R2, R3	CO1, CO2		PPT Digi Class /Chalk -Board	
18.	L4			Skills to represent ideas and forms through study model - Models with linear members such as match sticks, reeds, etc. to understand geometric form and structure.	R1, R2, R3,	CO1, CO2		PPT Digi Class /Chalk -Board	
19.	L5			Creative models with match sticks, reeds, etc. to understand geometric form	R1, R2, R3,	CO1, CO2, CO3		PPT Digi Class /Chalk	

				and structure.				-Board	
20.	L6			Creative models with match sticks, reeds, etc. to understand geometric form and structure.	R1, R2, R3,	CO1, CO2, CO3		PPT Digi Class /Chalk -Board	
21.	L7			Theme based models, sculptures, mural design, tile design, pattern making, etc.	R1, R2, R3	CO2, CO3			
22.	L8			Architectural Model Making with variety of materials such as card board, ivory sheets, plastic & acrylic sheets, glass, timber & plywood.	R1, R2, R3.	CO2		PPT Digi Class /Chalk -Board	
23.	L9			Architectural Model Making with variety of materials such as card board, ivory sheets, plastic & acrylic sheets, glass, timber & plywood.	R1, R2, R3	CO1, CO2, CO3		PPT Digi Class /Chalk -Board	
24.	L10			Architectural Model Making with variety of materials such as card board, ivory sheets, plastic & acrylic sheets, glass, timber & plywood.	R1, R2, R3	CO1, CO2, CO3		PPT Digi Class /Chalk -Board	
25.	L11			Architectural Model Making with variety of materials such as card board, ivory sheets, plastic & acrylic sheets, glass, timber & plywood.	R1, R2, R3	CO1, CO2, CO3		PPT Digi Class /Chalk -Board	
26.	L12			Development of surfaces,	R1, R2, R3	CO1, CO2, CO3		PPT Digi Class /Chalk -Board	
27.	L13			Model of unfolded surfaces of 3-D objects.	R1, R2, R3	CO1, CO2, CO3		PPT Digi Class /Chalk -Board	
28.	L14			Site visit report	R1, R2, R3	CO1, CO2, CO3		PPT Digi Class /Chalk -Board	

SEMESTER II

COURSE INFORMATION SHEET

Course code: AR 151
Course title: ADVANCED BUILDING MATERIALS
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L:3 T:0 P:0
Class schedule per week: 03
Class: B. Architecture
Semester / Level: II
Branch: Architecture
Name of Teacher: Anuj Kumar Toppo

Course Objectives

This course enables the students:

A.	To list the various properties of non-ferrous alloys used as building material
B.	To classify the types of corrosion of ferrous and non-ferrous metals and respective preventive measures.
C.	To outline the use of various admixtures in concrete
D.	To compare the use of traditional concrete and RMC
.E	To analyse and prepare the specification of various clay and ceramic tiles for building application.
F	To outline the application of different painting system in building exterior and interior

Course Outcomes

After the completion of this course, students will be:

1.	Understand the different types of Advanced building materials used in building Industry.
2.	Choose proper alternative of building material and their application in building Industry
3.	Develop a sense of organization of appropriate building material

Syllabus

Module 1: Non Ferrous Metal

Aluminum & important alloys and brief description of uses, Copper & important alloys and brief description of uses, Corrosion of both ferrous and non- ferrous metals – types and preventive measures.

Module 2: Clay Products, Wall & Floor Tiles

Roofing Tiles their properties and use, terra-cotta, earthenware, stoneware, porcelain, vitreous.
General character and construction process of traditional flooring like:
IPS flooring, Terrazzo flooring, Vitrified tiles, planks , Stone Sizes, Classification & Properties of tiles used in wall and flooring, Selection criteria & Methods of fixing various types of tiles.

Module 3: Special Concrete

Water repellent, Waterproofing compounds, Accelerators, Air entraining agents, Hardeners, plasticizer, Fly ash Their availability and uses, Light weight concrete, ready-mix concrete, precast concrete.

Module 4: Varnishes, Paints Distempers

Characteristics and process of varnishing, Type and Compositions of Paints.
Types of painting system: Aluminum paints, Cement-based paints, oil emulsion paints, Enamel paints and Their selection criteria.Texture Paints.

Module 5: Plastics and Polymers

Types and Use of Plastic in building construction, Properties of Plastic. Use of various Polymer

Materials in building industry
Use of Nano-paints.
Miscellaneous Materials
Glass, Fibre glass, Cork, rubber, Gypsum, sealants, Asbestos, Cement Board, WPC
Heat and sound insulative materials, Their trade name anduses.

Text books:

1. B. C. Punmia; *Building Materials and Construction* .Laxmi Publications Pvt Ltd, NewDelhi,1993
2. Bindra&Arora; *Building Materials andConstruction*.
3. W.B. Mckay, '*Building Construction'*, Vol. 1,2,3 Longmans, U.K.1981.
4. Rangwala: *Engineering Materials*
5. Sushil-Kumar, T. B. (2003).*Building Construction*. 19th Ed. Delhi : Standard Publishers.

Reference books:

1. Khanna: *Civil Engineer's Hand Book*
2. Arthur Lyons; Materials for Architects and Builders- An Introduction; Arnold, London1997

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus : Na

Topics beyond syllabus/Advanced topics/Design : Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Laboratory experiments/teaching aids
Industrial/guest lectures
Industrial visits/in-plant training
Self- learning such as use of NPTEL materials and internets
Simulation

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2 nos 10 marks each)	20
Assignment	05

Assessment Compoents	CO1	CO2	CO3
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (2 nos 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	M	H	L	H	H	H	M	L	H	H
2	H	H	H	M	H	M	H	H	M	L	H	H
3	H	H	H	H	M	H	M	L	M	M	M	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD 1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2
CD 2	Tutorials/Assignments		CO2	CD1, CD4
CD 3	Seminars		CO3	CD1 ,CD2and CD4
CD 4	Mini projects/Projects			
CD 5	Laboratory experiments/teaching aids			
CD 6	Industrial/guest lectures			
CD 7	Industrial visits/in-plant training			
CD 8	Self- learning such as use of NPTEL materials and internets			
CD 9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1-L2		1	Aluminum & important alloys and brief description of uses	T5, R1	CO1		PPT Digi Class/Chock -Board	
2	L3-L4			Copper & important alloys and brief description of uses	T1	CO1		PPT Digi Class/Chock -Board	

3	L4-L6			Corrosion of both ferrous and non-ferrous metals – types and preventive measures.	T1	CO1		PPT Digi Class/Chock -Board	
4	L7-L8			Roofing Tiles their properties and use, terra-cotta, earthenware, stoneware, porcelain, vitreous.	T1	CO2		PPT Digi Class/Chock -Board	
5	L9-L11			IPS flooring, Terrazzo flooring, Vitrified tiles, planks , Stone Sizes, Classification & Properties of tiles used in wall and flooring, Selection criteria & Methods of fixing various types of tiles.	T3,R1	CO2, CO3		PPT Digi Class/Chock -Board	
6	L12 - L15			Water repellent, Waterproofing compounds, Accelerators, Air entraining agents, Hardeners, plasticizer, Fly ash Their availability and uses,	T2,R2	CO1 CO2 CO3		PPT Digi Class/Chock -Board	
7	L16 - L18			Light weight concrete, ready-mix concrete, precast concrete.	T4,R1	CO2		PPT Digi Class/Chock -Board	
8	L19 - L21			Characteristics and process of varnishing, Type and	T3,R1	CO2		PPT Digi Class/Chock -Board	

				Compositions of Paints.					
9	L22 - L24			Types of painting system: Aluminum paints, Cement-based paints, oil emulsion paints, Enamel paints and Their selection criteria.Texture Paints.	T3,R1	CO3		PPT Digi Class/Chock -Board	
10	L25 - L26			Types and Use of Plastic in building construction, Properties of Plastic.	T2,R1	CO2 CO3		PPT Digi Class/Chock -Board	
11	L27 - L29			Use of various Polymer Materials in building industry	T4,R2	CO1		PPT Digi Class/Chock -Board	
12	L30			Use of Nano-paints.	R1			PPT Digi Class/Chock -Board	
12	L31 - L32			Glass, Fibre glass	T1,T3,R1	CO1		PPT Digi Class/Chock -Board	
13	L33 - L34			Cork, rubber, Gypsum, sealants	T1,T3,R1	CO1		PPT Digi Class/Chock -Board	
14	L35 - L38			Heat and sound insulative materials, Their trade name anduses.	T3,R2	CO3		PPT Digi Class/Chock -Board	

COURSE INFORMATION SHEET

Course code: AR 152
Course title: HISTORY OF ARCHITECTURE -WESTERN
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 **L: 3** **T: 0** **P: 0**
Class schedule per week: 03
Class: B. Arch
Semester / Level: II
Branch: Architecture
Name of Teacher: Apurv Ashish

Course Objectives

Grossly divided, architecture of the World are of two type – Oriental (eastern) and Occidental (western). Students of Architecture in this course have been exposed to the former in the previous semester, where they have studied the more spiritual approach towards buildings and their design. In this subject, they would be taught about the more materialistic and philosophical approach of the occidental school of thought. This course enables the students:

A.	To teach the development of occidental, henceforth mentioned as Western architecture along time scale, with the help of chronological development of civilizations across the globe.
B.	To impart knowledge about the art & architecture of the European, Egyptian & Middle eastern cultures, which have served as the cradle of human civilization during the ancient and the classical periods.
C.	To explain the relationship between culture, building art and construction techniques of space and time.
D	To teach the student the analysis of social, political, religious, climatological and financial factors and how they have influenced architecture.

Course Outcomes

After the completion of this course, students will be able to:

1.	Develop an appreciation of varied cultures and the resulting architectural productions which are unique in time and place.
2.	Improve their knowledge about place and culture by studying the planning, construction, and aesthetics of important historical buildings ie. Western Architecture.
3.	Build basic concepts for subjects like Principles of Human Settlements, Model Making Workshop, Contemporary Architecture etc.
4.	Improve their knowledge about the historical context and explore their contemporary design implications.

Syllabus-

Module 1: Primitive, Mesopotamian and Egyptian Architecture.

A. Development of forms of shelters and megalithic structures.
B. Salient building types :Ziggurats, Temples, Palaces, Housing and Town Planning Aspects (Mesopotamian)
   - Sumerians- City of Ur, White temple at Uruk, Great Ziggurat, Ur, Oval Temple at Khafaje.
   - Assyrians- Palace of Sargon, City of Khorsabad, Nineveh.

- Babylonians- City of Babylon, Nebuchadnezzar's Palace.
- Persians- Palace of Persepolis.

C. Salient building types: Development of Pyramids, Cult and Mortuary Temples, Housing and Town Planning Aspects (Egyptian)

- Ancient Egyptian Period- Mastabas, Bent Pyramid, Pyramids of Giza (Parts of Pyramid).
- Middle Egyptian Period- City of Hotepsenusret.
- New Empire- Temple at Abu Simbel, Great Temple at Karnak..

Module 2: Classical Architecture: Greek and Roman Architecture.

A. Greek Architecture -

I. Early Greek Period (Minoan Period)- Barrow Tombs, Minoan Palace at Knossos, Crete and Lion Gate, Mycenae.

II. Ancient Greek Period (Hellenic period)-

- Development of Classical Order – Doric, Ionic, Corinthian.
- City planning aspects of Athens, Priene.
- Relevance of open spaces
- Salient building types: Salient features of Greek Houses, Development of Temple types and Temples at Acropolis eg. Pantheon, Stoas, Theatre of Epidarus.
- Technology of Optical Correction (Entasis).

B. Roman Architecture

- Contribution in new materials and new construction/structural systems, eg, Pozzolana, Cement, Stone Blocks, Stone Masonry, Arch, Barrel and Groin Vault, Dome.
- Development of Tuscan and Composite order.
- Salient building Types: Parthenon, Forums, Colosseum, Circus Maximus, Thermaeof Caracalla, Basilica of Trajan.

Module 3: Early Christian, Romanesque and Byzantine Architecture.

A. Early Christian Architecture: Development of Early Christian Church from Roman Basilica. Example – St. Peter's Basilica

B. Romanesque Architecture: Development of Romanesque architecture from Early Christian architecture. Example- Pisa Complex.

C. Byzantine Architecture:

- Contribution of Byzantine architecture in the development of structural system – dome construction over square plan,
- Adoption of Greek cross in church layout.
- Use of mosaic and mural in interior.
- Case example – Saint Hagia Sophia, Istanbul; St. Mark's Cathedral, Venice.

Module 4:Gothic Architecture

A. Development of Gothic church and its new elements:

- Pointed Arch window
- Different arch types – lancet, equilateral, depressed
- Trefoil arch
- Cluster column and intersecting vault roof
- Clerestory window and triforium
- Flying buttress
- Glazed window, stone and metal trellis, flamboyant window, rose window
- Entrance of church

Case example – Cathedrals of Chartres, St. Dennis, Notre Dame (Paris), Reims.

Module 5: Renaissance Architecture

A. Division of Renaissance architecture into Early, Mature and Late periods.
B. Contribution in structural system, eg, Ribbed dome, Lantern dome.
Case example–St. Peter's Cathedral (Rome), Louvre Palace (Paris).

Text Books:

1. Sir Banister Fletcher, A History of Architecture, University of London, the Antholone Press, 1986.
2. G.K.Hiraskar, Great Ages of World Architecture, DhanpatRai& Sons, Delhi.
3. Moffet, M., Fazio, M. and Wodehouse, L., "A World History of Architecture", McGraw-Hill. 2008.

Reference Books:

1. Watkin, D., "A History of Western Architecture", Thames and Hudson. 1986.
2. S. Lloyd and H.W. Muller, History of World Architecture – Series, Faber and Faber Ltd. London, 1986.

POs met through Gaps in the Syllabus: Nil

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced Topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Self- learning such as use of NPTEL materials and internet.

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2nos. of 10 marks each)	20
Assignment	15

Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**
Mid Sem Examination Marks	√	√	√	√
End Sem Examination Marks	√	√	√	√
Quiz (2nos. of 10 marks each)	√	√	√	√
Assignment	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	L		M		M	M	L		M		M
2	H	L		M	L	H	M	M		H	L	M
3	H	M		M	L	H	M	L	L	L		H
4	H	M		M	L	M	H	M	L	M		M

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2, CO4
CD2	Tutorials/Assignments	CO1, CO2, CO4
CD3	Seminars	CO2, CO3
CD4	Self- learning such as use of NPTEL materials and internet	CO1, CO2, CO3, CO4

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			Development of Shelters and Megalithic structures.	T1, T3	CO1, CO2, CO3		PPT Digi Class/Chalk-Board	
1	L2-L3			**Sumerians**- City of Ur, White temple at Uruk, Great Ziggurat, Ur, Oval Temple at Khafaje.	T1, T3, R2	CO1, CO2, CO4		PPT Digi Class/Chalk-Board	
2	L4			**Assyrians**- Palace of Sargon, City of Khorsabad, City of Nineveh.	T1, T3, R1	CO1, CO3		PPT Digi Class/Chalk-Board	
2	L5-L6			**Babylonians**- City of Babylon, Nebuchadnezz	T3, R1	CO1, CO2, CO3		PPT Digi Class/Chalk-Board	

				ar's Palace. **Persians**- Palace of Persepolis.					
3	L7-L8			**Ancient Egyptian Period**- Mastabas, Bent Pyramid, Pyramids of Giza (Parts of Pyramid). **Middle Egyptian Period**- City of Hotepsen-usret.	T2, T3	CO2, CO3, CO4		PPT Digi Class/Chalk -Board	
3	L9			**New Egyptian Empire**- Temple at Abu Simbel, Great Temple at Karnak..	T2, T3, R2	CO1, CO2		PPT Digi Class/Chalk -Board	
4	L10-L11			**Early Greek Period**- Barrow Tombs, Minoan Palace at Knossos, Crete and Lion Gate, Mycenae.	T1, T3, R1	CO1, CO2, CO4		PPT Digi Class/Chalk -Board	
4	L12			**Ancient Greek Period** (**Hellenic period**)- Development of Classical Order – Doric, Ionic, Corinthian.	T1, T2	CO1, CO2		PPT Digi Class/Chalk -Board	
5	L13-L14			**Greek Period- City planning** aspects of Athens, Priene. Relevance of open spaces during Greek	T1, T3, R2	CO2, CO3, CO4		PPT Digi Class/Chalk -Board	

				Period.Sal-ient building types: Salient features of Greek Houses.					
6	L15-L16			**Greek Period-** Development of Temple types and Temples at Acropolis eg. Pantheon	T1, T3, R1	CO1, CO2, CO4		PPT Digi Class/Chalk -Board	
7	L17-L18			**Greek Period-** Development of Temple types and Temples at Acropolis eg. Pantheon, Stoas, Theatre of Epidarus. Technology of Optical Correction (Entasis).	T1, T3 R2	CO1, CO3, CO4		PPT Digi Class/Chalk -Board	
8	L19-L20			**Roman Architecture-** Contribution through new materials and new construction/st ructural systems, eg, Pozzolana, Cement, Stone Blocks, Stone Masonry, Arch, Barrel and Groin Vault, Dome.	T2, T3 R2, R3	CO1, CO2		PPT Digi Class/Chalk -Board	
8	L21-L22			**Roman Architecture-** Development of Tuscan and Composite order. Salient building Types: Parthenon, Forums, Colosseum.	T1, T3	CO1, CO2		PPT Digi Class/Chalk -Board	
9	L23-			**Roman**	T1,	CO1,		PPT Digi	

	L24			**Architecture-** Salient building Types: Parthenon, Forums, Colosseum, Circus Maximus, Thermae of Caracalla, Basilica of Trajan.	T2, T3, R1	CO2, CO4		Class/Chalk -Board	
10	L25-L27			**Early Christian Architecture-** Development of Early Christian Church from Roman Basilica. Example – St. Peter's Basilica	T1, T3, R2	CO1, CO2		PPT Digi Class/Chalk -Board	
11	L28-L29			**Romanesque Architecture-** Development of Romanesque architecture from Early Christian architecture. Example- Pisa Complex.	T1, T3	CO1, CO2, CO4		PPT Digi Class/Chalk -Board	
12	L30-L31			**Byzantine Architecture-** Contribution of Byzantine architecture in the development of structural system – dome construction over square plan, Adoption of Greek cross in church layout.	T1, T2, T3	CO1, CO2, CO4		PPT Digi Class/Chalk -Board	
12	L32-L33			**Byzantine Architecture-** Use of mosaic and mural in	T1, R3	CO1, CO2		PPT Digi Class/Chalk -Board	

				interior. Case example – Saint Hagia Sophia, Istanbul;					
12	L34-L35			**Byzantine Architecture**-Case example: St. Mark's Cathedral, Venice.	T1, T2, R2	CO1, CO2, CO4		PPT Digi Class/Chalk -Board	
13	L36			**Gothic Architecture**-Development of Gothic church and its new elements: Pointed Arch window Different arch types – lancet, equilateral, depressed Trefoil arch	T1, T3	CO1, CO2, CO4		PPT Digi Class/Chalk -Board	
13	L37-L38			**Gothic Architecture**-Cluster column and intersecting vault roof Clerestory window and triforium Flying buttress Glazed window, stone and metal trellis, flamboyant window, rose window Entrance of church Case example – Cathedrals of Chartres	T1, T3, R1, R2	CO1, CO2, CO4		PPT Digi Class/Chalk -Board	
14	L39-L40			**Gothic Architecture**-Case example –St. Dennis,	T1, T3, R3	CO1, CO2		PPT Digi Class/Chalk -Board	

				Notre Dame (Paris), Reims.					
14	L41-L42			**Renaissance Architecture**-Division of Renaissance architecture into Early, Mature and Late periods. Contribution in structural system, eg, Ribbed dome, Lantern dome.	T1, T2, T3	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
15	L43-L44			**Renaissance Architecture**-Case example –St. Peter's Cathedral (Rome), Louvre Palace (Paris).	T1, T3, R2	CO2, CO3, CO4		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR 153
Course title: STATICS AND STRENGTH OF MATERIALS
Pre-requisite(s): Mathematics course with ordinary differential equations
Co- requisite(s): None
Credits:3 L:3 T: 0 P:0
Class schedule per week: 03
Class: B. Arch
Semester / Level: II
Branch: Architecture
Name of Teacher:

Course Objectives

This course enables the students:

A.	To understand the equilibrium conditions of different force systems in two-dimensional plane
B	To understand stress-strain behaviour of ductile and brittle materials in their elastic limit.
C	To draw shear force and bending moment diagram of statically determinate beams subjected to different types of loads.

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand the basic principle of statics and strength of materials theorems and to apply the concept in structural problems.
2.	Analyse force applied to the truss members in simple and plane truss.
3.	Evaluate centre of gravity and centroid of solid objects and plane figures, respectively
4.	Analyse elastic behaviour of ductile and brittle materials
5.	Evaluate shear force and bending moment of the beams subjected to different types of loads

Syllabus

Module 1: Introduction to Statics

Basic principle of statics, coplanar and concurrent system of forces,Principle of Transmissibility, two-dimensional force systems, free body diagrams, moment and couple,Force-Couple Systems, Varignon's theorem of moment, resultant of force systems, and conditions of equilibrium.

(8 Lectures)

Module 2: Truss and Structures

Plane truss, simple truss**,** redundant, analysis of simple plane truss using method of sections and method of joints, and graphical solutions for force analysis of trusses.

(8 Lectures)

Module 3:Center of Gravity and Centroid

Center of gravity of solid objects, determination of centroid of plane and curve areas, Moment of Inertia of plane figures, Polar moment of inertia, parallel axis theorem, and radius of gyration.

(8 Lectures)

Module 4: Simple Stress and Strain

Concept of stress and strain – normal and shear,Poisson's ratio,stress-strain diagrams for ductile and brittle materials,elasticity and plasticity, linear elasticity and Hooke's Law, Young's modulus, modulus of rigidity, volumetric strain and bulk modulus, relations between Young's modulus, modulus of rigidity, and bulk modulus, allowable loads and factor of safety for ductile and brittle materials.

(9 Lectures)

Module 5: Shear Force and Bending Moment

Types of supports, beams, and loads, statically determinate and indeterminate beams, degree of statical indeterminacy, equilibrium of a beam, shear force and bending moment, relationship between shear force, bending moment and load intensity, shear force and bending moment diagrams for statically determinate beams subjected to different types of loads, point of contraflexure.

(9 Lectures)

Text books:

1. J.L. Meriam and L. G. Kraige, *Engineering Mechanics: Statics*, John Wiley & Sons, Inc.
2. J. M. Gere and S. P. Timoshenko, *Mechanics of Materials*, Springer-Science+Business Media, B.V.

Reference books:

1. I. H. Shames, *Engineering Mechanics: Statics and Dynamics*, Prentice Hall,New Jersey
2. I.B. Prasad, *A text book of Applied Mechanics: Dynamics and Statics*, Khanna Publishers
3. S. Ramamurtham, *Strength of Materials*, DhanpatRai Publications
4. S. S. Rattan, *Strength of Materials,* Tata McGraw-Hill Publishers.

Gaps in the syllabus (to meet Industry/Profession requirements):
Analysis of torsion and combined stresses

POs met through Gaps in the Syllabus:
PO1, PO2, and PO4

Topics beyond syllabus/Advanced topics/Design:
Stress-strain behaviour of materials using tensorial approach

POs met through Topics beyond syllabus/Advanced topics/Design
PO1, PO2, and PO4

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects

Laboratory experiments/teaching aids
Industrial/guest lectures
Industrial visits/in-plant training
Self- learning such as use of NPTEL materials and internets
Simulation

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2nos. of 10 marks each)	20
Assignment	15

Assessment Compoents	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (2nos. of 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes			
	1	2	3	4
1	H	M	-	H
2	H	M	-	L
3	L	-	-	L
4	H	M	L	M
5	M	L	-	L

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD 1	Lecture by use of boards/LCD projectors/OHP projectors		CO1-5	CD1
CD 2	Tutorials/Assignments		CO1-5	CD2
CD 3	Seminars			
CD 4	Mini projects/Projects			
CD 5	Laboratory experiments/teaching aids			

CD 6	Industrial/guest lectures			
CD 7	Industrial visits/in-plant training			
CD 8	Self- learning such as use of NPTEL materials and internets			
CD 9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / Refere nces	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1		1	Basic principle of statics, coplanar and concurrent system of forces	T1, R1, R2	1		PPT Digi Class/Chalk-Board	
1	L2		1	Basic principle of statics, coplanar and concurrent system of forces	T1, R1, R2	1		PPT Digi Class/Chalk-Board	
1	L3		1	Principle of Transmissibility, two-dimensional force systems	T1, R1, R2	1		PPT Digi Class/Chalk-Board	
2	L4		1	Principle of Transmissibility, two-dimensional force systems	T1, R1, R2	1		PPT Digi Class/Chalk-Board	
2	L5		1	free body diagrams, moment and couple,Force-Couple Systems	T1, R1, R2	1		PPT Digi Class/Chalk-Board	
2	L6		1	Varignon's theorem of moment	T1, R1, R2	1		PPT Digi Class/Chalk-Board	
3	L7		1	resultant of force systems, and conditions of equilibrium	T1, R1, R2	1		PPT Digi Class/Chalk-Board	
3	L8		1	resultant of force systems, and conditions	T1, R1, R2	1		PPT Digi Class/Chalk-Board	

				of equilibrium					
4	L9		2	Plane truss, simple truss**,** redundant	T1, R1, R2	2		PPT Digi Class/Chalk -Board	
4	L10		2	Plane truss, simple truss**,** redundant	T1, R1, R2	2		PPT Digi Class/Chalk -Board	
4	L11		2	analysis of simple plane truss using method of sections and method of joints	T1, R1, R2	2		PPT Digi Class/Chalk -Board	
5	L12		2	analysis of simple plane truss using method of sections and method of joints	T1, R1, R2	2		PPT Digi Class/Chalk -Board	
5	L13		2	analysis of simple plane truss using method of sections and method of joints	T1, R1, R2	2		PPT Digi Class/Chalk -Board	
5	L14		2	analysis of simple plane truss using method of sections and method of joints	T1, R1, R2	2		PPT Digi Class/Chalk -Board	
6	L15		2	graphical solutions for force analysis of trusses	T1, R1, R2	2		PPT Digi Class/Chalk -Board	
6	L16		2	graphical solutions for force analysis of trusses	T1, R1, R2	2		PPT Digi Class/Chalk -Board	
6	L17		3	Center of gravity of solid objects	T1, R1, R2	3		PPT Digi Class/Chalk -Board	
7	L18		3	determination of centroid of plane and curve areas	T1, R1, R2	3		PPT Digi Class/Chalk -Board	
7	L19		3	determination of centroid of plane and curve areas	T1, R1, R2	3		PPT Digi Class/Chalk -Board	

7	L20		3	Moment of Inertia of plane figures	T1, R1, R2	3		PPT Digi Class/Chalk -Board	
8	L21		3	Moment of Inertia of plane figures	T1, R1, R2	3		PPT Digi Class/Chalk -Board	
8	L22		3	Polar moment of inertia, parallel axis theorem	T1, R1, R2	3		PPT Digi Class/Chalk -Board	
8	L23		3	Polar moment of inertia, parallel axis theorem	T1, R1, R2	3		PPT Digi Class/Chalk -Board	
9	L24		3	radius of gyration	T1, R1, R2	3		PPT Digi Class/Chalk -Board	
9	L25			Concept of stress and strain – normal and shear	T2, R3, R4	4		PPT Digi Class/Chalk -Board	
9	L26			Concept of stress and strain – normal and shear	T2, R3, R4	4		PPT Digi Class/Chalk -Board	
10	L27			Concept of stress and strain – normal and shear	T2, R3, R4	4		PPT Digi Class/Chalk -Board	
10	L28			stress-strain diagrams for ductile and brittle materials	T2, R3, R4	4		PPT Digi Class/Chalk -Board	
10	L29			elasticity and plasticity, linear elasticity and Hooke's Law	T2, R3, R4	4		PPT Digi Class/Chalk -Board	
11	L30			elasticity and plasticity, linear elasticity and Hooke's Law	T2, R3, R4	4		PPT Digi Class/Chalk -Board	
11	L31			Young's modulus, modulus of rigidity, volumetric strain and bulk modulus	T2, R3, R4	4		PPT Digi Class/Chalk -Board	
11	L32			relations between Young's modulus,	T2, R3, R4	4		PPT Digi Class/Chalk -Board	

				modulus of rigidity, and bulk modulus					
12	L33			allowable loads and factor of safety for ductile and brittle materials	T2, R3, R4	4		PPT Digi Class/Chalk -Board	
12	L34			Types of supports, beams, and loads	T2, R3, R4	5		PPT Digi Class/Chalk -Board	
12	L35			Types of supports, beams, and loads	T2, R3, R4	5		PPT Digi Class/Chalk -Board	
13	L36			statically determinate and indeterminate beams	T2, R3, R4	5		PPT Digi Class/Chalk -Board	
13	L37			statically determinate and indeterminate beams	T2, R3, R4	5		PPT Digi Class/Chalk -Board	
13	L38			degree of statical indeterminacy, equilibrium of a beam	T2, R3, R4	5		PPT Digi Class/Chalk -Board	
14	L39			shear force and bending moment, relationship between shear force, bending moment and load intensity	T2, R3, R4	5		PPT Digi Class/Chalk -Board	
14	L40			shear force and bending moment diagrams for statically determinate beams subjected to different types of loads, point of contraflexure	T2, R3, R4	5		PPT Digi Class/Chalk -Board	
14	L41			shear force and bending moment	T2, R3, R4	5		PPT Digi Class/Chalk -Board	

				diagrams for statically determinate beams subjected to different types of loads, point of contraflexure					
15	L42			shear force and bending moment diagrams for statically determinate beams subjected to different types of loads, point of contraflexure	T2, R3, R4	5		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: **AR 161**
Course title: **ARCHITECTURAL DESIGN II**
Pre-requisite(s): The students should have registered for AR 111 Architectural Design-I
Co- requisite(s): None
Credits: 9 **L: 0 T: 0 P:6**
Class schedule per week: **06**
Class: **B. Arch**
Semester / Level: **II**
Branch: **Architecture**
Name of Teacher: **Prof. Ritu Agrawal**

Course Objectives:

This course enables the students:

A.	To introduce the process of architectural design - from inception to representation.
B.	To identify, analyse and relate the concepts of space, form and order in the context of three-dimensional designed space. To design objects based on the concept of space and form.
C.	To identify and classify different functional spaces, their relationships and analyse their space requirements.
D.	To identify the human standards of design based on ergonomics, and relate activities to spatial data (dimensions, space-defining/establishing elements).
E.	To understand and apply the design theory and principles of design for small buildings.

Course Outcome:

After the successful completion of the course, student will be able:

1.	To develop critical and analytical thinking skills in the context of the concepts of space, form and order.
2.	To understand, distinguish and analyse three dimensional designed spaces, wide range of functions and their relationships.
3.	To comprehend human standards of design based on ergonomics.
4.	To represent the forms in terms of drawings and 3D models.
5.	To design various components of different functional spaces with an integration of the principles of composition and design.

Syllabus

1. Relationship between Basic Design and Architectural Design: comprehensive understanding of space, form, function and design.
   Study of 3D forms/shades and shadow study and composition.

2. Application of elements of design to achieve design principles in creative work.
   Design of small objects (parts of building, like, window grill, boundary wall, floor tiles and similar projects) with respect to function structure aesthetics.

3. Introduction to external and internal form concept, their quality, concept of space, relation of space and volume.
   Approach to design as a continuous process through aesthetics, function and technology; study of basic components of a building and their functions.
   Study of basic human needs, standard measurements of human activities and allocation of spaces: Examples of Dimensions of different rooms.

4. Principle of design with reference to function, various activities and related spaces; Data collection, environments, climate, orientation, site conditions, circulation flow diagrams.
   Concepts of Anthropometrics and ergonomics.
   Study and concept of measured drawings of small buildings.
   Study and design of single units like living spaces, sleeping and cooking spaces, stalls, bus-stops, telephone booths, Rest pavilion, Picnic shelter, Small Florist's shop, Hostel room, Public Toilet, Internet Booth, Kids' Toy shop, Coffee shop, Fast-food restaurant, Yoga centre, Lodge in forest /hill etc. Detailed design of single room for simple function showing relationship with adjoining areas for other activities not more than 25 sq.mts.

5. Design assignments should gradually build up in complexity, starting from single spatial unit, through multiple attached units, to clustering of several units.

   Design problems dealing with planning for activities such as individual living units shops, stalls, snack bars, unilevel activities with three to four functions of total area up to 80 sq.mts; Residence design for single family - (site to be given & shown to students for better understanding and sensitivity towards site analysis).

Sessional Work: Assignments based on the above topics. Total – 10-12 sheets.

Importance should be given on sketching and communicating the design / study through effective two and three-dimensional drawings / sketches and models.

Viva-voce: Final Viva-vice on all the design assignments to be conducted at the end of the semester by experts from the field.

Reference Books:

1. C. D. Joseph and Callender John; Time Saver Standards for Building Types.
2. C. D. Joseph and Callender John; Time Saver Standards for Architectural Design Data.
3. Christopher Alexander; A Pattern Language.
4. Francis D.K. Ching; – Architecture: Form Space and Order; Van Nostrand Reinhold Co., (Canaa), 1979.
5. A George and Bruce Hannah," Access by Design", Van Nostrand Reinhold, 1996.

6. Pearce Peter; Structure in Nature – Strategy for Design.
7. Peter Fawcett A.; Architecture Design Notebook. http://www.scribd.com/doc/45018090/Architecture-Design-Notebook
8. Pickering, Ernest; Architectural Design, John Wiley and Sons Inc., Canada, 1949.
9. Marjore Elliott Bevin, "Design through Discovery", Holt Rinehart and Winton,NewYork,1977.
10. Neufert's Architect's Data.3rd Ed., Blackwell Science. 2000.
11. V.S. Paramar, Design Fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi – 1973.
12. Von MeissPieree; Elements of Architecture.
13. Francis D K Ching, A Visual Dictionary of Architecture, John Wiley & Sons, Inc.
14. James C Snyder and Anthony J. Catanese, Introduction to Architecture, McGraw-Hill, 1980.
All Books, journals and magazines on Architecture

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	CO1	CO2	CO3	CO4	CO5
Progressive Evaluation	√	√	√	√	√
End Sem Evaluation	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1.	H	L	-	L	L	-	-	-	-	-	-	-
2.	H	H	L	L	L	-	-	-	-	-	-	-
3.	H	L	-	M	L	-	-	-	-	-	-	-
4.	M	H	M	M	L	-	-	-	-	-	-	-
5.	H	H	H	H	M	-	-	-	-	L		

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2, CO3,
CD2	Mini projects/Projects	CO2, CO3,
CD3	Laboratory experiments/teaching aids	CO3,
CD4	Industrial/guest lectures	CO2, CO3

Lecture wise Lesson planning Details

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
29.	L1, L2			Relationship between Basic Design and Architectural Design: comprehensive understanding of space, form, function and design.	R1, R2, R3, R4	CO1		PPT Digi Class /Chalk -Board	
30.	L3, L4			Relationship between Basic Design and Architectural Design: comprehensive understanding of space, form, function and design.	R1, R2, R3	CO1		PPT Digi Class /Chalk -Board	
31.	L5, L6			Study of 3D forms/shades and shadow study and composition.	R1, R2, R3	CO1, CO2		PPT Digi Class /Chalk -Board	
32.	L7, L8			Application of elements of design to achieve design principles in creative work.	R1, R2, R3, R11	CO1, CO2		PPT Digi Class /Chalk -Board	
33.	L9, L10			Design of small objects (parts of building, like, window grill, boundary wall, floor tiles and similar projects) with respect to function structure aesthetics.	R1, R2, R3, R11	CO1, CO2, CO3		PPT Digi Class /Chalk -Board	
34.	L11, L12			Concepts of Anthropometrics and ergonomics.	R1, R2, R3, R10	CO1, CO4, CO3		PPT Digi Class /Chalk -Board	
35.	L13, L14			Study of basic human needs, standard measurements of human activities and allocation of spaces: Examples of Dimensions of different rooms.	R1, R2, R3, R11	CO2, CO3, CO4, CO5			
36.	L15, L16			Study and concept of measured drawings of small buildings.	R1, R2, R3, R11, R12,	CO2, CO4		PPT Digi Class /Chalk -Board	

					R14.				
37.	L17, L18			Study and concept of measured drawings of small buildings. Study and design of single units like living spaces, sleeping and cooking spaces, stalls, bus-stops, telephone booths, Rest pavilion, Picnic shelter, Small Florist's shop, Hostel room, Public Toilet, Internet Booth, Kids' Toy shop, Coffee shop, Fast-food restaurant, Yoga centre, Lodge in forest /hill etc. Detailed design of single room for simple function showing relationship with adjoining areas for other activities not more than 25 sq.mts. Discussion and review	R1, R2, R3, R11, R12, R14.	CO2, CO3, CO4		PPT Digi Class /Chalk -Board	
38.	L18, L20			Principle of design with reference to function, various activities and related spaces; Data collection, environments, climate, orientation, site conditions, circulation flow diagrams. Concepts of Anthropometrics and ergonomics.	R1, R2, R3, R12, R13, R14.	CO2, CO3, CO4		PPT Digi Class /Chalk -Board	
39.	L21, L22			Design problems dealing with planning for activities such as individual living units shops, stalls, snack bars, unilevel activities with three to four functions of total area up to 80 sq.mts.	R1, R2, R3, R12, R13, R14.	CO2, CO3, CO4		PPT Digi Class /Chalk -Board	
40.	L21, L23			Design problems dealing with planning for activities such as individual living units shops, stalls, snack bars, unilevel activities with three to four functions of total area up to 80 sq.mts. Discussion and review	R1, R2, R3, R12, R13, R14.	CO2, CO3, CO4		PPT Digi Class /Chalk -Board	

41.	L24, L25			Detailed design of single room for simple function showing relationship with adjoining areas for other activities not more than 25 sq.mts.	R1, R2, R3, R12, R13, R14.	CO2, CO3, CO4, CO5		PPT Digi Class /Chalk -Board	
42.	L26, L27			Detailed design of single room for simple function showing relationship with adjoining areas for other activities not more than 25 sq.mts. Discussion and review	R1, R2, R3, R12, R13, R14.	CO2, CO3, CO4, CO5		PPT Digi Class /Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR 162
Course title: BUILDING CONSTRUCTION I
Pre-requisite(s): None
Co- requisite(s): None
Credits: 6 L:0 T:0 P:4
Class schedule per week: 04
Class: B. Arch
Semester / Level: II
Branch: Architecture
Name of Teacher: Rajan Chandra Sinha

Course Objectives

This course enables the students:

A.	To label the various parts of building
B.	To develop the brick bond for different types of wall junction
C.	To compare the material consumption in various brick bonds
D.	To apply the different types of Door Window detailing in building application
E.	**To classify the requirement of DPC in various levels in building**

Course Outcomes

After the completion of this course, students will be able:

1.	To **define** basic building elements
2.	To **recognize** the various types of masonry, arches and foundation made up of suitable materials.
3.	To **recognize** the various types of doors and windows and **explain** the suitability of given doors and windows based on functional requirement and spatial context.
4.	To **recognize** the importance and constituents waterproofing requirement at different levels and **apply** waterproofing treatment at different levels

Syllabus

BASIC BUILDING COMPONENTS:
Development of Plan & Section of a small building to understand foundation, plinth, flooring, sill, lintel, roof slab and parapet. Typical Building Skin Section for a Two Storied House.

No. of sheets: 1

SHALLOW FOUNDATION:
Types, Isolated, combined and raft foundations and their construction techniques.

No. of sheets: 1

BRICK MASONRY AND ARCHES:
Types of Brick bonds: English, Flemish & Rat-trap bond**.** Detail brick layout at corners, junctions and brick columns.
Classification of Arches on the basis of geometrical shape, materials, construction techniques, viz. flat, segmental, semi-circular, Tudor, circular, elliptical, semi-elliptical, venetian, Florentine arches, etc. Illustration of terminology for arches, construction detailing and methods of centering.

No. of sheets: 3

DOORS & WINDOWS:

Details of door and ventilator. Battened /ledged/Braced door, Flush/Panelled door. Venetian door. Details of window, glazed, pivoted, louvered window, corner and bay window.

No. of sheets: 3

D.P.C. DETAILS:

Waterproofing details in different levels: Details of simple foundation, wall, roof, Details of sill, lintel and roof in RCC, RB and steel, Damp proof details of basement, plinth, sill, lintel, and roof level.

No. of sheets: 2

SITE STUDY & REPORT: different types of brick bonds in wall & Paving with sketches and some photographs, Traditional building component and Wood works

Text books:

1.Building Construction Illustrated by Francis D. K. Ching
2.Building Construction by W B Mackay (Volume 1 and Volume 2)
3.Building Construction by B C Punmia, Ashok K. Jain and Arun K. Jain
4.Building Construction Handbook by R. Chudely

Reference books:

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	60
End Sem Evaluation	40

Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**
Progressive Evaluation	√	√	√	√
End Sem Evaluation	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	L	-	L	L	-	-	L	-	-	L	-	-
2	L	-	L	L	-	L	L	L	-	L	-	L
3	L	-	L	L	-	L	M	L	-	L	-	L
4	M	-	L	L	-	L	L	L	-	L	-	L

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2, CO3, CO4
CD2	Mini projects/Projects	CO2, CO3, CO4
CD3	Laboratory experiments/teaching aids	CO2, CO3, CO4
CD4	Industrial/guest lectures	CO2, CO3, CO4

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1-4			Development of Plan & Section of a small building	1,2,3,4	CO1		PPT, Chalk & talk, Illustrations	
2	5-6			Internal evaluation	NA	CO1		Drawing on sheets	
2-3	7-10			Types, Isolated, combined and raft foundations and their construction techniques.	1,2,3,4	CO2		PPT, Chalk & talk, Illustrations	
3	11-12			Internal evaluation	NA	CO2		Drawing on sheets	
4	13-16			Types of Brick bonds: English, Flemish & Rat-trap bond.	1,2,3,4	CO2		PPT, Chalk & talk, Illustrations	
5	17-18			Internal evaluation	NA	CO2		Drawing on sheets	

5	19-20			Detail brick layout at corners, junctions and brick columns.	1,2,3,4	CO2		PPT, Chalk & talk, Illustrations	
6	21-22			Internal evaluation	NA	CO2		Drawing on sheets	
6-7	23-24			Classificati on of Arches	1,2,3,4	CO2		PPT, Chalk & talk, Illustrations	
7	25-26			Internal evaluation	NA	CO2		Drawing on sheets	
`8	27-30			Details of door and ventilator	1,2,3,4	CO3		PPT, Chalk & talk, Illustrations	
9	31-32			Internal evaluation	NA	CO3		Drawing on sheets	
9-10	33-38			Waterproofi ng details in different levels	1,2,3,4	CO4		PPT, Chalk & talk, Illustrations	
11	39-40			Internal evaluation	NA	CO4		Drawing on sheets	
11	41-42			Site Visit	NA	CO1, CO2, CO3, CO4		Mini projects/Proj ects	
12-13	43-48			Report of site visit	NA	CO3		Mini projects/Proj ects	
13	49-50			Internal evaluation	NA			Mini projects/Proj ects	

COURSE INFORMATION SHEET

Course code: AR 163
Course title: ARCHITECTURAL RENDERING TECHNIQUES
Pre-requisite(s): None
Co- requisite(s): None
Credits: 2 L: 0 T: 0 P: 4
Class schedule per week: 04
Class: B. Architecture
Semester / Level: II
Branch: Architecture
Name of Teacher: Anuj Kumar Toppo

Course Objectives

This course enables the students:

A.	To introduce to the students the fundamentals of drawing
B.	The studio also introduces drawings and sketching skill
C.	This studio teaches the students to learn the basics of graphic design and three-dimensional composition
D.	The studio also has a direct interface with the drafting skill.

Course Outcomes

After the completion of this course, students will be:

1.	Sketch buildings and building component.
2.	Understand the shading pattern of the object.
3.	Control over the pencil and technical pens strokes.

Syllabus

Assignment 1: Techniques for rendering of various materials/textures No. of Sheets

Brickwork, stone, plastering, timber, tiles, flooring types, floor rugs, water, rock. Drawing and rendering of miscellaneous objects. Techniques of rendering the effects of lighting, shades, shadows on primary 3D objects like cubes, spheres, cones, cylinders, pyramids in different media. 03

NB: All the above Rendering techniques will be done with the Pencil and Pen & Ink on Opaque paper Using variant, Line (hatch) technique, dot rendering.

Assignment 2:Techniques for rendering an architectural plan No. of Sheets

Rendering of trees, shrubs, hedges in a plan
Rendering of different earths capes (natural and manmade) in a plan. 03
Rendering of a building plan using different materials

NB: All the above Rendering techniques will be done on Opaque and Transparent paper Using Pencil color, Oil Crayons, and their intermixing.

Assignment 3: Techniques of rendering an architectural elevation: No. of Sheets

Human figures- proportions and styles
Landscaping- Trees, plants, hedges used in elevations
Different hard landscape materials (street furniture, automobiles) 03
Rendering of a building elevation.

NB: All the above Rendering techniques will be done on Opaque and Transparent paper Using variant

Pencil, Pen & Ink, Pencil color, Oil Crayons, and their intermixing.

Assignment 4:Techniques of rendering perspective views. No. of Sheets

Perspective human figures, Trees and plants, Rendering of perspective views- indoor and outdoor. (One point and Two Point), Concept of Computer Aided rendering techniques. 03

NB: All the above Rendering techniques will be done on Opaque and Transparent paper Using variant Pencil, Pen & Ink, Pencil color, Oil Crayons, and their intermixing.

Text books:

Reference books:

1. Sherley W, MORGAN; *Architectural Drawing, McGraw Hill*
2. Arthur L. Guptill, Watson ;*Rendering in Pen and Ink,– Guptill Publications, New York*
3. Gill Robert, "*Rendering with pen and ink*".
4. Gordon Griece; *The Art of Architectural Illustration.*
5. John Chen *; Architecture in Pen and Ink.*
6. Ching, F. D. K. (1997).*Design Drawing.Hoboken : John Wiley & Sons*

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: Na

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Mini projects/Projects
CD2	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	50
End Sem Evaluation	50

AssessmentCompoents	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Assignment	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	L				M		L	L	H	M	L	M
2	L	L	L	L	M	L	L		L		L	L
3	L		L	L	M	L	L		L		L	L

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2
CD2	Mini projects/Projects	CO1, CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1-L3			Drawing and rendering of miscellaneous objects	R3,	CO1,CO3		PPT, Chalk & talk,	
2-3	L4-L6			Techniques of rendering the effects of lighting, shades, shadows on primary 3D objects	R3	CO1,CO3		PPT, Chalk & talk,	
4	L7-L10			Rendering of trees, shrubs, hedges in a plan	R2	CO1CO3		PPT, Chalk & talk,	
5	L11-L14			Rendering of different earths capes (natural and manmade) in a plan. Rendering of a building	R2	CO1,CO2		PPT, Chalk & talk,	

				plan using different materials					
6	L15 - L18			Human figures- proportions and styles	R1	CO1, CO2, CO3		PPT, Chalk & talk,	
7	L19 - L21			Landscaping- Trees, plants, hedges used in elevations	R5	CO2		PPT, Chalk & talk,	
8-9	L22 - L28			Different hard landscape materials (street furniture, automobiles)	R5	CO1, CO3		PPT, Chalk & talk,	
10	L29 - L31			Rendering of a building elevation.	R6	CO2		PPT, Chalk & talk,	
11-12	L32 - L38			Perspective human figuresTrees and plants	R5	CO1		PPT, Chalk & talk,	
13	L39 - L41			Rendering of perspective views- indoor and outdoor	R2	CO1, CO2, CO3		PPT, Chalk & talk,	
`14	L42 - L44			Concept of Computer Aided rendering techniques.	R4	CO1, CO2		PPT, Chalk & talk,	

SEMESTER III

COURSE INFORMATION SHEET

Course code: AR 201
Course title: CLIMATOLOGY
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: III
Branch: Architecture
Name of Teacher: Dr. Manjari Chakraborty

Course Objectives

This course enables the students:

A.	To acquire clear knowledge of the various climatic zones , climate factors and elements
B.	well equipped with scientific background required to design climate responsive architecture
C.	To acquire basic concepts of impact of different climate elements on human comfort
D.	To analyse and cultivate the interrelationship between natural and built environment

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand of relevance of climate consideration in built environment
2.	To apply relevant technologies to bring comfort in built environment
3.	Designing Climate responsive Architecture
4.	Understand tools & instruments utilized for measurement of climatic elements to relate with human comfort level

Syllabus

Module 1 : INTRODUCTION TO CLIMATOLOGY

Climate and Weather , Global Climate, Tropical Climate, Site Climate, Elements of Climate, Factors Effecting Climate, Effect of Climates on Habitat, Shelter and Environment

Module 2 : BIO-CLIMATIC APPROACH

Human Comfort Conditions, Thermal Comfort Factors, Bioclimatic Requirements, Relation of climatic elements to comfort. Comfort Zone & Bio-Climatic Chart

Module 3 : SUN & BUILDING DESIGN

Basic Principles of Heat Transfer, Thermal Insulation, Sunpath Diagram, Daylight Assessment, Visual Comfort, Solar Control & Sun Shading Device, Building Orientation and Placement

Module 4 : WIND & BUILDING DESIGN

Wind effect and Air Flow Pattern, Wind break and Wind Rose Diagram, Air movement around the buildings, Ventilation Technique-Stack Effect & induced air currents, Wind Effect on sitting of buildings

Module 5: CLIMATE RESPONSIVE ARCHITECTURE

Site Selection, Site Planning, Climate Responsive Landscaping, Shelter for warm-humid climates, Shelter for hot-dry climates, Shelter for composite climate

Reference books:

1. Narashimhan; An Introduction to Building Physics.
2. O.H. Koenigsberger and others, Manual of Tropical Housing and Building – Part I – Climatic Design, Longmans , 1980.
3. M.Evans- Houising Climate & Comfort – Architectural Press, Londan, 1980.
4. B. Givoni, Man, Climate and Architecture, Applied Science, Banking Essex, 1992.

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus : Nil

Topics beyond syllabus/Advanced topics/Design : Nil

POs met through Topics beyond syllabus/Advanced topics/Design : Nil

Course Delivery methods (Select whichever is required)
Lecture by use of boards/LCD projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Laboratory experiments/teaching aids
guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2 nos 10 marks each)	20
Assignment	05

Assessment Components	CO1	CO2	CO3	CO4
Mid Sem Examination Marks	√	√	√	√
End Sem Examination Marks	√	√	√	√
Quiz (2 nos 10 marks each)	√	√	√	√
Assignment	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H			L			M	L				
2	H											
3				M			M					
4	H							L				

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1,L2			Climate and Weather, Global Climate, Tropical Climate, Site Climate	T2, T4	1		PPT Digi Class/Chalk-Board	
2	L3,L4			Elements of Climate, Factors Effecting Climate,	T1	1		PPT Digi Class/Chalk-Board	
3	L5,L6			Effect of Climates on Habitat, Shelter and Environment	T1	1		PPT Digi Class/Chalk-Board	
4	L7,L8			Human Comfort Conditions, Thermal Comfort Factors,	T2	2		PPT Digi Class/Chalk-Board	
5	L9			Bioclimatic Requirements, Relation of climatic elements to comfort.	T2	2		PPT Digi Class/Chalk-Board	

6	L10			Comfort Zone & Bio-Climatic Chart	T2	2		PPT Digi Class/Chalk -Board	
7	L11			Basic Principles of Heat Transfer, Thermal Insulation,	T2	2		PPT Digi Class/Chalk -Board	
8	L12, L13			Sunpath Diagram, Daylight Assessment,	T3	2,3		PPT Digi Class/Chalk -Board	
9	L14-L17			Visual Comfort, Solar Control & Sun Shading Device,	T3	2,3		PPT Digi Class/Chalk -Board	
10	L18-19			Building Orientation and Placement	T2,T3	2,3		PPT Digi Class/Chalk -Board	
11	L20,21			Wind effect and Air Flow Pattern,	T2,T3	3		PPT Digi Class/Chalk -Board	
12	L22, L23			Wind break and Wind Rose Diagram	T2,T3	3		PPT Digi Class/Chalk -Board	
13	L24-25			Air movement around the buildings,	T2,T3	3		PPT Digi Class/Chalk -Board	
14	L26-L28			Ventilation Technique-Stack Effect & induced air currents, Wind Effect on siting of buildings	T2,T3	3		PPT Digi Class/Chalk -Board	
15	L29, L30			Site Selection, Site Planning	T2,T3	2,4		PPT Digi Class/Chalk -Board	
16	L31-L33			Climate Responsive Landscaping	T2	2,4		PPT Digi Class/Chalk -Board	
17	L34-			Shelter for	T2	2,3		PPT Digi	

	L36			warm-humid climates,				Class/Chalk -Board	
18	L37-38			Shelter for hot-dry climates	T2	4		PPT Digi Class/Chalk -Board	
19	L39-40			Shelter for composite climate	T2	4		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR 202
Course title: BUILDING CONSTRUCTION AND CODES
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: III
Branch: Architecture
Name of Teacher: Dr. Satyaki Sarkar

Course Objectives

This course enables the students:

A.	To understand the relationship between soil and application of different types of foundations.
B.	To understand the techniques of construction and repair for RCC construction in multistoried building.
C.	To develop knowledge on the current materials available and their applications.
D	To apply the various building bylaws and codal provisions in design of built environment.

Course Outcomes

After the completion of this course, students will be able to:

1.	Explain safety practices and procedures in construction practices;
2.	Describe commonly used construction materials and techniques for sub and super structure;
3.	Identify current construction practices and various methods of construction;
4.	Understand the application of building byelaws and codes in design and implementation;

Syllabus

Module 1: Soil and foundation:
Soil properties and Bearing Capacity of Different soil, Foundation: Types of foundation, different types of shallow and deep foundation including high-rise constructions, Raft foundation, foundation detail for RCC column, grillage foundation, Pile foundation – Different component and use of pile foundation. Causes of foundation failure and remedies,

Module 2: Techniques for constructing superstructures
Temporary supporting structures: Form work and shuttering for different types of RCC elements. Different types of materials for shuttering and their specifications. Scaffolding, shoring and underpinning: Different types, uses and their specifications, Techniques adopted in construction of foundation, and superstructure for high rise constructions.

Module 3: Smart construction material and techniques:
Super-performing material like High performance concrete, aerated concrete, light transmitting concrete, floating concrete, foamed aluminum, Aerogel, Thermoplastics, Super-performing materials, Hollow and Panel wall: different types of partition wall. Reinforced brick work.

Module 4: Building byelaws application:
Building byelaws, submission plan, methods of municipal approval, NBC, fire prevention and safety measures, other regulatory aspects such as master plan and zonal plan

Module 5: Codal provision:
Codal provisions with respect to Landuse classifications and use permitted, Means of Access, Community open spaces and amenities, Requirement of Plots. Codal provisions with respect to classification of buildings, Open spaces within a plot, Off-street parking spaces.

Text books:
1. Roy Chudley, Roger Greeno, Building Construction Handbook, Routledge.
2. P.N. Khanna; Indian Practical Civil Engineer's Handbook, Engineer's Publishers New Delhi
3. W.B. MacKay, 'Building Construction', Vol. 1,2,3longmans, U.K. 1981.
4. Andrea Deplzes (Ed) Constructing Architecture: Materials, Process, Structures - A Handbook - BIRKHÄUSER, Berlin.

Reference books:
National Building Code of India 2016.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Industrial/guest lectures
CD5	Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2 nos 10 marks each)	20
Assignment	05

Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**
Mid Sem Examination Marks	√	√	√	√
End Sem Examination Marks	√	√	√	√

Quiz (2 nos 10 marks each)	√	√	√	√
Assignment	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1		H	L	M		H						
2	H	H	L	M	H	M	L	M				
3	L	H	L	L							L	L
4	H	M	H	H				L	M	M	L	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2, CO3
CD2	Tutorials/Assignments	CO2, CO3
CD3	Seminars	CO3, CO4
CD4	Industrial/guest lectures	CO3, CO4
CD5	Self- learning such as use of NPTEL materials and internets	CO1, CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / Refere nces	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1-2			Soil properties and Bearing Capacity of Different soil	T-1,2	CO1	Varieties of soil avaliable	Chalk - board, PPT	
1-2	3-4			Foundation	T-1,2	CO1	Types of foundation,	Chalk - board,, PPT	
2-3	5-8			Foundation	T-1,2	CO1	Components and their failure	Chalk - board,, PPT	
3	9			Supporting structures	T-2,3	CO2, CO3	Introduction	Chalk - board,, PPT	
4-5	10-15			Supporting structures	T-2,3	CO2, CO3	Different formwork, techniques, uses and specification	Chalk - board, PPT	

							s		
6-7	16-23			Smart construction material and techniques	T-2,3	CO2, CO3	Super-performing material, their application	Chalk – board, PPT	
8	24-27			Building byelaws application	R -1	CO3, CO4	Submission plan, methods of municipal approval	Chalk – board, PPT	
9	28-30			Building byelaws application	R -1	CO3, CO4	NBC & Fire safety	Chalk – board, PPT	
10	31-32			Building byelaws application	R-1	CO3, CO4	Regulatory plans	Chalk – board, PPT	
11	33-36			Codal provision	R-1	CO3, CO4	Landuse and building classifications	Chalk – board, PPT	
12	37-38			Codal provision	R-1	CO3, CO4	Parking, amenities and open spaces	Chalk – board, PPT	
13	39-40			Assignments & Guest lecture		CO1			

COURSE INFORMATION SHEET

Course code: AR 203
Course title: CONTEMPORARY ARCHITECTURE
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: III
Branch: Architecture
Name of Teacher: Apurv Ashish

Course Objectives

This course enables the students:

A.	To identify different styles and schools of Modernist, Post- Modernist, Contemporary architecture.
B.	To analyze the contributing factors for the design development of different styles.
C.	Introducing the students to various Design philosophies of post independence and contemporary architecture in Indian context.
D..	To evaluate the works of modern architecture that the student is coming across in everyday's life.
E.	To Design buildings in accordance with various Architectural Styles.

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand modern design philosophies in the evolution of innovative architectural forms and designs.
2.	Buildtheir perspective towards various Architectural Styles and Product Design.
3.	Improve their appreciation towards historical sources, precursors of Modernism and evolution of Contemporary Architecture.

Syllabus-

Module 1: Introduction, Advent of Steel, glass and Ferro-concrete

- Industrial Revolution: Cast Iron and Glass Construction
- Henry Labrouste and Cast Iron Construction.
- Joseph Paxton and Great English Exhibition of 1851.
- Gustave Eiffel and French Exhibition of 1889.
- Development of Ferro concrete: Tony Garnier, AugustePerret.

Module 2: Development of Ornamentation, Neo- Classicist Revival and Sky Scrapers

- Le Art Nouveau movement and Victor Horta, Antoni Gaudi
- H.P. Berlage, H. H. Richardson and 'True Construction'
- Chicago School: Louis Sullivan
- Organic, Usonian and Prarie Style: Frank Lloyd Wright.

Module 3: Programmatic Functionalism and Development of International Style

- Walter Gropius and Bauhaus.
- Le Corbusier
- Mies van der Rohe

Module 4: 20th Century World Architecture

- **Early Modern Architecture** (Cubism, Constructivism)-
  Philip Johnson, Louis I Kahn, , Oscar Niemeyer

- **Late Modern Architecture (**Post modernism and International Style, Neo- Futuristic)-
  ZahaHadid, Norman Foster, Frank O. Gehry, I. M. Pei, Santiago Calatrava.

Module 5: Indian Architecture since Independence

- B. V. Doshi
- Charles Correa
- Raj Rewal
- Laurie Baker

Text Books:

1. SigfriedGiedion ; Space, time and Architecture.
2. Vincent Scully Jr; Modern Architecture.
3. Vikram Bhatt and Peter Sciver; After the masters (Contemporary Architecture of India).
4. Kenneth Frampton; Modern Architecture.

Reference Books:

1. Gossel. P., "Architecture in the 20th Century", Vol.1 & 2, Taschen. 2005.
2. Ballard B. and Rank, V.P., "Materials for Architectural Design", Laurance King. 2006.
3. The Phaidon Atlas of Contemporary Architecture, Phaidon Press 2004.

POs met through Gaps in the Syllabus: Nil

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Self- learning such as use of NPTEL materials and internet

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2 nos 10 marks each)	20
Assignment	05

Assessment Components	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (2 nos 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M		M	M	H	L			H	L	H
2	M	H		H	M	H	M	M	M	M	L	H
3	L	M		L	H	M	L			H	L	M

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2, CO3
CD2	Tutorials/Assignments	CO1, CO2
CD3	Seminars	CO2, CO3
CD4	Self- learning such as use of NPTEL materials and internet	CO1, CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			**Industrial Revolution**: Cast Iron and Glass Construction	T1, T4	CO2, CO3		PPT Digi Class/Chalk-Board	
1	L2-L3			**Cast Iron Construction**-Henry Labrouste.	T1, T4	CO1, CO3		PPT Digi Class/Chalk-Board	
2	L4			**English Exhibition of 1851**-	T1, T2, T4	CO1, CO3		PPT Digi Class/Chalk-Board	

				Joseph Paxton and Great.					
2	L5-L6			**French Exhibition of 1889-** Gustave Eiffel	T1, T2, T4, R3	CO1, CO3		PPT Digi Class/Chalk -Board	
3	L7-L8			**Development of Ferro concrete**: Tony Garnier.	T1, T4, R3	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
4	L9-L10			**Development of Ferro concrete-** AugustePerret.	T1, T4	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
4	L11			**Le Art Nouveau movement-** Victor Horta, Antoni Gaudi	T2, T4	CO2, CO3		PPT Digi Class/Chalk -Board	
5	L12			**True Construction-** H.P. Berlage, H. H. Richardson	T1	CO1, CO3		PPT Digi Class/Chalk -Board	
5	L13 - L14			Introduction to Chicago School	T2, T4	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
6	L15 - L16			**Chicago School**: Works of Louis Sullivan	T1, T4, R1, R3	CO2, CO3		PPT Digi Class/Chalk -Board	
7	L17 - L18			**Frank Lloyd Wright-** Organic, Usonian Style	T2, T4, R2	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
7	L19			**Frank Lloyd Wright**- Prarie Style	T2, T4, R2	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
8	L20 - L21			**Bauhaus-** Walter Gropius	T1, T4	CO2, CO3		PPT Digi Class/Chalk -Board	
9	L22 - L23			Works of Le Corbusier	T1, T4	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
10	L24 -			Works of Mies van der Rohe	T4, R2,	CO1, CO2,		PPT Digi Class/Chalk	

	L25				R3	CO3		-Board	
11	L26 - L27			**Early Modern Architecture** (Cubism, Constructivism)- Philip Johnson	T2, T4, R3	CO1, CO3		PPT Digi Class/Chalk -Board	
12	L28 - L29			**Early Modern Architecture** (Cubism, Constructivism)- Louis I Kahn, , Oscar Niemeyer	T2, T4, R3	CO1, CO3		PPT Digi Class/Chalk -Board	
12	L30 - L31			Works of ZahaHadid, Norman Foster	T1, T4, R1	CO1, CO3		PPT Digi Class/Chalk -Board	
13	L32 - L33			Frank O. Gehry, I. M. Pei, Santiago Calatrava	T1, T4, R1	CO2, CO3		PPT Digi Class/Chalk -Board	
14	L34 - L36			Works of B. V. Doshi, Charles Correa,	T3, R3	CO1, CO3		PPT Digi Class/Chalk -Board	
14	L37 - L38			Works of Raj Rewal, A. P. Kanvinde	T3, R3	CO2, CO3		PPT Digi Class/Chalk -Board	
15	L39 - L40			Works of Laurie Baker	T3, R3	CO2, CO3		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR 204
Course title: STRUCTURAL MECHANICS
Pre-requisite(s):AR 153 Statics and Strength of Materials
Co- requisite(s): None
Credits: 3 L:3 T: 0 P:0
Class schedule per week: 03
Class: B. Arch
Semester / Level: III
Branch: Architecture
Name of Teacher:
Course Objectives

This course enables the students:

A.	To understand the nature of stresses developed in beams for various types of simple loads.
B	To calculate the elastic deformation and deflection occurring in various simple geometries for different types of loading.

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand the basic Strength of Materials theorems and to apply the concept in structural problems.
2.	Analyse different structural bodies viz.beam, frame, and column.
3.	Evaluate the influence of various geometric and loading parameters of structural bodies.
4.	Compare the results obtained from bending theory of beam and strain energy method of structural problems.
5.	Create new ideas in the field of structural mechanics.

Syllabus

Module 1: Two-dimensional stress and strain

Plane stress, Bi-axial state of stress at a point, Complementary shear, Principal stresses, Graphical representation of stresses (Mohr's Circle), Plane strain, principal strains, Graphical representation of state of strain, Strain rosettes. **(9 Lectures)**

Module 2: Stresses in Beams

Pure Bending, Theory, assumptions and equation of bending, Concept of Sectional modulus, Distribution of bending stress in beam cross-section, Assumptions and equation of shear in beam section, Distribution of shear stress in beam cross-section. **(9 Lectures)**

Module 3: Deflection of Beams

Differential equation of elastic curve of beams, Deflection of beams (due to bending only) by double integration, Macaulay's, and moment-area method – applications to simply supported, cantilever and overhanging beams. **(10 Lectures)**

Module 4:Energy Methods

Strain energy due to axial and bending load, Castigliano's First theorem - applications to find the deflection of beams and statically determinate trusses. **(8 Lectures)**

Module 5:Columns

Buckling and stability of columns, Euler's theory of column for different support conditions, Effective lengths, slenderness ratio, Rankine's formula. **(6 Lectures)**

Text books:

3. J. M. Gere and S. P. Timoshenko, *Mechanics of Materials*, Springer-Science+Business Media, B.V.
4. S. S. Rattan, Strength of Materials, Tata McGraw-Hill Publishers.

Reference books:

5. S. Ramamurtham, *Strength of Materials*, DhanpatRai Publications
6. S. S. Rattan, *Strength of Materials,* Tata McGraw-Hill Publishers.
7. G. H. Ryder, *Strength of Materials,*Macmillan Publishers India Limited

Gaps in the syllabus (to meet Industry/Profession requirements):
Torsion of circular shafts

POs met through Gaps in the Syllabus:
PO1, PO2, and PO4
Topics beyond syllabus/Advanced topics/Design:
Stress-strain behaviour of materials using tensorial approach

POs met through Topics beyond syllabus/Advanced topics/Desi
PO1, PO2, and PO4

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Laboratory experiments/teaching aids
Industrial/guest lectures
Industrial visits/in-plant training
Self- learning such as use of NPTEL materials and internets
Simulation

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2 nos 10 marks each)	20
Assignment	05

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (2 nos 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping of Course Outcomes onto Program Outcomes

Course Outcome	Program Outcomes			
	1	2	3	4
1	H	M	-	H
2	H	M	-	L
3	L	-	-	L
4	H	M	L	M
5	M	L	-	L

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1-5	CD1
CD2	Tutorials/Assignments		CO1-5	CD2
CD3	Seminars			
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / Refere nces	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1		1	Plane stress, Bi-axial state of stress at a point	T1, T2, R1, R2, R3	1		PPT Digi Class/Chalk-Board	
1	L2			Plane stress, Bi-axial state of stress at a point	T1, T2, R1, R2, R3	1		PPT Digi Class/Chalk-Board	
1	L3			Complementary shear	T1, T2, R1, R2, R3	1		PPT Digi Class/Chalk-Board	
2	L4			Principal stresses	T1, T2, R1, R2, R3	1		PPT Digi Class/Chalk-Board	
2	L5			Principal stresses	T1, T2, R1, R2, R3	1		PPT Digi Class/Chalk-Board	
2	L6			Graphical representation of stresses (Mohr's Circle)	T1, T2, R1, R2, R3	1		PPT Digi Class/Chalk-Board	
3	L7			Plane strain, principal strains, Graphical representation of state of strain	T1, T2, R1, R2, R3	1		PPT Digi Class/Chalk-Board	
3	L8			Plane strain, principal strains, Graphical representation of state of strain	T1, T2, R1, R2, R3	1		PPT Digi Class/Chalk-Board	
3	L9			Strain rosettes	T1, T2, R1,	1		PPT Digi Class/Chalk-Board	

					R2, R3				
4	L10			Pure Bending, Theory, assumptions and equation of bending	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
4	L11			Pure Bending, Theory, assumptions and equation of bending	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
4	L12			Concept of Sectional modulus	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
5	L13			Distribution of bending stress in beam cross-section	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
5	L14			Distribution of bending stress in beam cross-section	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
5	L15			Assumptions and equation of shear in beam section	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
6	L16			Assumptions and equation of shear in beam section	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
6	L17			Distribution of shear stress in beam cross-section	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
6	L18			Distribution of shear stress in beam cross-section	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
7	L19			Differential equation of elastic curve of beams	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
7	L20			Differential equation of	T1, T2,	1,2,3		PPT Digi Class/Chalk	

				elastic curve of beams	R1, R2, R3			-Board	
7	L21			Deflection of beams (due to bending only) by double integration method	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
8	L22			Deflection of beams (due to bending only) by double integration - applications to simply supported beam	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
8	L23			Deflection of beams (due to bending only) by double integration - applications to cantilever beam	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
8	L24			Deflection of beams (due to bending only) by double integration - applications to overhanging beam	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
9	L25			Deflection of beams (due to bending only) by Macaulay's, and moment-area method	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
9	L26			Deflection of beams (due to bending only) by Macaulay's, and moment-area method - applications to simply supported beam	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
9	L27			Deflection of beams (due to	T1, T2,	1,2,3		PPT Digi Class/Chalk	

				bending only) by Macaulay's, and moment-area method - applications to cantilever beam	R1, R2, R3			-Board	
10	L28			Deflection of beams (due to bending only) by Macaulay's, and moment-area method - applications to overhanging beam	T1, T2, R1, R2, R3	1,2,3		PPT Digi Class/Chalk -Board	
10	L29			Strain energy due to axial and bending load	T1, T2, R1, R2, R3	1,2,3,4, 5		PPT Digi Class/Chalk -Board	
10	L30			Strain energy due to axial and bending load	T1, T2, R1, R2, R3	1,2,3,4, 5		PPT Digi Class/Chalk -Board	
11	L31			Castigliano's First theorem	T1, T2, R1, R2, R3	1,2,3,4, 5		PPT Digi Class/Chalk -Board	
11	L32			Castigliano's First theorem	T1, T2, R1, R2, R3	1,2,3,4, 5		PPT Digi Class/Chalk -Board	
11	L33			Castigliano's First theorem - applications to find the deflection of beams	T1, T2, R1, R2, R3	1,2,3,4, 5		PPT Digi Class/Chalk -Board	
12	L34			Castigliano's First theorem - applications to find the deflection of beams	T1, T2, R1, R2, R3	1,2,3,4, 5		PPT Digi Class/Chalk -Board	
12	L35			Castigliano's First theorem - applications to find the	T1, T2, R1, R2,	1,2,3,4, 5		PPT Digi Class/Chalk -Board	

				deflection of statically determinate trusses	R3				
12	L36			Castigliano's First theorem - applications to find the deflection of statically determinate trusses	T1, T2, R1, R2, R3	1,2,3,4, 5		PPT Digi Class/Chalk -Board	
13	L37			Buckling and stability of columns	T1, T2, R1, R2, R3	1,2,3,4,		PPT Digi Class/Chalk -Board	
13	L38			Euler's theory of column for different support conditions	T1, T2, R1, R2, R3	1,2,3,4		PPT Digi Class/Chalk -Board	
13	L39			Euler's theory of column for different support conditions	T1, T2, R1, R2, R3	1,2,3,4		PPT Digi Class/Chalk -Board	
14	L40			Euler's theory of column for different support conditions	T1, T2, R1, R2, R3	1,2,3,4		PPT Digi Class/Chalk -Board	
14	L41			Effective lengths, slenderness ratio, Rankine's formula	T1, T2, R1, R2, R3	1,2,3,4		PPT Digi Class/Chalk -Board	
14	L42			Effective lengths, slenderness ratio, Rankine's formula	T1, T2, R1, R2, R3	1,2,3,4		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

OFFERED BY DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Course code: CE 101
Course title: ENVIRONMENTAL SCIENCES
Pre-requisite(s):
Co- requisite(s):
Credits: 2 L:2 T:0 P:0
Class schedule per week: 02
Class: B.Arch
Semester / Level: III
Branch: Architecture
Name of Teacher:

Course Objectives

This course enables the students:

A.	To impart basic knowledge of ecological principles and their applications in environment
B.	To help the students get exposed to the structure composition of the spheres of the earth, the only planet sustaining life
C.	To make students competent to analyse, how the environment is getting contaminated and probable control mechanisms for them
D.	To train students to generate awareness and become a sensitive citizen towards the changing environment

Course Outcomes

After completing this course, a student:

1	Would get introduced to the structure and function of ecosystems and their importance in the holistic environment
2	Would be able to know the sources, causes, impacts and control of air pollution
3	Would get exposed to various types of water pollution happening in the environment and learn about their effects and potential control mechanisms
4	Would get to know about the importance of soil, its contamination and basics of solid waste management
5	Is expected to have knowledge about radiation hazards and pros and cons of noise pollution

Syllabus

Module I: Ecosystem and Environment
Environmental status and reports on climate change, Concepts of ecology, and Environmental science, ecosystem: structure, function and services, Biogeochemical cycle, energy and nutrient flow, fate of environmental pollutants. Ecosystem management.

Module II: Air Pollution
Structure and composition of unpolluted atmosphere, classification of air pollution sources, types of air pollutants, effects of air pollution, monitoring of air pollution, control methods and equipment for

air pollution control, vehicular emissions and control, indoor air pollution, air pollution episodes and case studies.

Module III: Water Pollution

Water Resource; Water Pollution: types and Sources of Pollutants; effects of water pollution; Water quality monitoring, various water quality indices, water and waste water treatment: primary, secondary and tertiary treatment, advanced treatments (nitrate and phosphate removal); Sludge treatment and disposal.

Module IV:Soil Pollution and Solid Waste Management

Lithosphere – composition, soil properties, soil pollution, ecological & health effects, biogeochemical cycles; Municipal solid waste management – classification of solid wastes, MSW characteristics, collection, storage, transport and disposal methods, sanitary landfills, technologies for processing of MSW: incineration, composing, pyrolysis.

Module V: Noise pollution & Radioactive pollution

Noise pollution: introduction, sources: Point, line and area sources; outdoor and indoor noise propagation, Effects of noise on health, criteria noise standards and limit values, Noise measurement techniques and analysis, prevention of noise pollution; Radioactive pollution: introduction, sources, classification, health and safety aspects, Hazards associated with nuclear reactors and disposal of spent fuel rods-safe guards from exposure to radiations, international regulation, Management of radioactive wastes.

Text books:

1. A, K. De. (3rd Ed). 2008 Environmental Chemistry. New Age Publications India Ltd.
2. C. N. Sawyer, P. L. McCarty and G. F. Parkin. 2002. Chemistry for Environmental Engineering and Science. John Henry Press.
3. S.C. Santra. 2011. Environmental Science. New Central Book Agency.
4. Connell, D. W., Basic Concepts of Environmental Chemistry
5. Introduction to Environmental Engineering and Science, G.M. Masters & Wendell Ela, PHI Publishers
6. Environmental Chemistry – A global perspective, Gary W. Van Loon and Stephen J. Duffy, Oxford University Press

Reference books:

1. Basic Concepts of Environmental Chemistry, DW Conell, CRC Press
2. Environmental Engineering, Peavy, H., Rowe, D.R, Tchobanoglous, G. Mc-Graw - Hill International

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	√
Tutorials/Assignments	√
Seminars	√
Mini projects/Projects	√

Laboratory experiments/teaching aids	√
Industrial/guest lectures	√
Industrial visits/in-plant training	√
Self- learning such as use of NPTEL materials and internets	√
Simulation	√

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (2 nos 10 marks each)	20
Assignment	05

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (2 nos 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	M	M	M	L	H	H	M	M	M	M	H
2	M	H	M	H	M	H	H	M	M	M	M	H
3	M	H	M	H	M	H	H	M	M	M	M	H
4	M	H	M	H	M	H	H	M	M	M	M	H
5	M	H	M	H	M	H	H	M	M	M	M	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2
CD2	Tutorials/Assignments		CO2	CD1, CD2
CD3	Seminars		CO3	CD1, CD2

CD4	Mini projects/Projects		CO4	CD1, CD2
CD5	Laboratory experiments/teaching aids		CO5	CD1, CD2
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: AR 211
Course title: ARCHITECTURAL DESIGN-III
Pre-requisite(s): None
Co- requisite(s): None
Credits: 9 L: 0 T: 0 P: 6
Class schedule per week: 06
Class: B. Arch
Semester / Level: III
Branch: Architecture
Name of Teacher: Dr. Manjari Chakraborty

Course Objectives

This course enables the students:

A.	To familiarize students with organization of spaces with simple design problems
B.	Use of Bubble diagrams and Flow charts to start the design process
C.	To comprehend relationship between design, visual arts, building construction, building materials, structure etc and evolve a design solution.
D.	Interpretation of climatic data to formulate design approaches

Course Outcomes

After the completion of this course, students will be able :

1.	To understand the basic functional aspect of designing simple building type and its relevant spatial organization and accordingly design the unit
2.	The students shall learn to reciprocate and sensitize the design/concept to the environment with respect to specific site climate.

Syllabus

Assignment I : Small residential building – Approx duration : 6 weeks

The students are expected to design a residential building in a specific site for a small Indian joint family in urban, semi-urban or rural setting. The projects investigate the study of built form, function, activity, ergonomics & anthropometrics and its relationship to the site and surroundings.

Case Study : Students need to do a detailed case study of similar type small residence before starting actual design.

Assignment II : Multi-functional, Multi-cellular built environments- Approx duration : 4 weeks

Design projects to focus on multi-functional, multi-cellular built environments such as canteen, health club, small resort, crèche, community hall, health club, hobby centre for children etc.

Design Exercise as **Time Problem**	**Duration**
Small design exercise from various sources for inspiration for	8 hrs.

architectural design such as nature, history, geometry, culture etc. Example : children park, Monument, War Memorial, Dhaba.

Viva voce
Final Viva-vice on all the design assignments to be conducted at the end of the semester

Reference books:

1.National Building Code of India, Vol.1-5,2005.
2.Joseph De Chiara, Michael J.Crosbie,"Time Savers Standards for Building Types", McGraw-Hill Professional 2001.
3. Ernst Neuferts, "Architects Data", Blackwell, 2002.
4. Daniel Williams, "Sustainable Design: Ecology, Architecture & Planning", John Wiley & sons Inc, NJ, 2007.
5. The American Institute of Architects , Architectural Graphic Standards
6. Local building byelaws corresponding to the site.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods (Select whichever is required)
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Projects
Laboratory experiments/teaching aids
Industrial/guest lectures
Site visit

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	**CO1**	**CO2**
Progressive Evaluation	√	√
End Sem Evaluation	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2.
CD2	Mini projects/Projects	CO2.
CD3	Laboratory experiments/teaching aids	CO1,CO2.
CD4	Industrial/guest lectures	CO2.

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H		M		M				L		L	
2	M			H					L		L	

Lecture wise Lesson planning Details :

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Books/References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1,2,3			Introduction to the problem and site	1,2,3,4/1,2,3, 4,5,6	CO1, CO2	Details of Planning and services for Main design	PPT, Chalk & talk, Illustrations	
1	4			Internal evaluation of case studies / Literature studies	1,2,3,4/1,2	CO1, CO2		PPT	
2	5,6,7, 8			Site study, Conceptual Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Computerised drawing tool	
3	9,10, 11			Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Computerised drawing tool	
4	13 ,14 , 15			Design, Layout planning	1,2,3,4,5,6	CO1, CO2.	Design of building and site planning	Computerised drawing tool	
4	16			Internal	NA	CO1,		PPT,	

				evaluation of design development		CO2		Computerised drawing tool, paper	
5-7	16-24			Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Computerised drawing tool	
7	25-26			Internal evaluation of design development	NA	CO1, CO2.		PPT, Computerised drawing tool, paper	
8-9	27-35			Preparation of elevation, section & view	1,2,3,4,5,6	CO1, CO2.	Design of building and site planning	Computerised drawing tool	
9	36			Submission of Final design					
10	37			Staring of new problem on urban design	1,2,3,4,5,6	CO2	Introduction to problems and describing various methods of approach	PPT, Chalk & talk, Illustrations	
10	38-40			Introduction to the problem and site	1,2,3,4,5,6	CO1, CO2.	Details of Planning and services for Main design	PPT, Chalk & talk, Illustrations	
11	41			Internal evaluation of case studies / Literature studies	NA	CO1, CO2.		PPT	
11	42-45			Conceptual Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Computerised drawing tool	
12	46-48			Design, Layout planning	1,2,3,4,5,6	CO2.	Design of building and site	Computerised drawing	

							planning	tool	
13	39			Internal evaluation	NA	CO1, CO2.		PPT	
14	40-42			Preparation of elevation, section & view	1,2,3,4,5,6	CO1, CO2.	Design of building and site planning	Computerised drawing tool	
14	43			Final submission					

COURSE INFORMATION SHEET

Course code: AR 212
Course title: BUILDING CONSTRUCTION – II
Pre-requisite(s): None
Co- requisite(s): None
Credits: 6 L: 0 T: 0 P: 4
Class schedule per week: 04
Class: B. Arch
Semester / Level: III
Branch: Architecture
Name of Teacher: Rajan Chandra Sinha

Course Objectives

This course enables the students:

A.	Develop and understand the different types of deep foundation and elements of basement
B.	Identify the various elements of flooring and roofing
C.	Understand the layout and construction details of different types of staircase
D.	Apply the special types of Door Window detailing in building application
E.	Site visits to be organized to make the students aware of various technical aspects, practical difficulties, onsite decisions which will strengthen the knowledge for handling and executing a project

Course Outcomes

After the completion of this course, students will be able:

1.	**To recognize the various types of deep foundations, basement construction, flooring, roofing, special doors and windows and staircase.**
2.	To **explain** the context and suitability of above elements under a given situation.

Syllabus

DEEP FOUNDATION & BASEMENT:
Grillage foundations, Piles foundations and Caisson foundations
Construction detail of basement wall, Retaining wall, floor and foundation with particular emphasis to their damp proofing protection against rain water and provision for natural lighting and ventilation.
No. of sheets: 3

FLOORING:
Types of flooring, methods of laying, furnishing of floors with different floor finishes like cement, colored cement, mosaic, terrazzo, tiles etc.
Timber floors: construction techniques, types of timber floors: single, double and triple joist timber floors.
Special consideration for rubber, Linoleum and PVC flooring, Flag Stone Flooring, parquet flooring.
Different type of resilient and vibration resistive floor.
Floorings for special functional space viz. auditorium stage, Operation theatre in hospitals etc.,
No. of sheets: 3

ROOFING:
Types of roof, Parts of roof and Types of Roof trusses.
Flat roof with wood and RCC, simple jack arch, Waterproofing, Rainwater gutter details.
Inclined Roof - Common roof covering and its arrangement: tiles, metal sheets etc. with fixing and rainwater gutter

No. of sheets: 2

SPECIAL DOOR & WINDOW:
Special doors and windows: One way and both way-swinging door, sliding door (manual and automatic), folding, revolving, collapsible and rolling door with hardware details.
Window and Ventilator with Aluminum frame.

No. of sheets: 2

STAIRCASE
Different elements of staircase, Relation between Tread and Riser, Types of staircase, Construction Details of a concrete staircase, balustrade and handrail detail

No. of sheets: 2

SITE VISIT:
At least one visit to be paid to the construction site covering various sequences of construction and a report to be submitted by individual students as a part of the sessional work.

Text books:
1.Building Construction - W.B. Mc. Kay Vol. 1- 4
2.Building Construction Illustrated - Francis D.K. Ching
3.Construction Technology - R. Chudly Vol. 1- 4
4.Building Materials and Construction - B. C. Punmia
5.Building Materials and Construction - Bindra& Arora

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation	60
End Sem Evaluation	40

Assessment Components	**CO1**	**CO2**
Progressive Evaluation	√	√
End Sem Evaluation	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	-	-	-	-	L	-	-	-	-	L	L
2	M	M	M	L	L	M	L	L	L	L	L	L

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2
CD2	Mini projects/Projects	CO1, CO2
CD3	Laboratory experiments/teaching aids	CO1, CO2
CD4	Industrial/guest lectures	CO1, CO2

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1-4			Deep Foundation and basement	1,2,3,4, 5	CO1, CO2		PPT, Chalk & talk, Illustrations	
2	5-6			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
2-3	7-10			Flooring with various materials	1,2,3,4, 5	CO1, CO2		PPT, Chalk & talk, Illustrations	
3	11-12			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
4	13-16			Flooring for special functional spaces	1,2,3,4, 5	CO1, CO2		PPT, Chalk & talk, Illustrations	
5	17-18			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
5	19-20			Types of roof, Parts of roof and Types of	1,2,3,4, 5	CO1, CO2		PPT, Chalk & talk, Illustrations	

				Roof trusses.					
6	21-22			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
6-7	23-26			Inclined Roof	1,2,3,4, 5	CO1, CO2		PPT, Chalk & talk, Illustrations	
7	27-28			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
`8	29-32			Special doors and windows	1,2,3,4,5	CO1, CO2		PPT, Chalk & talk, Illustrations	
9	33-34			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
9-10	35-40			Staircase design elements	1,2,3,4, 5	CO1, CO2		PPT, Chalk & talk, Illustrations	
11	41-42			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
11	43-44			Site Visit	NA	CO1, CO2		Mini projects/Projects	
12-13	45-50			Report of site visit	NA	CO1, CO2		Mini projects/Projects	
13	51-52			Internal evaluation	NA	CO1, CO2		Mini projects/Projects	

COURSE INFORMATION SHEET

Course code: AR 213
Course title: COMPUTER APPLICATION IN ARCHITECTURE
Pre-requisite(s): None
Co- requisite(s): None
Credits: 2 L: 0 T: 0 P: 4
Class schedule per week: 04
Class: B. Arch
Semester / Level: III
Branch: Architecture
Name of Teacher: Apurv Ashish

Course Objectives

This course enables the students:

A.	To learn various commands in 2D operation.
B.	To learn Development of 3D objects and Surfaces
C.	To learn various commands in 3D operation and drawing of 3D objects
D	To learn 3D in higher(current) versions of AutoCAD, material attachment and Rendering in AutoCAD 2011 & 2012.
E	To get an introduction to Google Sketch up.

Course Outcomes

After the completion of this course, students will be able to:

1.	Handle the software to exploreinnovative forms and geometry.
2.	Develop the concepts to produce 2D Architectural drawings.
3.	Apply the concepts in Architectural Design, Working Drawing and Landscape Design (Sessional).
4,	Explore concepts about 3D modelling and Walkthroughs.

Syllabus

Activities -	**No. of Weeks**
A. AutoCAD 2D • Drawing and modifying operations in AutoCAD, Coloring and Hatching in AutoCad, Block making, writing Text and doing Dimensioning in AutoCAD. • Formatting in AutoCad, Working in Layers in AutoCAD and Use of Viewport in AutoCad ▪ Color and hatch, Object properties • Making of Blocks, Text and Dimensioning, Formatting operation: dimensions, text, line type etc	**7 Weeks**

B. AutoCAD 3D ▪ Basic operations of 3-D ▪ Development of regions, polylines, Generation of surfaces and solids ▪ 3-D operation: Union, Subtraction and Intersection; 3-D operation: Rotate, Mirror and Array; ▪ Material Attachment and Rendering. ▪ Final rendering in Photoshop. ▪ Operations in 3-D ▪ Solids editing; ▪ UCS operation; ▪ Working with 3-D Viewports and 3-D Pan/Zoom to generate different views. ▪ Implications and advantage of 3-D wireframe, Hide, Shade etc. in generating 3-D views • Making of perspective views, adjustment of camera.	**3 Weeks**
C. Sketchup (3D) • Introduction to Sketchup, Material application, Different views, Rendering with Background and Foreground, Architectural Walkthrough.	**5 Weeks**

Design Assignments

To be conducted at the end of each lecture.

Viva voce

Final Viva-vice on the design assignments to be conducted at the end of the semester.

Text books:

1. AutoCAD Manual
2. AutoCAD Command Reference
3. Learning SketchUp: A 3D Modeling Guide for Beginnersby Allan Hanson.

POs met through Gaps in the Syllabus : Nil

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Industrial/guest lectures
CD4	Self- learning such as use of NPTEL materials and internet.

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	CO1	CO2	CO3	CO4
Mid Sem Examination Marks	√	√	√	√
End Sem Examination Marks	√	√	√	√
Assignment	√	√	√	√

Indirect Assessment –
1.Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	H	L	H		M			M	H	L	H
2	L		L		L				M		L	M
3	H	M		M		H			M	H	L	M
4	M	M		H		H		L	H	H	L	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2, CO4
CD2	Mini projects/Projects	CO1, CO3
CD3	Industrial/guest lectures	CO1, CO2, CO3
CD4	Self- learning such as use of NPTEL materials and internet.	CO1, CO2, CO4

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1-L3			Introduction to AutoCAD 2D	T1, T2	CO1, CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
2	L4-L6			Introduction to AutoCAD	T1, T2	CO1, CO2, CO3		PPT, Chalk-talk, Software	

				2D				Illustrations, Assignments	
3	L7-L9			Introduction to AutoCAD 2D	T1, T2	CO1, CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
4	L10-L12			Introduction to AutoCAD 2D	T1, T2	CO1, CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
5	L13-L15			Introduction to AutoCAD 2D	T1, T2	CO1, CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
6	L16-L18			Introduction to AutoCAD 2D	T1, T2	CO1, CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
7	L19-L21			Introduction to AutoCAD 2D	T1, T2	CO1, CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
8	L22-L-24			Introduction to AutoCAD 3D	T1, T2	CO1, CO3, CO4		PPT, Chalk-talk, Software Illustrations, Assignments	
9	L25-L27			Introduction to AutoCAD 3D	T1, T2	CO1, CO3, CO4		PPT, Chalk-talk, Software Illustrations, Assignments	
10	L28-L30			Introduction to AutoCAD 3D .	T1, T2	CO1, CO3, CO4		PPT, Chalk-talk, Software Illustrations, Assignments	
11	L31-L33			Introduction to Sketchup (3D)	T3	CO1, CO3, CO4		PPT, Chalk-talk, Software Illustrations, Assignments	
12	L34-L36			Introduction to Sketchup (3D)	T3	CO1, CO3, CO4		PPT, Chalk-talk, Software	

								Illustrations, Assignments	
13	L37-L39			Introduction to Sketchup (3D)	T3	CO1, CO3, CO4		PPT, Chalk-talk, Software Illustrations, Assignments	
14	L40-L42			Introduction to Sketchup (3D)	T3	CO1, CO3, CO4		PPT, Chalk-talk, Software Illustrations, Assignments	
15	L43-L45			Introduction to Sketchup (3D)	T3	CO1, CO3, CO4		PPT, Chalk-talk, Software Illustrations, Assignments	

SEMESTER IV

COURSE INFORMATION SHEET

Course code: AR 251
Course title: BUILDING SERVICES I- Water Supply and Sanitation
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: IV
Branch: Architecture
Name of Teacher: Dr. Bimal Chandra Roy

Course Objectives

This course enables the students:

A.	To identify the different sources of water, list them and describe the method of intake.
B.	To identify the various methods of water purification and water distribution networks.
C.	To explain the various water supply appurtenances required for the distribution networks
D.	To explain the various sanitation system in Indian context and their functioning process
E	To design water storage tank, septic tank and soak pit
F	To prepare plumbing layout drawings for water supply and sanitation for buildings

Course Outcomes

After the completion of this course, students will be able:

1.	Identification of the various sources of water supply and the intake methods
2.	Understand the water treatment processes for different types of water
3.	Understand the waste water treatment processes and the functioning of various sewer appurtenances
4.	Designing the water reservoir, septic tanks and soak pits
5.	Preparing plumbing layout drawings for water supply and sanitation for buildings

Syllabus

Module 1: Water Supply System
Introduction, various sources of water supply, standards of purity and treatment of water, qualities of potable water.Domestic water demand, calculation of capacity of overhead/underground water tank and distribution system.water distribution networks, pipe appurtenances, pumps, pumping plants. Building service connection, ferrules, water meters. Layout of domestic water piping systems, joints, fittings and valves. Cold & hot water lines in buildings, Water supply to high rise buildings: problems encountered & systems adopted.

Module 2: 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, plumbing systems (one pipe, two pipeetc), House drainage system, Drainage of sub-soil water. Inspection chambers, Manholes, Sub-drains, culverts, ditches and gutters, drop inlets and catch basins, roads and pavements, storm overflow/regulators.

Module 3: Plumbing and Sanitary Appliances
Basic principles of Plumbing, need, scope, terminology. Specifications and installation of sanitary fittings like wash basins, water closets, urinals, bidets, sinks, etc in buildings. Uses of gate valve, float valve, flap valve, ball valve, flush valve, etc, different types of taps, faucets, stop cocks, bib cocks, 'P', 'Q', 'S', floor/bottle traps used in buildings.

Module 4:Design of Plumbing Systems
Design considerations on drainage scheme. Planning of bathrooms, lavatory blocks and kitchen in domestic and multi-storeyed buildings.Preparation of plumbing drawings, symbols commonly used in these drawings.

Module 5: SewerageSystem
Indian standards and byelaws for sanitary conveyance.Disposal of sewage from isolated building, Gradients used in laying of drains and sewers for various sizes.Septic tank details & capacity calculation.Sewage treatment.Use of pumps in sanitation, biogas, soil disposal without water carriage, rural sanitation.

Text books:
1.AFE Wise, JA Swaffied Water, Sanitary & Waste Services in buildings, V Edition, Mitchell Publishing, Co. Ltd., 2002.
2.B.C Punmia., "WasteWater Engineering", Laxmi Publications, 2009.
3.S.J Arceivala., "WasteWaterTreatment for Pollution Control",Tata McGraw Hill, 2008.
4**.** S.C.Rangwala, "Water supply and sanitary engineering", Chartar publishing house, Anand, 2016.

Reference books:
1. National Building Code of India, 2016.
2. Manual of water supply and treatment, Second edition, CPHEEO, Ministry of works and housing, New Delhi, 1977
Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1.Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	L	M							
2	H	H	H	M	L		H	H			L	
3	H	H	H	M	L		H	H			L	
4	H	H	H	H	M	H	H	H			L	
5	H	H	H	H	H	H				M	L	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2
CD2	Tutorials/Assignments		CO2	CD3, CD4
CD3	Seminars		CO3	CD2, CD3, CD5
CD4	Mini projects/Projects		CO4	CD1, CD2, CD3
CD5	Laboratory experiments/teaching aids		CO5	CD2, CD5
CD6	Industrial/guest lectures		CO5	CD5
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			Introduction, various sources of water supply, standards of purity and treatment of water, qualities of potable water.	T1,T4, R1,R2	CO1		PPT Digi Class	

1	L2, L3			Domestic water demand, calculation of capacity of overhead/underground water tank and distribution system	T1,T4, R1	CO1, CO2		PPT Digi Class	
2	L4, L5			water distribution networks, pipe appurtenances, pumps, pumping plants, various water treatment methods	T1,T4, R1,R2	CO2		PPT Digi Class	
2	L6			Building service connection, ferrules, water meters	T1, T4, R1	CO2		PPT Digi Class	
3	L7, L8			Layout of domestic water piping systems, joints, fittings and valves. Cold & hot water lines in buildings, Water supply to high rise buildings: problems encountered & systems adopted.	T1,T4, R1	CO2		PPT Digi Class	
3	L9			Principles of sanitation, collection and disposal of various kinds of refuse from buildings.	T1, T2, T3, R1	CO3		PPT Digi Class/Chalk -Board	
4	L10, L11			Methods of carrying refuse, systems of refuse disposal, their principles	T1,T2, T3,R1	CO3		PPT Digi Class/Chalk -Board	
4	L12			Plumbing definitions and related terms, plumbing systems (one pipe, two pipe etc), House drainage system, Drainage of sub-soil water	T1,T2, T3, R1	CO3		PPT Digi Class/Chalk -Board	
5	L13, L14			Inspection chambers, Manholes, Sub-drains, culverts, ditches and gutters, drop inlets and catch basins, roads and pavements, storm overflow/regulators.	T1, T2, T3, R1	CO3		PPT Digi Class	
5	L15			House drainage system, Drainage of sub-soil water	T1,T2, T3,R1	CO4		PPT Digi Class	
6	L16			Basic principles of Plumbing, need,	T1,T2, T3,T4,	CO3, CO4		PPT Digi Class/Chal	

				scope, terminology	R1			k -Board	
6	L17, L18			Specifications and installation of sanitary fittings like wash basins, water closets, urinals, bidets, sinks, etc in buildings	T1,T2, T3,T4, R1,R2	CO3, CO4, CO5		PPT Digi Class	
7	L19, L20			Uses of gate valve, float valve, flap valve, ball valve, flush valve, etc	T2,T4, R1	CO4, CO5		PPT Digi Class/Chalk -Board	
7	L21			different types of taps, faucets, stop cocks, bib cocks, 'P', 'Q', 'S', floor/bottle traps used in buildings.	T2,T4, R1	CO4, CO5		PPT Digi Class	
8	L22			Design considerations on drainage scheme	T2,T4, R1	CO4, CO5		PPT Digi Class	
8	L23, L24			Planning of bathrooms, lavatory blocks in domestic and multi-storeyed buildings	T2,T4, R1	CO4, CO5		PPT Digi Class	
9	L25			Planning of kitchen in domestic and multi-storeyed buildings	T2,T4, R1	CO4, CO5		PPT Digi Class	
9	L26, L27			Symbols commonly used in plumbing drawings.	T2,T4, R1	CO4, CO5		PPT Digi Class	
10	L28, L29			Preparation of plumbing drawings for individual buildings, multi-storeyed apartment buildings	T2,T4, R1	CO5		PPT Digi Class	
10	L30			Indian standards and byelaws for sanitary conveyance	T2,T3, T4,R1, R2	CO3, CO5		PPT Digi Class/Chalk -Board	
11	L31, L32			Methods of disposal of sewage from isolated building	T1,T2, T3,T4, R1,R2	CO3, CO5		PPT Digi Class	
11	L33,			Gradients used in laying of drains and sewers for various sizes	T1,T2, T3,T4, R1,	CO3, CO5		PPT Digi Class	
12	L34, L35			Septic tank details & capacity calculation, design of soak pits	T1,T2, T3,T4, R1,R2	CO4		PPT Digi Class	
12	L36			Need of sewage treatment, various environmental acts	T1,T2, T3,T4, R1,R2	CO4		PPT Digi Class	

13	L37, L38			Various sewage treatment processes	T1,T2, T3,T4, R1	CO4		PPT Digi Class/Chalk -Board	
13	L39			Various sewage treatment processes	T1,T2, T3,R1	CO3, CO5		PPT Digi Class/Chalk -Board	
14	L40			Use of pumps in sanitation	T2,T3, T4,R1	CO3, CO4		PPT Digi Class/Chalk -Board	
14	L41, L42			Biogas, soil disposal without water carriage, rural sanitation.	T1,T2, T3,T4, R1,R2	CO3, CO5		PPT Digi Class	

COURSE INFORMATION SHEET

Course code: AR 252
Course title: BUILDING SERVICES - II (Electrical & Lighting)
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L:3 T:0 P:0
Class schedule per week: 03
Class: B. Architecture
Semester / Level: IV
Branch: Architecture
Name of Teacher: Anuj Kumar Toppo

Course Objectives

This course enables the students:

A.	To list the various components required in electricity distribution system
B.	To explain the electrical distribution in campus
C.	To develop the electrical layout diagram for building for the estimation and installation purpose
D.	To identify the various types of light requirement for different purpose
.E	To apply the fundamental of laws of illumination for analyse the light requirements of any space (both exterior and interior)
F	To design the lighting scheme for interiors spaces

Course Outcomes

After the completion of this course, students will be:

1.	Understand about the basic services and their generation
2.	Apply their knowledge in Professional life
3.	Develop a sense of organization of appropriate solution in their design

Syllabus

Module 1: Basic Concept of Electricity

Sources of Electricity, Electricity generation, Basic Electrical Distribution System – Substation, transformer, over head line, underground line. Three phase supply. Electrical distribution in campus

Module 2: Techniques for Electrical Services

Domestic wiring system, Material, classification, merits and demerits, Electrical accessories, Symbols and representation in architectural layout drawings, Single line- wiring diagram, Safety aspects, protection of buildings against lightning, NBC Recommendations, Earthing, Short circuit and overloading, Preliminary Estimation of Electrical & illumination works

Module 3: Fundamental of Illumination

Fundamentals of light. General definition of terms related to optical sensitivity, visual performance & vision, Visual field, Application of lighting and illumination in Architecture. Artificial sources of light; Lamps and their characteristics: Incandescent lamp, Fluorescent lamp, Gas filled lamp, HID lamp. Neon lamp and LED lamp. Polar Curves Luminaries and theirapplications

Module 4: Basic Lighting Design

Definition of Light power, light flux Light intensity, Laws of Illumination: inverse square law and Lambert's Cosine law. Application of law of illumination.General formula for illumination calculation of distributed source.Coefficient of utilization.Standard level of illuminations for various tasks, Basic lighting design, Direct, Indirect and semi-direct lighting. General and local

lighting, Glare and glare control.

Module 5: Application of Lighting
Lighting design of: Residential units, Shops & Restaurants, general office, conference hall, Art – gallery and Museum Parks & playgrounds Road/area lighting and Landscape Lighting.

Text books:
1. Derek Philips; Lighting in Architectural Design.
2. G.K.Lal, Elements of Lighting, 3-D Publishers.
3. R.G. Hopkinson and J.D.Kay, The lighting of buildings, Faber and Faber, London, 1969.
4. Philips Lighting in Architectural Design, McGraw Hill, New York, 1964.

Reference books:
1. I.E.S. Handbook.
Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: Na

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures
Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	CO1	CO2	CO3
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –
1.Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	H	H	L	H	H	H	M	L	H	H
2	H	H	H	M	H	M	H	H	M	L	H	H
3	H	H	H	H	M	H	M	L	M	M	M	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD 1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1
CD 2	Tutorials/Assignments		CO2	CD1
CD 3	Seminars		CO3	CD1 and CD2
CD 4	Mini projects/Projects			
CD 5	Laboratory experiments/teaching aids			
CD 6	Industrial/guest lectures			
CD 7	Industrial visits/in-plant training			
CD 8	Self- learning such as use of NPTEL materials and internets			
CD 9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / Refere nces	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1		1	Sources of Electricity,	T1, R1	CO1		PPT Digi Class/Chock -Board	
1	L2			Electricity generation	T2	CO1		PPT Digi Class/Chock	
2	L3-L4			Basic Electrical Distribution System – Substation, transformer	T2-R1	CO2		PPT Digi Class/Chock	
2	L5			over head line, underground line	T4	CO1		PPT Digi Class/Chock	

2	L6			Three phase supply	T4	CO1		PPT Digi Class/Chock	
3	L7			Electrical distribution in campus	T3,R1	CO1		PPT Digi Class/Chock	
3	L8-L9			Domestic wiring systemMaterial, classification, merits and demerits, Electrical accessories,	T4	CO3		PPT Digi Class/Chock	
3	L10			Symbols and representation in architectural layout drawings,	T3	CO3		PPT Digi Class/Chock	
4	L11 - L12			Single line-wiring diagram, Safety aspects, protection of buildings against lightning,	T2, R1	CO3		PPT Digi Class/Chock	
4	L13 - L14			NBC Recommendations, Earthing, Short circuit and overloading,	T2	CO2		PPT Digi Class/Chock	
5	L15 - L16			Preliminary Estimation of Electrical & illumination works	T1	CO1		PPT Digi Class/Chock	
5	L17			Fundamentals of light.	T2	CO3		PPT Digi Class/Chock	
6	L18 - L20			General definition of terms related to optical sensitivity, visual performance & vision, Visual field, Application of lighting and illumination in Architecture	T4	CO3		PPT Digi Class/Chock	
7	L21 - L22			Artificial sources of light; Lamps and their characteristics	T1,R1	CO2		PPT Digi Class/Chock	
7	L23			Incandescent	T2	CO2		PPT Digi	

	- L25			lamp, Fluorescent lamp, Gas filled lamp, HID lamp. Neon lamp and LED lamp. Polar Curves Luminaries and theirapplications				Class/Chock	
7-8	L26 - L27			Definition of Light power, light flux Light intensity, Laws of Illumination: inverse square law and Lambert's Cosine law	T2	CO1		PPT Digi Class/Chock	
8	L28			Application of law of illumination	T3	CO3		PPT Digi Class/Chock	
9	L29			General formula for illumination calculation of distributed source.	T3	CO3		PPT Digi Class/Chock	
9	L30			Coefficient of utilization. Standard level of illuminations for various tasks,	T4	CO1		PPT Digi Class/Chock	
10	L31			Coefficient of utilization	T1	CO1		PPT Digi Class/Chock	
10	L31 - L32			Standard level of illuminations for various tasks, Basic lighting design,	T3	CO3		PPT Digi Class/Chock	
11-12	L33 - L34			Direct, Indirect and semi-direct lighting. General and local lighting, Glare and glare control	T3	CO2		PPT Digi Class/Chock	
12	L35			Lighting design of: Residential units, Shops & Restaurants,	T3	CO1		PPT Digi Class/Chock	
13	L36 - L37			Lighting design of:general office, conference hall, Art – gallery and Museum	T3	CO2		PPT Digi Class/Chock	

14	L38 - L39			Lighting design of: Parks & playgrounds Road/area lighting and Landscape Lighting	T4	CO3		PPT Digi Class/Chock	

COURSE INFORMATION SHEET

Course code: AR 253
Course title: SITE PLANNING AND LANDSCAPE ARCHITECTURE
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: IV
Branch: Architecture
Name of Teacher: Apurv Ashish

Course Objectives

This course enables the students:

A	To explain relationship between environment, human interventions and the impacts on it and knowledge about various measures of protecting it.
B.	To define site planning process and identify basic principles and list them.
C.	To classify historical gardens and identify their characteristics.
D.	To illustrate the different processes of site study and its application
E.	To classify natural and man-made elements, list them, identify their use and infer their application.

Course Outcomes

After the completion of this course, students will be able to:

1.	Improve their concepts, ideas and techniques prevalent in landscape architecture.
2.	Develop knowledge about various techniques of site analysis and planning, which will help in Architectural Design and Landscape Design (Sessional).
3.	Build their understanding about the design process used in landscape architectural practice.

Module 1: Natural Elements of Landscape:
Landforms- soil dynamics, rock, water, vegetation. Plant types, characteristics, structure and colour. Climate and their role in landscape design, Environmental Degradation.

Module 2: Manmade Elements of Landscape:
Hard and soft landscaping, garden furniture, lighting fixtures, signage and sign boards, fences, garden hardware and surface treatment, paving materials, surface drainage, artworks, planters, garden shelters, artificial rocks, plants and waterfalls.

Module 3: Introduction to Site Analysis and Site Planning Process:
Site Analysis: Site study and analysis of all natural and man-made factors of site like site-topography and slope, soil, hydrology and drainage, vegetation, climate and visual analysis
Site Planning Process: Need, Definition, scope and relationship in between Site planning & Landscape Arch. Basic principles of landscape design.

Module 4:Evolution of Garden Design and Modern Gardens:
Origin of the concept of garden. A brief study of different garden types: Egyptian, Mesopotamian, Persian, Mughal gardens, Indian Vedic Gardens, Japanese gardens, Chinese Gardens, French Gardens, Renaissance Gardens, English Gardens.

Modern gardens: Rock garden, terrace garden, Indoor garden and other Contemporary thoughts of landscape.

Module 5: Guidelines for different landscape situations, safety and security features of Neighbourhoods:
Passive and Active Recreation spaces and Safety, Circulation and Aesthetics in Residential parks and Tot lots.

Text Books:
1. Charles W. Harris & Nicholas T. Dines; Time Saver Standards for Landscape Architecture
2. Kevin Lynch ;Site planning ;MIT Press, Cambridge, MA – 1967
3. J. O. Simonds; Landscape Architecture; McGraw Hill.
4. J. E. Ingels; Landscaping – Principles and Practice.
5. P. Walker, Theodre D; Planting Design.

Reference Books:
1. Bose, T.K. and Chowdhury, B., "Tropical Garden Plants in Colour", Allied Publishers.
2. Black & Decker, "Landscape Design & Construction", Creative Publishing International.
3. Thompson, W. and Sorvig, K., "Sustainable Landscape Construction: A Guide to Green", Island Press.

POs met through Gaps in the Syllabus : Nil

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design : Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Self- learning such as use of NPTEL materials and internet.

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –
1.Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	M	H	M	M	H	H		M	L	H
2	M	H	M	M	L	M	M	L	M	M	M	M
3	M	L	M	M	L	M	H	M	L	M	M	M

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2, CO3
CD2	Tutorials/Assignments	CO2, CO3
CD3	Seminars	CO1, CO3
CD4	Self- learning such as use of NPTEL materials and internet	CO1, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			**Landforms**-soil dynamics, rock, water, vegetation.	T3, R2, R3	CO1, CO3		PPT Digi Class/Chalk-Board	
1	L2-L3			Plant types, characteristics, structure and colour.	T4, R1	CO1		PPT Digi Class/Chalk-Board	
2	L4			Climate and their role in landscape design	T2, T3, R3	CO1, CO2		PPT Digi Class/Chalk-Board	
2	L5-L6			Environmental Degradation.	T4, R3	CO1		PPT Digi Class/Chalk-Board	
3	L7-L8			Hard and soft landscaping, garden furniture, lighting fixtures,	T1, T3, T4, T5, R1	CO2, CO3		PPT Digi Class/Chalk-Board	
4	L9			Signage and sign boards, fences, garden hardware and surface treatment,	T1, T3, T4, T5, R1	CO2, CO3		PPT Digi Class/Chalk-Board	
4	L10			Paving materials,surface drainage, artworks,	T1, T3, T4, R1	CO1, CO2, CO3		PPT Digi Class/Chalk-Board	

				planters, garden shelters,					
5	L11			Artificial rocks, plants and waterfalls.	T1, T3, T4, R1	CO3		PPT Digi Class/Chalk -Board	
5	L12 - L13			**Site Analysis**: Site study and analysis of all natural and man-made factors of site like site-topography and slope	T2, T4, R3	CO2, CO3		PPT Digi Class/Chalk -Board	
6	L14 - L15			**Site Analysis**: soil, hydrology and drainage, vegetation, climate and visual analysis	T2, T4, R3	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
7	L16 - L18			**Site Planning Process**: Need, Definition, scope	T2, T4, R3	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
8	L19			**Site Planning Process**: relationship in between Site planning & Landscape Arch. Basic principles of landscape design.	T2, T4, R3	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
8	L20 - L21			Origin of the concept of garden. A brief study of different garden types: Egyptian, Mesopotamian	T3, T4, T5, R2	CO1, CO2		PPT Digi Class/Chalk -Board	
9	L21 - L24			Mughal gardens, Indian Vedic Gardens	T3, T4, T5, R2	CO2, CO3		PPT Digi Class/Chalk -Board	
10	L25 - L27			Japanese gardens	T3, T4, T5, R2	CO1, CO3		PPT Digi Class/Chalk -Board	
11	L28			Chinese	T3,	CO1,		PPT Digi	

	- L29			Gardens	T4, T5, R2	CO3		Class/Chalk -Board	
12	L30 - L31			French Gardens, Renaissance Gardens	T3, T4	CO1, CO3		PPT Digi Class/Chalk -Board	
12	L32 - L33			English Gardens	T3, T4	CO1, CO3		PPT Digi Class/Chalk -Board	
12	L34 - L35			Rock garden, terrace garden	T3, T4	CO1, CO2		PPT Digi Class/Chalk -Board	
13	L36			Indoor garden and other Contemporary thoughts of landscape.	T3, T4, T5, R2, R3	CO1, CO2		PPT Digi Class/Chalk -Board	
14	L37 - L38			Passive and Active Recreation spaces	T1, T4, R3	CO1, CO3		PPT Digi Class/Chalk -Board	
14	L39 - L40			Circulation and Aesthetics in Residential parks and Tot lots.	T1, T4, R3	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

OPEN ELECTIVE I

Course code: MT 417/ MT 418
Course title: FRENCH/ GERMAN)
Pre-requisite(s):
Co- requisite(s):
Credits: 3 L:3 T:0 P:0
Class schedule per week: 03
Class: B. Arch
Semester / Level: IV
Branch: ARCHITECTURE
Name of Teacher:

AS OFFERED BY MANAGEMENT DEPARTMENT

COURSE INFORMATION SHEET

Course code: AR 261
Course title: ARCHITECTURAL DESIGN – IV & ACADEMIC FIELD TRIP
Pre-requisite(s): Candidate should have cleared AR 111 Arch. Design-I, AR 161 Arch Design-II and AR 211 Arch Design-III
Co- requisite(s): None
Credits: 9 L: 0 T:0 P: 6
Class schedule per week: 06
Class: B. Arch
Semester / Level: IV
Branch: Architecture
Name of Teacher: Dr. Janmejoy Gupta

Course Objectives

This course enables the students:

A.	Understand how to interpret terms like Allowable FAR, Ground Coverage, Setbacks, Required Parking to be provided, etc as per Municipal Corporation bye-laws and National Building Code.
B.	Learn how to do Area-Calculations of spaces depending on number of users and nature of use to prepare Area-Statement and based on area-statement do functional space-zoning.
C.	Learn to make proper architectural space layout ensuring adequate natural light and ventilation, using either column-beam system or load-bearing walls. Also understand how to have large span structures using waffle-slab, etc.
D	Learn to integrate building aesthetics with functionality for designed building along with application of issues taught in all architectural subjects taught in first three semesters.

Course Outcomes

After the completion of this course, students will be able to:

1.	Design of Low rise / Medium rise buildings with issues of moderate complexity to be tackled covering zoning regulations, byelaws, functional relationship, climatic condition, and social aspects along with basic-level structural considerations.
2.	To produce architectural design presentation drawings with site-plan, floor-plans, elevations, sections, views (exterior as well as internal) and model.

Syllabus

Main Design (Two Designs Mandatory)	**Exercise Duration (approx.)**
1. Primary school / Hostel.	14 weeks
OR	
2. Nursing Home / Tourist-Lodge / Country Club-house.	5 weeks
3.Measured Drawing (based on architectural field trip)	2 weeks

4. Design (Time) Exercise Duration Any one of the above, not covered in the class 8 hrs.

Viva voce:Final Viva-vice on all the design assignments to be conducted at the end of the semester by experts from the field.

Text books:
1. Educational Facilities 1995-96 Review, Wiley.
2. School Building Design in Asia, Allied Publishers.
3. Educational Facilities Design, Princeton Review.
4. Architecture school Building Manual, Boston Press.

Reference books:

1.National Building Code of India, Vol.1-5,2005.
2.JosephDeChiara,MichaelJ.Crosbie,"TimeSaversStandardsforBuildingTypes",McGraw-Hill Professional 2001.
3. Ernst Neuferts, "Architects Data", Blackwell, 2002.
4. Daniel Williams, "Sustainable Design: Ecology, Architecture & Planning", John Wiley & sons Inc, NJ, 2007.
5. The American Institute of Architects , Architectural Graphic Standards
6. Local building byelaws corresponding to the site.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus:NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	**CO1**	**CO2**	**CO3**
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	H	M	M	M	L	L			L	L
2	H		H	M	M			L	L	L	L	

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2.
CD2	Mini projects/Projects	CO2.
CD3	Laboratory experiments/teaching aids	CO1,CO2.
CD4	Industrial/guest lectures	CO2.

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Books/References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1,2,3			Introduction to the problem and site	1,2,3,4/1,2,3,4,5,6	CO1, CO2	Details of Planning and services for Main design	PPT, Chalk & talk, Illustrations	
1	4			Internal evaluation of case studies / Literature studies	1,2,3,4/1,2	CO1, CO2		PPT	
2	5,6,7, 8			Site study, Conceptual Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Computerised drawing tool	
3	9,10, 11			Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Computerised drawing tool	
4	13 ,14 , 15			Design, Layout planning	1,2,3,4,5,6	CO1, CO2.	Design of building and site planning	Computerised drawing tool	
4	16			Internal evaluatio	NA	CO1, CO2		PPT, Computeri	

				n of design developm ent				sed drawing tool, paper	
5-7	16-24			Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Computeri sed drawing tool	
7	25-26			Internal evaluatio n of design developm ent	NA	CO1, CO2.		PPT, Computeri sed drawing tool, paper	
8-9	27-35			Preparatio n of elevation, section & view	1,2,3,4,5,6	CO1, CO2.	Design of building and site planning	Computeri sed drawing tool	
9	36			Submissi on of Final design					
10	37			Staring of new problem on urban design	1,2,3,4,5,6	CO2	Introducti on to problems and describin g various methods of approach	PPT, Chalk & talk, Illustration s	
10	38-40			Introducti on to the problem and site	1,2,3,4,5,6	CO1, CO2.	Details of Planning and services for Main design	PPT, Chalk & talk, Illustration s	
11	41			Internal evaluatio n of case studies / Literature studies	NA	CO1, CO2.		PPT	
11	42-45			Conceptu al Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Computeri sed drawing tool	
12	46-48			Design, Layout planning	1,2,3,4,5,6	CO2.	Design of building and site planning	Computeri sed drawing tool	
13	39			Internal evaluatio	NA	CO1, CO2.		PPT	

				n					
14	40-42			Preparation of elevation, section & view	1,2,3,4,5,6	CO1, CO2.	Design of building and site planning	Computerised drawing tool	
14	43			Final submission					

COURSE INFORMATION SHEET

Course code: AR 262
Course title: BUILDING CONSTRUCTION-III
Pre-requisite(s): None
Co- requisite(s): None
Credits: 6 L: 0 T: 0 P: 4
Class schedule per week: 04
Class: B. Arch
Semester / Level: IV
Branch: Architecture
Name of Teacher: Rajan Chandra Sinha

Course Objectives

This course enables the students:

A.	To understand the layout and construction details of different types of Partitions, Cladding and suspended ceiling
B.	To understand the need for providing expansion joints and its construction details
C.	To know the construction details of ramps, elevators and escalators
D.	To know the different types and forms of large spans structures
E.	Site visits to be organized to make the students aware of various technical aspects, practical difficulties, onsite decisions which will strengthen the knowledge for handling and executing a project

Course Outcomes

After the completion of this course, students will be able:

1.	**To recognize the various types of partitions, cladding, suspended ceiling, expansion joints, vertical transportation and large span structures.**
2.	To explain the context and suitability of above elements under a given situation

Syllabus

PARTITIONS:
Details of Timber Panelled and Soft Board Partitions, Glazed Partitions using Aluminium and Timber sections, Glass Block Partitions, Partition with timber, metal, stone, PVC / plastic etc.

No. of sheets: 2

CLADDING AND SUSPENDED CEILING
Details of cladding of walls with stone, tiles, timber and steel framing.
Methods of suspended framing materials like timber, pressed steel, aluminium, different covering materials such as acoustical board gypsum board, PVC tiles etc.

No. of sheets: 2

EXPANSION JOINTS:
Construction details at foundation, walls, floors and roof level for both concrete and brick work.

No. of sheets: 1

ESCALATORS, RAMPS AND ELEVATORS:
Construction Details of Ramps and Elevators, Details of Escalators

No. of sheets: 2

LARGE SPAN STRUCTURES:
Types and forms of roofing in steel and RCC, their applications to factories sheds, halls, Hangers, canopies, North light roofing in steel and RCC, Patent Glazing.
Coffered Slab, Flat Slab.

No. of sheets: 2

SITE VISIT:
At least two visits to be paid to the construction site covering various sequences of construction and a report to be submitted by individual students as a part of the sessional work.

Text books:
1.Building Construction - W.B. Mc. Kay Vol. 1- 4
2.Building Materials and Construction - B. C. Punmia
3.Building Materials and Construction - Bindra& Arora

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	60
End Sem Evaluation	40

Assessment Components	**CO1**	**CO2**
Progressive Evaluation	√	√
End Sem Evaluation	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	-	-	-	-	L	-	-	-	-	L	L
2	M	M	M	L	L	M	L	L	L	L	L	L

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2
CD2	Mini projects/Projects	CO1, CO2
CD3	Laboratory experiments/teaching aids	CO1, CO2
CD4	Industrial/guest lectures	CO1, CO2

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1-4			Details of Timber Panelled and Soft Board Partitions, Glazed Partitions using Aluminium and Timber sections	1,2,3	CO1, CO2		PPT, Chalk & talk, Illustrations	
2	5-6			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
2-3	7-10			Glass Block Partitions, Partition with timber, metal, stone, PVC / plastic	1,2,3	CO1, CO2		PPT, Chalk & talk, Illustrations	
3	11-12			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
4	13-16			Details of cladding of walls with stone, tiles, timber and steel framing	1,2,3	CO1, CO2		PPT, Chalk & talk, Illustrations	
5	17-18			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
5	19-20			Expansion joints: Construction details at foundation, walls,	1,2,3	CO1, CO2		PPT, Chalk & talk, Illustrations	

				floorsand roof level for both concrete and brick work.					
6	21-22			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
6-7	23-26			Construction details of Ramps and Elevators, Escalators	1,2,3	CO1, CO2		PPT, Chalk & talk, Illustrations	
7	27-28			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
`8-	29-32			Types and forms of roofing in steel and RCC, their applications to factories sheds, halls, Hangers, canopies	1,2,3	CO1, CO2		PPT, Chalk & talk, Illustrations	
9	33-34			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
9-10	35-40			North light roofing in steel and RCC, Patent Glazing. Coffered Slab, Flat Slab	1,2,3	CO1, CO2		PPT, Chalk & talk, Illustrations	
11	41-42			Internal evaluation	NA	CO1, CO2		Drawing on sheets	
11	43-44			Site Visit	NA	CO1, CO2		Mini projects/Projects	
12-13	45-50			Report of site visit	NA	CO1, CO2		Mini projects/Projects	
13	51-52			Internal evaluation	NA	CO1, CO2		Mini projects/Projects	

COURSE INFORMATION SHEET

OFFERED BY DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Course code:	**CE 212**
Course title:	**SURVEYING FIELD WORK**
Pre-requisite(s):	None
Co- requisite(s):	None
Credits: 2	**L: 0 T: 0 P:4**
Class schedule per week:	**04**
Class:	**B. Arch**
Semester / Level:	**IV**
Branch:	**Architecture**
Name of Teacher:	

SEMESTER V

COURSE INFORMATION SHEET

OFFERED BY MANAGEMENT DEPARTMENT

Course code: MT 203
Course title: CONSTITUTION OF INDIA
Pre-requisite(s): None
Co- requisite(s): None
Credits: Nil Credit L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: V
Branch: Architecture
Name of Teacher:

COURSE INFORMATION SHEET

Course code: AR 301
Course title: ACOUSTICS
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: V
Branch: Architecture
Name of Teacher: Dr. Bimal Chandra Roy

Course Objectives

This course enables the students:

A.	To explain the various characteristics of sound including origin, propagation and auditory sensation of sound
B.	To distinguish the behaviour of sound for enclosed spaces and open spaces.
C.	To identify different acoustical defects along with their remedies.
D.	To apply the Sabin's equation for calculating surface areas of different acoustical materials and reverberation time.
E	To identify the acoustical design criteria for theatres, cinema halls, auditorium, conference halls. lecture hall, class rooms etc.
F	To provide the solutions to reduce the environmental noise.
G	To apply the different types of acoustical materials based on their suitability for different acoustical conditions.

Course Outcomes

After the completion of this course, students will be able:

1.	Understand the behaviour of sound in enclosed spaces and open spaces.
2.	Define the various acoustical defectsalong with their remedies.
3.	Apply Sabine's equation to calculate R.T and surface area of different acoustical materials.
4.	Explain acoustical design criteria of various indoor and outdoor spaces based on the function/ uses of the spaces.
5.	Synthesize the knowledge to provide the remedial measures for controlling noise, towards creating the most favourable conditions for indoor and outdoor acoustical environment.

Syllabus

Module 1: Sound Engineering
Introduction to architectural acoustics - characteristic and measurement of sound, frequency, intensity, decibel scale, auditory range, effects of sound on humans, loudness, acoustics and acoustical environment, behavior of sound in an enclosed space.

Module 2: Auditorium Acoustics
Size, shape, sitting arrangement design criteria for speech and music, Principle of geometrical acoustics, Different acoustical defects in auditorium and its solution, reverberation and reverberation time calculations – Sabine's formula and its interpretation, dead and live room, acoustical correction design and modification techniques for broadcasting studio, television studio, classroom, lecture hall, church and cathedral.

Module 3: Electro-acoustics
Introduction of electro-acoustical systems, unidirectional and stereophonic sound system, digital and surround-sound systems, design criteria for theatres, motion picture halls, multiplexes and multipurpose auditoriums.

Module 4: Environmental Acoustics
Noise sources, air borne and structure borne sound, N-C curve, propagation of noise of mechanical operation and impact noise, sound transmission through wall and partition, vibration isolation – control of mechanical noise, floor, wall, ceiling treatment; design principles for reduction of noise at the source, reduction of noise near the source; application of sound absorptive materials, reduction of noise by structural defense, reduction of noise by town planning and regional planning consideration; absorption from air and natural elements, effect of barriers, effect of landscape element on noise reduction, thermal and wind gradient, design of open-air theatres.

Module 5: Acoustical Materials
General description of acoustical materials - acoustical tiles, fiberboard, resonator absorption unit absorber, carpets, acoustical plaster, resilient packing composite materials, etc. – Their use, selection criteria and fixing details.

Text books:
1. A. B. Wood, A Text book of sound.
2. T. M. Yarwood, Acoustics.
3. Duncan Templeton, Acoustics in the Built Environment.
4. J E Moore, Design for good Acoustics and noise control.
5. Dr.V.Narasimhan, An introduction to building physics, Kabir Printingworks,Chennai-5, 1974.
6. David Egan, Concepts in Architectural Acoustics, 1972.

Reference books:
1.National Building Code of India, 2016.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus:NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50

Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1.Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	M		M	H						
2	H	H	H	L								
3	H	H	M	H	H	H						
4	H	H	H	H	H	H	M	L				M
5	H	H	H	M	H		H	H	M			H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD 1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2
CD 2	Tutorials/Assignments		CO2	CD3, CD4
CD 3	Seminars		CO3	CD2, CD3, CD5
CD 4	Mini projects/Projects		CO4	CD1, CD2, CD3
CD 5	Laboratory experiments/teaching aids		CO5	CD2, CD5
CD 6	Industrial/guest lectures		CO5	CD5
CD 7	Industrial visits/in-plant training			
CD 8	Self- learning such as use of NPTEL materials and internets			
CD 9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			Introduction to architectural acoustics	T1-T6	CO1		PPT Digi Class	
1	L2, L3			Characteristic and measurement of sound, frequency, intensity, decibel scale, auditory range	T1-T6	CO1		PPT Digi Class	
2	L4, L5			Acoustical environment, behavior of sound in an enclosed space	T1-T6	CO1, CO2		PPT Digi Class	
2	L6			Effects of sound on humans, loudness, acoustics	T1-T6	CO1, CO2		PPT Digi Class	
3	L7, L8			Size, shape, sitting arrangement design criteria for speech and music	T1-T6, R1	CO1, CO2		PPT Digi Class	
3	L9			Principle of geometrical acoustics	T1-T6, R1	CO1, CO2		PPT Digi Class/Chalk -Board	
4	L10, L11			Different acoustical defects in auditorium and its solution	T1-T6, R1	CO2		PPT Digi Class/Chalk -Board	
4	L12			Dead and live room	T1-T6	CO2		PPT Digi Class/Chalk -Board	
5	L13, L14			Reverberation and reverberation time calculations – Sabine's formula and its interpretation	T1-T6, R1	CO3		PPT Digi Class	
5	L15			Acoustical correction design and modification techniques for broadcasting studio, television studio,	T1-T6	CO2, CO3		PPT Digi Class	
6	L16			Acoustical correction design and modificationtechniques forclassroom, lecture	T1-T6	CO2, CO3		PPT Digi Class/Chalk -Board	

				hall, multiplex,church and cathedral.					
6	L17, L18			Introduction of electro-acoustical systems and its need	T1-T6	CO4, CO5		PPT Digi Class	
7	L19, L20			Unidirectional and stereophonic sound system	T1-T6	CO4		PPT Digi Class/Chalk -Board	
7	L21			Digital and surround-sound systems,	T1-T6	CO4		PPT Digi Class	
8	L22			Design criteria for theatres	T1-T6,R1	CO4		PPT Digi Class	
8	L23, L24			Design criteria for motion picture halls, multiplexes and multipurpose auditoriums.	T1-T6, R1	CO4		PPT Digi Class	
9	L25			Noise sources and their classification	T1-T6, R1	CO4 CO5		PPT Digi Class	
9	L26, L27			Air borne and structure borne sound, N-C curve	T1-T6, R1	CO4, CO5		PPT Digi Class	
10	L28, L29			Propagation of noise of mechanical operation and impact noise	T1-T6	CO4, CO5		PPT Digi Class	
10	L30			Sound transmission through wall and partition, vibration isolation – control of mechanical noise	T1-T6, R1	CO4, CO5		PPT Digi Class/Chalk -Board	
11	L31, L32			Floor, wall, ceiling treatment for reduction of noise	T1-T6, R1	CO4, CO5		PPT Digi Class	
11	L33,			Design principles for reduction of noise at the source	T1-T6, R1	CO4, CO5		PPT Digi Class	
12	L34, L35			Reduction of noise near the source; application of sound absorptive materials	T1-T6, R1	CO4, CO5		PPT Digi Class	
12	L36			Reduction of noise by structural defence	T1-T6, R1	CO4, CO5		PPT Digi Class	
13	L37, L38			Reduction of noise by town planning and regional planning consideration	T1-T6	CO4, CO5		PPT Digi Class/Chalk -Board	

13	L39			Effect of barriers, effect of landscape element on noise reduction, thermal and wind gradient, design of open-air theatres.	T1-T6	CO1, CO4, CO5		PPT Digi Class/Chalk -Board	
14	L40			General description of acoustical materials - acoustical tiles, fiberboard, resonator absorption unit absorber, carpets, acoustical plaster, resilient packing composite materials, etc.	T1-T6	CO4, CO5		PPT Digi Class/Chalk -Board	
14	L41, L42			Use of various acoustical materials, their selection criteria and fixing details.	T1-T6, R1	CO4, CO5		PPT Digi Class	

COURSE INFORMATION SHEET

Course code: AR 302
Course title: BUILDING SERVICES III- (Mechanical & Fire Safety)
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. ARCH
Semester / Level: V
Branch: Architecture
Name of Teacher: Dr. Janmejoy Gupta

Course Objectives

This course enables the students:

A.	To differentiate between Natural Ventilation and Mechanical Ventilation.
B.	To identify the factors responsible for comfort conditions.
C.	To define the different Psychrometric Processes.
D.	To identify the factors responsible for cooling load calculation.
E	To classify different types of Air Conditioning systems and their suitability for different psychrometric conditions.
F	To identify different Air Conditioning equipment's and their suitable location in buildings.
	To explain the function of mechanical equipment's for vertical transportation (elevators and escalators for buildings).
	To explain the different firefighting methods to be adopted in buildings.

Course Outcomes

After the completion of this course, students will be able:

1.	To design schematic HVAC drawings for a building, (Air conditioning system of an office building, hotel, auditorium etc.) showing AHU location(s), ductwork (main trunk duct as well as branch ducts), position of registers & diffusers, etc.
2.	To calculate Duct Sizing, Total Air Volume Requirement, AHU Size and Approximate Cooling Load for a Room, all conditions and required parameters been given and to calculate Combined Thermal Transmissivity (U) value for a wall, having different layers (for e.g. Insulation layer, brick, plaster, etc.)
3.	To know how to provide appropriate elevators/ lifts/escalators and represent them appropriately in section drawings for different buildings like residences, apartments, offices, hospitals, hotels, stations, airports.
4.	To plan buildings as per the fire safety norms.
5.	Learn to use simple software for measuring extent of human comfort zone in different climatic zones (Climate Consultant & Autodesk Ecotect) and for calculating duct sizing, airflow requirement, etc. like RHVAC (R-9).

Syllabus

Module 1: Introduction to Mechanical Services in a building.
Mechanical Services required in Buildings.
Role of an Architect regarding mechanical Services.

The scope and impact of Mechanical system- Impact of space planning
Impact on Architectural Design
Impact on High-Rise Bldg.
Impact on construction cost.
Impact on Global environment.
Basic generic Types of HVAC systems.
Basic components of a HVAC system and their locations based on type of HVAC systems used.

Modue2: Mechanical Ventilation:
Standard requirements of ventilation for different conditions of living and works.

Conditions for comfort – Building Bioclimatic Chart (Givony, 1969) and its application in Modern Simulation Software like Climate Consultant and Autodesk Ecotect-Version 2011.
Control of quality, quantity, temperature, and humidity of air.
Psychrometry- Introduction, meaning of air conditioning, different psychometric properties, psychrometric processes, Bypass Factor of Cooling/Heating Coil, Psychometric chart & its application summer air conditioning system, winter air conditioning system, year-round air conditioning system. Principles of refrigeration & Air -Conditioning
Different types of Air-Conditioning.
Calculation of U-Values of Composite Walls.
Cooling load Calculation.

Module 3: Air Conditioning Equipment's
Elaboration of equipment's. Calculation of AHU sizing required for different uses, based on the air volumes required to be handled.
Major equipment used in Air conditioning – Ducts, Registers, Diffusers, Grilles, etc., their characteristics & suitable place for location, consideration for reduction of heat gain and economic layout of supply and return air ducts. Introduction to simple software like RHVAC (R-9), for calculating duct sizing, airflow requirement, etc.

Module 4: Mechanical Equipment's for vertical transportation:
Building design and vertical transportation demand for vertical transportation, Lift and Escalators: types, uses, functioning, and automatic control system. Special Types of Lifts, Plans & sections to explain different parts of lifts and escalators, Planning for vertical transportation.

Module 5: Fire Safety Services:
Fire Safety, Role and Importance, Fire safety design, planning for fire protection, Fire detection & fire-fighting, Different firefighting methods to be adopted in buildings.

Text books:

1. Arora &Duinkand, "Text book of Refrigeration & Air conditioning"
2. Architectural Graphic Standard (HVAC System)
3. William.K.Y.Tao; "Mechanical and Electrical Systems in Buildings"
4. V.P.Lang," Principles of air conditioning"
5. Rodney R.Alder ;"Vertical Transportation for Building"

Reference books:
1. National Building Code of India, 2016.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1.Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	L	M	M						
2	H	H	H	M	H		H	H			L	
3	H	H	H	M	L		H	H			L	
4	H	H	H	H	M	H	H	H			L	
5	H	H	H	H	H	H				M	L	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD 1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2

CD 2	Tutorials/Assignments		CO2	CD3, CD6
CD 3	Seminars		CO3	CD2, CD3, CD4
CD 4	Mini projects/Projects		CO4	CD1, CD2, CD3
CD 5	Laboratory experiments/teaching aids		CO5	CD2, CD6
CD 6	Industrial/guest lectures			
CD 7	Industrial visits/in-plant training			
CD 8	Self- learning such as use of NPTEL materials and internets			
CD 9	Simulation			

Lecture wise Lesson Planning Details

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			Mechanical Services required in Buildings. Role of an Architect regarding mechanical Services.	T1,T4, R1.	CO1		PPT Digi Class	
1	L2, L3			The scope and impact of Mechanical system- Impact of space planning Impact on Architectural Design Impact on High-Rise Bldg.	T1,T4, R1	CO1, CO2		PPT Digi Class	
2	L4, L5			Impact on construction cost. Impact on Global environment.	T1,T4, R1.	CO2		PPT Digi Class	
2	L6			Basic generic Types of HVAC systems.Basic components of a HVAC system and their locations based on type of HVAC systems used.	T1, T4, R1	CO2		PPT Digi Class	
3	L7, L8			Standard requirements of ventilation for different conditions of	T1,T4, R1	CO2		PPT Digi Class	

				living and works. Conditions for comfort – Building Bioclimatic Chart (Givony, 1969) and its application in Modern Simulation Software like Climate Consultant and Autodesk Ecotect-Version 2011.					
3	L9			Control of quality, quantity, temperature, and humidity of air.	T1, T2, T3, R1	CO3		PPT Digi Class/Chalk -Board	
4	L10, L11			Psychrometry-Introduction, meaning of air conditioning, different psychometric properties, psychrometric processes, Bypass Factor of Cooling/Heating Coil, Psychometric chart.	T1,T2, T3,R1	CO3		PPT Digi Class/Chalk -Board	
4	L12			application in summer air conditioning system, winter air conditioning system, year-round air conditioning system. Principles of refrigeration & Air - Conditioning	T1,T2, T3, R1	CO3		PPT Digi Class/Chalk -Board	
5	L13, L14			Different types of Air-Conditioning. Calculation of U-Values of Composite Walls.	T1, T2, T3, R1	CO3		PPT Digi Class	
5	L15			Cooling load Calculation.	T1,T2, T3,R1	CO4		PPT Digi Class	
6	L16			Elaboration of equipment's.	T1,T2, T3,T4, R1	CO3, CO4		PPT Digi Class/Chalk -Board	
6	L17, L18			Calculation of AHU sizing required for different uses, based on the air volumes required to be handled.	T1,T2, T3,T4, R1	CO3, CO4, CO5		PPT Digi Class	
7	L19, L20			Major equipment used in Air conditioning – Ducts, Registers,	T2,T4, R1	CO4, CO5		PPT Digi Class/Chalk	

				Diffusers, Grilles, etc., their characteristics & suitable place for location				-Board	
7	L21			consideration for reduction of heat gain and economic layout of supply and return air ducts.	T2,T4, R1	CO4, CO5		PPT Digi Class	
8	L22			Introduction to simple software like RHVAC (R-9), for calculating duct sizing, airflow requirement, etc.	T2,T4, R1	CO4, CO5		PPT Digi Class	
8	L23, L24			Building design and vertical transportation demand for vertical transportation,	T2,T4, T5 R1	CO4, CO5		PPT Digi Class	
9	L25			Lift and Escalators: types, uses, functioning, and automatic control system.	T2,T4, T5 R1	CO4, CO5		PPT Digi Class	
9	L26, L27			Special Types of Lifts,	T2,T4, T5 R1	CO4, CO5		PPT Digi Class	
10	L28, L29			Plans & sections to explain different parts of lifts and escalators, Planning for vertical transportation.	T2,T4, T5 R1	CO5		PPT Digi Class	
10	L30			Fire Safety, Role and Importance,	T2,T3, T4,T5, R1	CO3, CO5		PPT Digi Class/Chalk -Board	
11	L31, L32			Fire safety design, planning for fire protection,	T1,T2, T3,T4, T5 R1	CO3, CO5		PPT Digi Class	
11	L33,			Fire detection & fire-fighting,	T1,T2, T3,T4, R1	CO3, CO5		PPT Digi Class	
12	L34, L35			Different firefighting methods to be adopted in buildings.	T1,T2, T3,T4, T5 R1	CO4		PPT Digi Class	

COURSE INFORMATION SHEET

OFFERED BY DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Course code: CE 301
Course title: STRUCTURAL DESIGN – I
Pre-requisite(s):
Co- requisite(s):
Credits: 4 L:4 T:0 P:0
Class schedule per week: 4
Class: B. Arch
Semester / Level: V
Branch: Architecture
Name of Teacher:

Course Objectives

This course enables the students to:

A.	Apply knowledge of limit state design method in addressing design problems of structural engineering

Course Outcomes

After the completion of this course, students will be to:

1.	Identify and apply appropriate parameters, assumptions and design criteria
2.	Design a simple reinforced concrete structural system
3.	Have familiarity with the IS456:2000 code of practice

Syllabus

Module I: Introduction to Limit State Design of RCC
Design Loads, Materials for Reinforced Concrete and Code requirements, Factor of Safety, Characteristic and designloads, Characteristic and design strength, Design Philosophy, Principles of limit states, Stress block parameters for limit state of collapse.

Module II: Design of Beams
Design procedures for critical sections of simply supported and Cantilever beams for rectangular and flanged sections for moment and shears, Reinforcement requirements Anchorages of bars, check for development length, Slenderness limits for beams to ensure lateral stability.

Module III: Design of Slabs
General consideration of design of slabs, Rectangular slabs spanning one direction, Rectangular slabs spanning in two directions for various boundary conditions. Design of simply supported, cantilever and continuous slabs as per IS: 456 – 2000.

Module IV: Design of Columns
General consideration of design of column,Axially and eccentrically loaded columns, Design of circular column.

Module V: Design of Footings
Loads on footing, Design basis forlimit state method, Design of isolated rectangular footing for axial load anduniaxial moment, design of pedestal.

Text books:

1. Nilson, A. H. Design of Concrete Structures, 13th edition, McGraw Hill, 2004.

Reference books:

1. Wang C-K. and Salmon, C. G., Reinforced Concrete Design, 6th Edition, Addison Wesley, New York.
2. MacGregor, J. G., Reinforced Concrete: Mechanics and Design, 3rd Edition, Prentice Hall, New Jersey, 1997.

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	✓
Laboratory experiments/teaching aids	
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	CO1	CO2	CO3
Mid Sem Examination Marks	✓	✓	✓
End Sem Examination Marks	✓	✓	✓
Quiz (02 nos. of 10 marks each)	✓	✓	✓
Assignment		✓	

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	M	M	L	L	M	M	L	L	M	L
2	H	M	M	M	L	L	M	M	L	L	M	L
3	H	M	M	M	L	L	M	M	L	L	M	L

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD8
CD2	Tutorials/Assignments		CO2	CD1, CD2, CD4, CD8
CD3	Seminars		CO3	CD2, CD4, CD8
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

OPEN ELECTIVE II

Course code:
Course title:
Pre-requisite(s):
Co- requisite(s):
Credits: 3 L:3 T:0 P:0
Class schedule per week: 03
Class: B. Arch
Semester / Level: V
Branch: ARCHITECTURE
Name of Teacher:

COURSE INFORMATION SHEET

Course code: AR 311
Course title: ARCHITECTURAL DESIGN-V
Pre-requisite(s): Candidate should have cleared Architectural Design III
Co- requisite(s): None
Credits: 13.5 L: 0 T: 0 P: 9
Class schedule per week: 09
Class: B.Arch
Semester / Level: V
Branch: Architecture
Name of Teacher: Dr.Satyaki Sarkar

Course Objectives

This course enables the students:

A.	To engage in an effective design process; that entails application and use of relevant building bye-laws and provisions of National Building Code;
B.	To explain exterior and interior design decisions through scaled drawings;
C.	To use 2D and 3D media to clearly and evocatively present and document design ideas;
D	To develop concepts that integrate site, human activity, structure and building materials

Course Outcomes

After the completion of this course, students will be able to:

1.	To demonstrate design, structural systems, services and construction systems in the design of a modern medium to high rise building in the urban context.
2.	To apply and use building byelaws and codal provision contextually.
3.	To design structures with lighting and circulation efficiency.

Syllabus

Main Design (Two Designs mandatory)	**Exercise Duration (approx.)**
1. Multistoried Commercial–cum-Residential complex OR Any other mixed use development	9 weeks
2. Exhibition Pavilion / Museum OR Public library building	5 weeks

3. Design (Time) Exercise Duration Any one of the above, not covered in the class 8 hrs.

Viva voce:Final Viva-vice on all the design assignments to be conducted at the end of the semester by experts from the field.

Text books: Nil

Reference books:

1. Michael Malone, The Architects guide to Residential Design, McGraw-Hill Publication
2. Mary Lou Bakker, Space Planning for Commercial Office Interiors, Bloomsbury Publishing
3. Joseph De Chiara, Michael J. Crosbie, Times Savers Standard for Building types, McGraw-Hill Publication
4. The American Institute of Architects , Architectural Graphic Standards,
5. Francis D. K. Ching, Steven R. Winkel, Building Codes Illustrated: A Guide to Understanding the 2015 International Building Code, Wiley
6. Local building byelaws corresponding to the site.

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	60
End Sem Evaluation	40

Assessment Components	**CO1**	**CO2**	**CO3**
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	H	M	M	M	L	L			L	L
2	H		H	M	M			L	L	L	L	
3	H	H	H	H	H	M	M	M	M			M

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2, CO3,
CD2	Mini projects/Projects	CO2, CO3,
CD3	Laboratory experiments/teaching aids	CO3,
CD4	Industrial/guest lectures	CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1,2,3			Introduction to the problem and site	1,2,3,4,5,6	CO1, CO2	Details of Planning and services for Main design	PPT, Chalk & talk, Illustrations	
1	4			Internal evaluation of case studies / Literature studies	NA	CO1, CO2		PPT	
2	5,6,7,8			Site study, Conceptual Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Compuertised drawing tool	
3	9,10,11			Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Compuertised drawing tool	
4	13 ,14 , 15			Design, Layout planning	1,2,3,4,5,6	CO1, CO2, CO3	Design of building and site planning	Compuertised drawing tool	
4	16			Internal evaluation of design development	NA	CO1, CO2		PPT, Compuertised drawing tool, paper	
5-7	16-24			Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Compuertised drawing tool	
7	25-26			Internal evaluation of design developme	NA	CO1, CO2, CO3		PPT, Compuertised drawing tool, paper	

				nt					
8-9	27-35			Preparation of elevation, section & view	1,2,3,4,5,6	CO1, CO2, CO3	Design of building and site planning	Compuertised drawing tool	
9	36			Submission of Final design					
10	37			Staring of new problem on urban design	1,2,3,4,5,6	CO3	Introduction to problems and describing various methods of approach	PPT, Chalk & talk, Illustrations	
10	38-40			Introduction to the problem and site	1,2,3,4,5,6	CO1, CO2	Details of Planning and services for Main design	PPT, Chalk & talk, Illustrations	
11	41			Internal evaluation of case studies / Literature studies	NA	CO1, CO2		PPT	
11	42-45			Conceptual Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Compuertised drawing tool	
12	46-48			Design, Layout planning	1,2,3,4,5,6	CO2, CO3	Design of building and site planning	Compuertised drawing tool	
13	39			Internal evaluation	NA	CO1, CO2		PPT	
14	40-42			Preparation of elevation, section & view	1,2,3,4,5,6	CO1, CO2, CO3	Design of building and site planning	Compuertised drawing tool	
14	43			Final submission					

COURSE INFORMATION SHEET

Course code: AR 312
Course title: WORKING DRAWING I
Pre-requisite(s): Preparation of Architectural Working drawings and details for one of the design projects of medium rise-framed structure, from earlier semester. Students will prepare the drawing in AutoCad
Co- requisite(s): None
Credits: 2 L:0 T:0 P:4
Class schedule per week: 04
Class: B. Arch
Semester / Level: V
Branch: Architecture
Name of Teacher: Anila Smriti Surin

Course Objectives

This course enables the students:

A.	To familiarize the students with the drawings which are prepared for the actual construction/ execution of the buildings.
B.	To enable students to understand the basics in working drawings, study of process of making working drawing and symbols, labelling and dimensioning of working drawings.
C.	To teach students the essential components of working drawings, notations, drawing standards, strengthen the students' knowledge about preparing working drawings for various buildings and elements.

Course Outcomes

After the completion of this course, students will be:

1.	Able to understand the basics in working drawings and its use and implementation on site.
2.	Able to read the drawing and know the implementation and challenges on construction site.
3.	This will improve the understanding of the principles of design detailing as applicable to various situations.
4.	It will be helpful in detailing out the drawings for the subject working drawing-I and understand the various stages of construction for estimation and costing.

Syllabus

Topics	***A1 size sheet***
Developing Key plans Site plan and Layout plan of the whole complex	1
Foundation plan	1
Floor plans along with schedule of internal finishes	Minimum 3
Terrace / roof plan including roof drainage	1

All 4 side elevation with labelling	Minimum 1
Minimum 3 sections including one through staircase, lift shaft and toilets	Minimum 1
Skin section showing required detailing.	2
Staircase/ramp section and details	1
Door window schedule to be prepared for the undertaken building.	2
External finishes of all types included in the complex; the drawings shall include all details required.	1

Text books:

Reference books:

1- Joe, B. (Ed). (2002). *Details in Architecture: Vol. I-V*. Victoria : The Images Publishing group.
2- Weston, R. (2004). *Plans Sections Elevations – Key buildings of the twentieth century*. London :
Laurence King Publishing.
3- RIBA Working Drawings Handbook, Keith Styles, 2014,1893 (Part 1).

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus : Nil

Topics beyond syllabus/Advanced topics/Design : Nil

POs met through Topics beyond syllabus/Advanced topics/Design

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Industrial/guest lectures
CD4	Industrial visits/in-plant training

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation	60
End Sem Evaluation	40

Assessment Components	CO1	CO2	CO3
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	M	L	H	M	M		M	H		M
2	H	H	H		L	M	L		M			
3	M	H		M		L		L	L		M	L
4	M	M			M	M		M	L	L	H	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO4
CD2	Mini projects/Projects	CO1, CO2, CO3
CD3	Industrial/guest lectures	CO2, CO4
CD4	Industrial visits/in-plant training	CO2, CO3,CO4

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1- 3			Basic introduction to Working Drawing: historical perspective; consultants involved in preparation of working drawings, their role and scope; reading, error checking, problems in working drawings.	R1	CO1, CO3		PPT, Chalk & talk, Illustrations	
1	4- 6			Representation of materials, graphic symbols, line type conventions, grid	R1,R3	CO1		PPT, Chalk & talk, Illustrations, Computerised drawing	

				lines, lettering, colour codes, paper sizes, title blocks, office practices, standardization of details, dimensioning and dimension style. Working with layers, blocks, templates, assemblies, libraries, layouts, plot styles, error checking, editing. List of drawings, list of symbols, list of abbreviations, sheet layout.				tool	
2	7- 9			Developing Key plans, Site plan and Layout plan of the whole complex.	R3	CO1, CO3, CO4		PPT, , Illustrations, Computerised drawing tool	
2	10-12			Foundation plan.	R1	CO1		Computerised drawing tool	
3	13-15			Floor plans along with schedule of internal finishes	R2	CO1, CO2		Computerised drawing tool	
4	16-18			Terrace / roof plan including roof drainage	R1, R2, R3			PPT, Computerised drawing tool	
5	19-24			All 4 side elevation with labelling	R1, R2	CO1, CO2, CO3, CO4		PPT, Computerised drawing tool	
6	25-30			Internal evaluation	R1, R2	CO1, CO3, CO4		PPT, Computerised drawing tool	
6	31-33			Minimum 3 sections including one through staircase, lift shaft and toilets. Skin section showing required detailing.	R1, R2, R3			Computerised drawing tool	
7	34-36			Staircase/ramp section and details	R1, R2, R3	CO1, CO3		Computerised drawing tool	
8	37-39			Door window schedule to be prepared for the undertaken building	R1, R2, R3	CO1, CO2, CO4		Chalk board, Computerised drawing	

								tool	
9	40-42			External finishes of all types included in the complex; the drawings shall include all details required.	R3	CO1, CO4		Chalk board, Computerised drawing tool	
10	43-45			Submission of final sheets and final jury.	R1	CO3, CO4		Computerised drawing tool	

COURSE INFORMATION SHEET

Course code: AR 313
Course title: BUILDING INFORMATION MODELLING
Pre-requisite(s): The student must have taken AR 214 Computer Application in Architecture.
Co- requisite(s): None
Credits: 1.5 L: 0 T: 0 P: 3
Class schedule per week: 03
Class: B. Arch
Semester / Level: V
Branch: Architecture
Name of Teacher: Apurv Ashish

Course Objectives

This course enables the students:

A	To familiarize the students with the concepts of Building Information Modelling.
B.	To enable them to experiment with forms, mapping, rendering and presentation techniques.
C.	To familiarize the students with the concepts of Cloud Rendering and Building Walkthrough.

Course Outcomes
After the completion of this course, students will be able to:

1.	Explore innovative forms and geometry in Architectural Design, Working Drawing and Landscape Design.
2.	Develop concepts of Building Information Modelling and Cloud Rendering.
3.	Communicate through visual literacy using computer technology.

SYLLABUS-

Activities:	No of Weeks
1. Introduction about Revit Architecture- New Features of Revit, Editing and Working with Families in a Project, Concepts of Revit, creating a shared Family, Project and System settings, Creating the Basic Model, Adding Doors and Windows, Floors and Floor Openings, Roof and Ceiling, Staircases.	**2 Weeks**
2. Modelling and Rendering- • Creating Walls, Doors. Windows, openings, stairs, railings, roofs, curtain systems. • Creating drawings, Creating detail from Building Model, Scheduling, Annotating and Dimensioning, Viewing the Model, Applying Materials and textures, creating a perspective vies, rendering an Exterior view, rendering an Interior, Creating and Recording Walkthroughs, creating 3D cutaways with Section Boxes.	**4 Weeks**
3. Introduction to 3DS Max **An overview:** Types of modelling, transforming objects, Compound objects, modifiers & modifier stack.	**3 Weeks**
4. Introduction to Photoshop Photoshop interface, creating and saving images, basic image editing, Photoshop toolbox and tools, using layers, special effects	**4 Weeks**

5. Animation Various animation techniques, editing animation using key frames, animation constraints/controller, rendering and special effects, walkthroughs.	**2 Weeks**

Design Assignments-

To be conducted at the end of each lecture.

Viva Voce-

Final Viva-vice on the design assignments to be conducted at the end of the semester.

Text Books:

1. Autodesk Revit Architecture No Experience Required- Eric Wing
2. 3DS MAX- Advanced 3D modelling and animation – C & M, CADD Centre
3. 3DS MAX 8 Bible – Kelly C.Murdock
4. Photoshop CS Bible – Deke McClelland
5. Adobe Photoshop 7.0 classroom in a book – Adobe creative team

POs met through Gaps in the Syllabus : Nil

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Industrial/guest lectures
CD4	Self- learning such as use of NPTEL materials and internet.

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	60
End Sem Evaluation	40

Assessment Components	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Assignment	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	L	L	H	M	H	L		H	H	M	H
2	L	L	M	H		M		M	H	M	H	H
3	M	L	M	H	M		H	L	H	H	L	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2 , CO3
CD2	Mini projects/Projects	CO1, CO2
CD3	Industrial/guest lectures	CO1, CO2, CO3
CD4	Self- learning such as use of NPTEL materials and internet.	CO1, CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / Refere nces	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			Introduction to Revit Architecture	T1	CO1, CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
2	L2			Introduction to Revit Architecture	T1	CO1, CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
3	L3			Revit Architecture-Modelling and Rendering	T1	CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
4	L4			Revit Architecture-Modelling and Rendering	T1	CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
5	L5			Revit Architecture-Modelling and Rendering	T1	CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	

6	L6			Revit Architecture-Modelling and Rendering	T1	CO2, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
7	L7			Introduction to 3DS Max	T2, T3	CO1, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
8	L8			Introduction to 3DS Max	T2, T3	CO1, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
9	L9			Introduction to 3DS Max	T2, T3	CO1, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
10	L10			Introduction to Photoshop .	T4, T5	CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
11	L11			Introduction to Photoshop	T4, T5	CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
12	L12			Introduction to Photoshop	T4, T5	CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
13	L13			Introduction to Photoshop	T4, T5	CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
14	L14			Introduction to Animation and Walkthrough	T1, T2, T3	CO1, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	
15	L15			Introduction to Animation and Walkthrough	T1, T2, T3	CO1, CO3		PPT, Chalk-talk, Software Illustrations, Assignments	

SEMESTER VI

COURSE INFORMATION SHEET

AS OFFERED BY MANAGEMENT DEPARTMENT

Course code:	**MT 123**
Course title:	**BUSINESS COMMUNICATION**
Pre-requisite(s):	None
Co- requisite(s):	None
Credits: 3	**L: 3 T: 0 P: 0**
Class schedule per week:	**03**
Class:	**B. Arch**
Semester / Level:	**VI**
Branch:	**Architecture**
Name of Teacher:	

COURSE INFORMATION SHEET

Course code:	**AR 351**
Course title:	**SPECIFICATION ESTIMATION & COSTING**
Pre-requisite(s):	None
Co- requisite(s):	Should have registered for AR 102 Primary Building Materials
Credits: 3	**L: 3 T: 0 P: 0**
Class schedule per week:	**03**
Class:	**B. Arch**
Semester / Level:	**VI**
Branch:	**Architecture**
Name of Teacher:	**Dr. D. J. Biswas**

Course Objectives

This course enables the students:

A	To introduce the subject along with various aspects writing specification and quantity survey and to understand the basic difference between the general specification and detail specification of works
B.	To familiarize with various methods of estimation and their suitability for different projects and to introduce the basic skill of writing items of works and its relation with specification
C.	To analyse the material quantity and rate for different item of works

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand the relevance and importance of Estimation and costing for building projects.
2.	Develop the basic skill to prepare the building estimate and costing with suitable specification
3	Have brief understanding of Rate analysis of a composite item

Syllabus

Module 1: Introduction to Specification and Item of works:
Explain in detail the relevance of specification for building projects, General specification of material and composite works for construction. Brief introduction of different types of tenders and their relation with BOQ.

Module 2: Introduction to Building Estimate and Costing:
Definition and purpose of Building estimate and costing, Different types of estimates and its suitability. Different methods of preparing Approximate or Rough estimate, explain the relevance of "Measurement Form" and "Abstract of estimate form" for preparation of Detail estimate. Basic skill of writing items in BOQ for Item Rate Tender, along with unit of measuremen

Module 3: Methods of Measurement of works:
Explain the different methods of measurement of construction works, exercise with different types and shapes of building to estimate detail quantity at various stages, such as: Foundation up to plinth, Superstructure and finishing works.

Module 4: Estimating quantity and cost of Reinforcement in RCC works:
Explain the different cross-section and structure of steel reinforcement in concrete slab, beam, column etc and methodology for calculating the quantity and cost with suitable exercise.

Module 5: Analysis of Rate for different items:
Explain the basic purpose of Rate analysis, analysis of different materials for a composite item. Analysis the component of various types of labour involved in the composite item, through suitable exercise.

Text books:
1. Chakraborty M, Estimating, Costing, Specification & Valuation
2. Kohli D. D. & Kohli R. C, A Text Book of Estimating and Costing

Reference books:
1. Dutta B N, Estimating & Costing
2. Delhi Schedule of Rate 2016

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –
1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	L		L		M	L	L	M	M	H	
2	H		L			L		M	M	H	H	L
3	M	M			L	M		M	H	M	H	

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD 1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2, CD3
CD 2	Tutorials/Assignments		CO2	CD1, CD3, CD6
CD 3	Seminars		CO3	CD2, CD3
CD 4	Mini projects/Projects			
CD 5	Laboratory experiments/teaching aids			
CD 6	Industrial/guest lectures			
CD 7	Industrial visits/in-plant training			
CD 8	Self- learning such as use of NPTEL materials and internets			
CD 9	Simulation			

Lecture wise Lesson planning Details

Wk. No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1			Explain in detail the specification and its relevance for building projects	T1, R1	CO1		Chalk boards/LCD projectors	
1	2,3			-do-	-do-	-do-		-do-	
2	4			General specification of material and composite	-do-	-do-		-do-	

				works for construction					
2	5,6			-do-	-do-	-do-		-do-	
3	7			Introduction of different types of tenders and their relation with BOQ	-do-	-do-		-do-	
3	8,9			-do-	-do-	-do-		-do-	
4	10			Definition and purpose of Building estimate and costing	T1, R1	CO2		-do-	
4	11,12			Different methods of preparing Approximate or Rough estimate	-do-	-do-		-do-	
5	13			Preparation of "Measurement Form" and "Abstract of estimate form" for preparation of Detail estimate.	-do-	-do-		-do-	
5	14,15			-do-	-do-	-do-		-do-	
6	16			Basic skill of writing items in BOQ for Item Rate Tender, along with unit of measurement.	T1, R1, R2	CO2		-do-	
6	17,18			-do-	-do-	-do-		-do-	
7	19			Explain the different methods of measurement of construction works	-do-	-do-		-do-	
7	20,21			-do-	-do-	-do-		-do-	
8	22			Problem solving with different types and	-do-	-do-		-do-	

				shapes of building to estimate detail quantity at various stages					
8	23,24			-do-	-do-	-do-		-do-	
9	25			-do-	-do-	-do-		-do-	
9	26,27			Estimating quantity and cost of Reinforcement in RCC works	T1, R1, R2	C2, C3		-do-	
10	28			-do-	-do-	-do-		-do-	
10	29,30			Methodology for calculating the quantity and cost with suitable exercise	-do-	-do-		-do-	
11	31			-do-	-do-	-do-		-do-	
11	32,33			-do	-do-	-do-		-do-	
12	34			Explain the basic purpose of Rate analysis	T1, R1, R2	C2, C3		-do-	
12	35,36			Analysis of Labour and material components for different composite item	-do-	-do-		-do-	
13	37			-do-	-do-	-do-		-do-	
13	38,39			Analysis of Rates for different components	-do-	-do-		-do-	
14	40			-do-	-do-	-do-		-do-	

COURSE INFORMATION SHEET

OFFERED BY DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Course code: CE 308
Course title: STRUCTURAL DESIGN II
Pre-requisite(s): AR 204 STRUCTURAL MECHANICS
Co- requisite(s):
Credits: 4 L: 4 T: 0 P: 0
Class schedule per week: 04
Class: B.Arch
Semester / Level: VI
Branch: Architecture
Name of Teacher:

Course Objectives

This course enables the students to:

1	Discuss the behaviour and design principles of various structural steel elements in accordance to IS 800:2007.

Course Outcomes

After the completion of this course, students will be able to:

1.	Enhance confidence on designing abilities for steel structures.
2.	Apply IS 800:2007 codal provisions to design various structural steel elements.
3.	To design primary steel structural elements and their connections.
4.	Self-motivated inquiry.

Syllabus

Module I: Structural Steel and Design Approaches
Manufacture, Metallurgy, Engineering properties and characteristics, Types of sections, Rolling process –necessity and importance, Specifications, Advantages and disadvantages. Loads and loading standards, Assessment of wind load and earthquake loads as per IS codes. Methods of design – working stress, LRFD and Limit state design, Fundamental concepts, Performance criteria, Comparison of methods, Specifications of IS code for limit state design.

Module II: Connections
Bolted connections - Design of bolted connections subjected to direct and eccentric loadings.
Welded connections - Design of welded connections subjected to direct and eccentric loadings.

Module III: Design of Tension Members
Types of tension members, sectional areas, types of failure, design strength, design of tension members, lug angles and splices.

Module IV: Compression Members and foundation design
Types of section, section classification, column formulae, buckling classification. Design strength of simple members and struts, Design of built up and compound members including splicing, lacing and

battening, Design of column bases and foundation.

Module V: Design of Flexural Members
Concept of lateral restraint, laterally supported and unsupported beams, section classification, Elastic and plastic sections modulus, Determination plastic section modulus of sections, IS criteria for design, Design of simple and plated beams.

Text books:

1. Design of Steel Structures, N. Subramanyam, Oxford University Press, New Delhi, india, 2008
2. Limit State Design of Steel Structures, S. K. Duggal, Tata McGraw Hill Education Private Limited, New Delhi, India, 2015
3. Design of Steel Structures, P. Dayarathnam, Prentice Hall India, New Delhi, India, 2011

Reference books:

1. IS : 800 – 2007 Code of Practice for General Construction in Steel
2. SP : 6(1) – 1964 Handbook for Structural Engineers : I. Structural Steel Sections
3. Teaching Resources for Structural Steel Design – Vol. I & II, INSDAG, Kolkatta.
4. Gaylord, E.H., Gaylord, N.C., and Stallmeyer, J.E., Design of Steel Structures, 3rd edition, McGraw-Hill Publications

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	√
Tutorials/Assignments	√
Seminars	
Mini projects/Projects	√
Laboratory experiments/teaching aids	
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	√
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	CO1	CO2	CO3	CO4
Mid SemExamination Marks	√	√	√	√
End Sem Examination Marks	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√
Assignment/ Quiz	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	L	H	H	L	L	L	L	M	M
2	H	H	H	L	H	H	L	M	H	H	H	M
3	H	H	H	L	H	H	L	L	H	H	H	M
4	H	H	H	L	H	H	L	H	M	L	M	H
5	H	H	H	L	H	H	L	L	L	L	M	M

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1 and CD8
CD2	Tutorials/Assignments		CO2	CD1, CD2 and CD8
CD3	Seminars		CO3	CD1, CD2 and CD8
CD4	Mini projects/Projects		CO4	CD4
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: **AR 352**
Course title: **VERNACULAR ARCHITECTURE**
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 **L: 3 T:0 P:0**
Class schedule per week: **03**
Class: **B. Arch**
Semester / Level: **VI**
Branch: **Architecture**
Name of Teacher: **Prof. Ritu Agrawal**

Course Objectives:

A.	To acquire basic concepts regarding the traditional and vernacular architecture of India with regard to traditional building forms and its relation to settlement system..
B.	To understand the socio-economic and technological architectural expressions with regard to the regional vernacular context.
C.	To develop capacity to understand, appreciate and impart knowledge of vernacular architecture of India.
D.	To analyse and cultivate a broader sense of understanding of the relationship between architecture, environment and culture.
E.	To apply and adopt the materials, patterns of construction and building techniques in vernacular style in modern contemporary times.

Course Outcomes:

After the completion of this course, students will be able:

1.	To define and outline the vernacular styles of different traditional settlements in India.
2.	To identify and interpret specific local, regional and national vernacular traditions from India in socio-cultural context.
3.	To analyse the association between architecture, environment and culture.
4.	To explain the requirement and application of traditional construction techniques.
5.	To evaluate the applicability of vernacular styles in present practice in architecture.

Syllabus

Module 1: Introduction to the field of Vernacular Architecture

Defining and differentiating vernacular architecture from contemporary architecture;Differentiating Vernacular Architecture from traditional architecture;Scope of Vernacular Architecture in Indian Context;Factors Influencing Vernacular Architecture;Building Material and Construction Techniques in Indian Vernacular Architecture; Vernacular Architecture in 21st Century; Purpose and scope of Vernacular Architecture;Evolution of development of shelter form and identity**;** Physiography, ecology, culture and Vernacular Architecture; Difference in rural and urban Vernacular Architecture.

Module 2: Vernacular Architecture of Rajasthan and Gujarat

Materials and Construction techniques of the region;Banni Community and their Bhunga House from Rajasthan; Havelis of the Brahmins, Rajputs and Hindu Merchants from Rajasthan;
Shekawati Haveli of Rajasthan;Tribes of Gujarat - Rathva, Chodri – the settlement pattern and the houses;Sociology and Planning of North Gujarat, Rural South Gujarat, Saurashtra, Muslim Community in Gujarat; Woodwork Details of Gujarat;Contemporary Examples from the region.

Module 3: Vernacular Architecture in Jharkhand, Bengal and North Eastern Hills
Rural Villages and Houses of Jharkhand, Bengal; Eight Roof House Structure of Bengal style, Four Roof House Structure of Bengal style; Traditional houses of different tribes of Jharkhand, Bungalow Construction;Khasi community of Meghalaya; BodoKachari tribe; AdiGallong folk of Sian district,Arunachal and their settlement pattern; Naga house, Morung of Naga Community, ThadouKukis Community of Manipur; Contemporary Examples from the region.

Module 4: Vernacular Architecture of the North
Regional topography, local climate, settlement pattern; Case studies covering settlement pattern, architectural forms and construction details of Northern India - Jammu Kashmir, Himachal Pradesh, Uttarakhand; TAQ construction, DhajjiDiwari Construction, Khat-Kuni Technique using local materials; Contemporary Examples from the region.

Module 5: Vernacular Architecture of the South
Regional topography, local climate;Case studies covering vernacular settlement pattern, architectural forms and construction details of Southern India - Karnataka, Kerala, Tamil Nadu, Andra Pradesh; Contemporary Examples from the region.

Text Books:

1. Dawson Bary, Cooper Ilay, Traditional Buildings of India,1998.
2. Shikha Jain, Havelis of Rajastan.
3. C. Tadgell,The History of Indian Architecture, Design and Technology Press, London 1990.
4. Kullrishan Jain &Minakshi Jain – Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad, 1992.

Reference Books:

1. Fathy Hassan – Architecture for the Poor. University of Chicago Press.
2. Michell, G., Penguin Guide to the Monuments of India, Vol I, Viking, London 1989.
3. Paul Oliver, Encyclopedia of Vermacular Architecture of the World, Cambridge University Press, 1997.
4. V.S. Praman, Havali – Wooden Houses & Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
5. G.H.R. Tilotsum, The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.
6. Richardson,Vickey; New Vernacular Architecture: Laurance King Publishing, 2001.
7. Appropriate and Affordable Rural Housing for Jharkhand –UNDP/Ministry of Rural Development, Govt. of India.

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures
Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	-	-	L	-	L	-	-	-	-	-
2	H	L	--	-	-	_-	-	-	-	-	-	-
3	L	L	--	H	-	-	H	-	-	L	-	-
4	L	H	L	M	M	L	L	-	-	H	-	M
5	M	H	L	H	M	H	M	L	-	M	L	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD8
CD2	Tutorials/Assignments		CO2	CD1, CD8
CD3	Seminars		CO3	CD1, CD2
CD4	Mini projects/Projects		CO4	CD1, CD8
CD5	Laboratory experiments/teaching aids		CO5	CD1, CD3, CD8
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
15.	L1, L2, L3			Introduction to the field of Vernacular Architecture; Factors Influencing Vernacular Architecture	T1, R1, R3, R5	CO1, CO2		PPT Digi Class/Chalk -Board	
16.	L4, L5, L6			Building Material and Construction Techniques in Indian Vernacular Architecture; Evolution of development of shelter form and identity.	T1, R7, R9	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
17.	L7, L8, L9			Vernacular Architecture of Rajasthan and Gujarat - Bhunga House from Rajasthan, ribes of Gujarat - Rathva, Chodri – the settlement pattern and the houses.	T1, T2, R3, R4	CO3, CO4		PPT Digi Class/Chalk -Board	
18.	L10, L11, L12			Hindu Merchants from Rajasthan;Shekawati Haveli of Rajasthan.	T1, T2, R3, R4	CO3, CO4		PPT Digi Class/Chalk -Board	
19.	L13, L14, L15			Rural South Gujarat, Saurashtra, Muslim Community in Gujarat; Woodwork Details of Gujarat; Contemporary Examples from	T1, T2, R3, R4	CO3, CO4		PPT Digi Class/Chalk -Board	

				the region.					
20.	L16, L17, L18			Vernacular Architecture in Jharkhand - Rural Villages and Houses of Jharkhand.	T1, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
21.	L19, L20, L21			Vernacular Architecture in Bengal -Eight Roof House Structure of Bengal style, Four Roof House Structure of Bengal style	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
22.	L22, L23, L24			Vernacular Architecture in North Eastern Hills– Contemporary Examples from the region.	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
23.	L25, L26, L27			Vernacular Architecture of the North- Case studies covering settlement pattern, architectural forms and construction details of Northern India - Jammu Kashmir.	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
24.	L28, L29, L30			Case studies covering settlement pattern, architectural forms and construction details of Himachal Pradesh.	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
25.	L31, L32, L33			TAQ construction, DhajjiDiwari Construction	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	
26.	L34, L35, L36			Vernacular Architecture of the South - Regional	T2, T4 R8, R9	CO3, CO4		PPT Digi Class/Chalk -Board	

				topography, local climate					
27.	L37, L20, L21			Case studies covering vernacular settlement pattern, architectural forms and construction details of Southern India - Karnataka, Kerala, Tamil Nadu, Andra Pradesh	T1, T2, T4 R1, R2.	CO3, CO4		PPT Digi Class/Chalk -Board	
28.	L38, L39, L40			Vernacular settlement patternof Tamil Nadu, Andra Pradesh. Contemporary Examples from the region.	T1, T2, T4 R1, R2.	CO3, CO4, CO5		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR. 353
Course title: ARCHITECTURAL CONSERVATION AND HERITAGE MANAGEMENT
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T:0 P:0
Class schedule per week: 03
Class: B. Arch
Semester / Level: VI
Branch: Architecture
Name of Teacher: Dr. Satyaki Sarkar

Course Objectives

This course enables the students:

A.	To explore the history, philosophy and science of building conservation;
B.	To encourage appropriate methodologies and tools for recording, documentation, inventories and information management of historic structures
C.	To develop professional level skills on conservation using various techniques.

Course Outcomes
After the completion of this course, students will be able to:

1.	To understand the development of the philosophy and ethics of conservation and the legislation that protects the historic environment.
2.	To survey, record and analyze the development of historic buildings through the examination of their materials, construction and style.
3.	To arrive at environmentally sustainable solution for conservation of build structuresusing practical techniques for conservation, repair and restoration.

Syllabus

Module 1: Definition and concepts
Definition of conservation and its socially accepted meanings, objectives, Theories, Principles and concepts of conservation and its application. Values and Ethics in conservation and Degrees of intervention in historic buildings & monuments & Why to conserve issues.

Module 2: History of conservation and Acts;
History of conservation movement in the world and
Indian response to the movement. History of Indian conservation movement. Development of theory of conservation and various charters of International importance like Athens Charter, Venice Charter, Bombay Heritage Act.

Module 3: Deterioration to cultural properties and remedies
Causes of Decay in Cultural property, External causes of Decay, Biological & Botanical causes, Natural disasters & Man made causes of decay, Remedies for these decay. The context of inspecting historic building – Inventory, norms for grading and enlisting.

Module 4: Appropriate conservation techniques
Actual conservation techniques for relevant building materials.Some specifications and instruction about parts of buildings. Such as foundations walls, chhajjas, wall tops, roofs &terraces with various examples of conservation practiced globally. Procedures for giving new uses to old buildings and urban sensitive infill. Examples of Revitalization and Redevelopment

Module 5: Planning and Management of Historic towns
Concept of Historic towns, & Heritage zone; Conservation Planning based on surveys, concept of Integrated conservation with global examples. Policies, legislation and agencies of conservation.Economics in conservation, Public management of heritage.

Text books:
1. Bernard M. Feilden; Conservation of Historic Buildings, Architectural Press, London
2. Bernard M. Feilden; Guidelines for conservation; Architectural Press, London.
3. Robert Pickard; Policy and Law in Heritage Conservation; Taylor & Francis
4. Nahoum Cohen, Urban Conservation, MIT Press,
5. Eric May, Mark Jones, Conservation Science: Heritage Materials, Royal Society of Chemistry

Reference books:
1. Nahoum Cohen, Urban Planning, Conservation, and Preservation, Volume 1 McGraw Hill Professional
2. Xavier Greffe; Managing our Cultural Property; Aryan Book International, New Delhi.
3. Claire Cave, Elene Negussie, World Heritage Conservation: The World Heritage Convention, Linking Culture and nature for Sustainable Development, Routledge
4. Alison Richmond, Alison Bracker, Conservation, Routledge

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus:NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Industrial/guest lectures
CD5	Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	H	H			M						M
2	H	H	M	H	H	H	L	L				
3	H	H	H	M	H	H	M	M	L	L	M	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2, CO3
CD2	Tutorials/Assignments	CO2, CO3
CD3	Seminars	CO3
CD4	Industrial/guest lectures	CO3
CD5	Self- learning such as use of NPTEL materials and internets	CO1, CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / Refere nces	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1-3			Definition and concepts	T-2, R-4	CO1	Definition, Theories, Principles with examples	Chalk-board, PPT	
2-3	4-9			Definition and concepts	T-2, R-4	CO1	Values, ethnicity, need, degrees,	Chalk-board, PPT	
3-4	10-12			History of conservation and Acts	T-2, R-4	CO1	Genesis, different movement and their results	Chalk-board, PPT	
5	13-15			History of conservation and Acts	T-2, R-4	CO1	Charters	Chalk-board, PPT	
6	16-18			Deterioration to cultural properties	T-2, R-4	CO2	Causes and remedy to decay	Chalk-board, PPT	
7	19-21			Deterioration to	T-2, R-4	CO2	Identification of decay and	Chalk-board, PPT	

				cultural properties			treatments		
8	22-24			Deterioration to cultural properties	T-2, R-4	CO2	Grading and Enlisting	Chalk-board, PPT	
9	25-27			Appropriate conservation techniques	T-5	CO2, CO3	Techniques for relevant building materials	Chalk-board, PPT	
10	28-30			Appropriate conservation techniques	T-2, R-4	CO2, CO3	Revitalization, Redevelopment, Adaptive reuse and Infill	Chalk-board, PPT	
11	31-33			Planning and Management of Historic towns	T-1, 3, 4, R-1	CO2, CO3	Concept of Historic towns and conservation with actual examples	Chalk-board, PPT	
12	34-36			Planning and Management of Historic towns	T-1, 3, 4, R-1,2	CO3	Economic policies, legislation and public management	Chalk-board, PPT	
13	37-39			Assignments & Guest lecture		CO1			

COURSE INFORMATION SHEET

Course code: AR 361
Course title: ARCHITECTURAL DESIGN -VI & ACADEMIC FIELD TRIP
Pre-requisite(s): Should have cleared all Architectural Design Laboratories up to IV Semester;
Co- requisite(s): Should have registered for AR 3001 Acoustics
Credits: 13.5 L: 0 T: 0 P: 9
Class schedule per week: 09
Class: B. Arch
Semester / Level: VI
Branch: Architecture
Name of Teacher: Dr. Bimal Chandra Roy

Course Objectives

This course enables the students:

A.	To apply the design theory and principles in the design of multi- functional large span public building in an urban setting with various aspects to be tackled covering design parameters, graphical presentation of design details and architectural expression in functional and constructional elements.
B.	To apply and use the relevant building bye-laws and provisions of National Building Code in the design assignments

Course Outcomes

After the completion of this course, students will be able:

1.	Design of the built structures incorporating the local building bye-laws and the relevant provisions of of NBC applicable to the design assignment
2.	Design of various components and aspects associated with the urban environment in terms of physical infrastructure, socio cultural aspects etc, with an integration of the various building services.

Syllabus

Activities:

Main Design (Two Designs mandatory)	**Exercise Duration (approx.)**
1. Three Star Hotel/ Three Star Tourist Resort	7 weeks
2. Auditorium (1000 Capacity) / Convention Center	7 weeks
3. Critical appraisal of the buildings covered during educational tour (as a group work)	1 week
Design (Time) Exercise Duration Any one of the above, not covered in the class	8 hrs.

Viva voce : Final Viva-vice on all the design assignments to be conducted at the end of the semester by experts from the field.

Text books:

1.Michael Barron, Auditorium Acoustics and Architectural Design, Taylor and Francis, 2010
2. David Egan, "Concepts inArchitecturalAcoustics", 1972.
3. Richard H. Penner, Hotel Design, Planing and Development, 2012

4. Cindy Allen, Hospitality,Architecture and Design, 2012

Reference books:

1.Chiara, J.D., Panero, J., Zelnik, M., "Time Saver Standards for Building Types", 2nd Ed., McGraw-Hill,1995
2. Neufert, P., "Architects" Data", 3rd Ed., Blackwell Science. 2000
3. Watson, D.(Editor), "Time-saver Standards for Architectural Design: Technical Data for Professional Practice", McGraw-Hill. 2005

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus:NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	60
End Sem Evaluation	40

Assessment Components	**CO1**	**CO2**
Progressive Evaluation	√	√
End Sem Evaluation	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	H	H	H	M	M	H	H	L	H
2	H	H	H	H	H	H	H	H	H	H	L	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2
CD2	Mini projects/Projects	CO1, CO2
CD3	Laboratory experiments/teaching aids	CO2
CD4	Industrial/guest lectures	CO1, CO2

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1,2			Introduction to the problem	T3,T4, R1-R3	CO1, CO2	Details of Planning and services with local building bye-laws	PPT, Chalk & talk, Illustrations	
1	3			Case study, literature study, area programming	T3,T4, R1-R3	CO2	Area programming	Compuertised drawing tool	
2	4,5			site analysis, site zoning	T3,T4, R1-R3	CO2	Site zoning based on area programming	Compuertised drawing tool	
2	6			Internal evaluation of case study, literature study, area programming, site zoning	NA	CO2		PPT	
3	7,8,9			Conceptual design, Layout planning	T3,T4, R1-R3	CO1	Design of building and site planning	Compuertised drawing tool	
4	10			Internal evaluation of design development	NA	CO1, CO2		PPT	
4	11, 12			Design, Layout planning	T3,T4, R1-R3	CO1, CO2	Design of building and site planning	Compuertised drawing tool	
5	13, 14, 15			Design, Layout planning	T3,T4, R1-R3	CO1, CO2	Design of building and site	Compuertised drawing tool	

							planning		
6	16			Internal evaluation of design development	NA	CO1, CO2		PPT	
6	17, 18			Preparation of elevations, sections and views	T3,T4, R1-R3	CO1, CO2	Design of buildings	Compuertised drawing tool	
7	19, 20			Incorporation of the suggested inputs	T3,T4, R1-R3	CO1, CO2		Compuertised drawing tool	
7	21			Submission of the Final Design				Compuertised drawing tool	
8	22, 23			Introduction to the new problem	T1,T2, R1-R3	CO1, CO2	Details of Planning and services with local building bye-laws	PPT, Chalk & talk, Illustrations	
8	24			Case study, literature study, area programming	T1,T2, R1-R3	CO2	Area programming	Compuertised drawing tool	
9	25, 26			site analysis, site zoning	T1,T2, R1-R3	CO2	Site zoning based on area programming	Compuertised drawing tool	
9	27			Internal evaluation of case study, literature study, area programming, site zoning	NA	CO2		PPT	
10	28, 29, 30			Conceptual design, Layout planning	T1,T2, R1-R3	CO1	Design of building and site planning	Compuertised drawing tool	
11	31			Internal evaluation of design development	NA	CO1, CO2		PPT	
11	32, 33			Design, Layout planning	T1,T2, R1-R3	CO1, CO2	Design of building and site planning	Compuertised drawing tool	
12	34, 35,			Design, Layout	T1,T2, R1-R3	CO1, CO2	Design of building	Compuertised drawing	

	36			planning			and site planning	tool	
13	37			Internal evaluation of design development	NA	CO1, CO2		PPT	
13	38, 39			Preparation of elevations, sections and views	T1,T2, R1-R3	CO1, CO2	Design of buildings	Compuertised drawing tool	
14	40, 41			Incorporation of the suggested inputs	T1,T2, R1-R3	CO1, CO2		Compuertised drawing tool	
14	42			Submission of the Final Design					
15	43			Critical appraisal of the buildings covered during educational tour (as a group work)	NA	CO1, CO2		PPT	

COURSE INFORMATION SHEET

Course code: AR 362
Course title: WORKING DRAWING II
Pre-requisite(s): One of the design projects in their previous semester.
Co- requisite(s): None
Credits: 2 L:0 T:0 P:4
Class schedule per week: 04
Class: B. Arch
Semester / Level: VI
Branch: Architecture
Name of Teacher: Anila Smriti Surin

Course Objectives

This course enables the students:

A.	To train to prepare detailed Working drawings for effective execution at construction site, preparation of integrated services drawings and detailing for various types of drawings, mainly plumbing, electrical, mechanical(elevators). .
B.	To enable them to understand and the challenges in construction detailing and to train those in the aspects of detailing buildings with allied requirements namely structure, building services, Furniture, Fittings & Equipment along with the installation methods.

Course Outcomes

After the completion of this course, students will be:

1.	Exposed to various materials, furniture's, fittings and the equipments that are needed in buildings.
2.	The students are also exposed to integration of Structure and Services components and to deal with the project as a whole.
3.	The students will have a better understanding that Architectural Drawings is detailed out on the basis of services layouts and other important features which are to be used in the designed building to be executed and constructed..

Syllabus

Topics	***A1 size sheet***
Details of toilets including plan, elevation, sections of it.	2
Details of kitchen including plan, elevation, sections of it.	2

Layout of sanitary and plumbing lines on site and connection with the main sewer.	1
Freight/ passenger lift details	1
stone cladding and other internal Finishing Plan	Minimum 1

Text books:

Reference books:

1. Joe, B. (Ed). (2002). *Details in Architecture: Vol. I-V*. Victoria : The Images Publishing group.
2. RIBA Working Drawings Handbook, Keith Styles, 2014,

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus : Nil

Topics beyond syllabus/Advanced topics/Design : Nil

POs met through Topics beyond syllabus/Advanced topics/Design

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Industrial/guest lectures
CD4	Industrial visits/in-plant training

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation	60
End Sem Evaluation	40

Assessment Components	CO1	CO2	CO3
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M		M	H	M	L		M	H		H
2	M	M	M		H	H		M	H	M	H	M
3	M	M	L	H	M	H	L	L	H	H	M	M

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2, CO3,
CD2	Mini projects/Projects	CO2, CO3,
CD3	Industrial/guest lectures	CO2, CO3,
CD4	Industrial visits/in-plant training	CO1, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1-3			Introduction to the problem and brief to the services required.	R1, R2	CO2		PPT, Chalk & talk, Illustrations	
2-4	4-12			Details of toilets including plan, elevation, sections of it.	R1, R2	CO1, CO2		PPT, Computerised drawing tool	
5	13-15			Internal evaluation					
6-	16-24			Details of kitchen including plan, elevation, sections of it.	R1, R2				
7	25-27			Internal evaluation					
8	27-33			Layout of sanitary and plumbing lines on site and connection with the main	R1, R2	CO1, CO2, CO3		PPT, Computerised drawing tool	

				sewer					
9	34-36			Internal evaluation					
10-12	37-39			Freight/ passenger lift details	R1, R2	CO2, CO3		PPT, Computerised drawing tool	
13	40-42			stone cladding and other internal Finishing Plan	R1, R2	CO2, CO3		PPT, Computerised drawing tool	
14	43-45			Submission of final sheets and final jury.					

SEMESTER VII

COURSE INFORMATION SHEET

Course code: AR 401
Course title: HOUSING AND SETTLEMENT SYSTEMS
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: VII
Branch: Architecture
Name of Teacher: Rajan Chandra Sinha

Course Objectives

This course enables the students:

A.	To select different types of housing and methods of delivery for housing schemes
B.	To explain the issues involved with changing contextual policies for housing and generalize the new directions of opportunities
C.	To assess housing shortage and decide criteria for selection of land for development in order to bridge the gap in a settlement/ part of a settlement
D.	To analyze the nature and causes of growth of deficient housing / slums and identify differentiated needs across income categories
E.	To evaluate and apply the settlement plan provisions affecting the housing delivery and development
F.	To apply the standards, norms and statutory regulations affecting the housing development and design of housing neighbourhoods

Course Outcomes

After the completion of this course, students will be:

1.	**To define** basic elements of housing, neighbourhood, community and slums.
2.	**To outline** various housing policies and programmes
3.	**To explain** housing typologies or differentiate settlement design in terms of local context (Physical, economical, socio-cultural, ecological, environmental aspects)
4.	**To interpret** cause and effects housing demand and supply
5.	**To Apply** zoning regulations and sub-division techniques and computation for density, FAR, built-up area, as per development norms.

Syllabus

Module 1: Introduction to Housing
Definition & concept of Housing, Housing typologies, Form of Housing provision (Plotted, Group Housing, Cooperative, Self Help, Leasehold, Freehold / Condominium, Rental Housing etc.) and Special Housing types (Barrier free, Mobile homes, congregate housing for assisted living, disaster housing, Student & public housing, Guest house, Night shelters, Incremental Housing etc.). Concept of Neighbourhood and community. Neighbourhood planning principles & examples

Module 2: Housing Scenario & Urban Slums
Overview of Housing situation in India, Census classification of houses, Computation of Housing Shortage.

Understanding the causes of growth of Slums, Squatter settlements & Urban sprawl, Types and generic characteristics of slums, An overview of measures & approaches to slums & squatter settlements, Objectives of National Slum Policy (2002), Concept of few schemes e.g.: Site & Services, EIUS, BSUP, VAMBAY, IHSDP.

Module 3: Affordable Housing, new trends & Housing Policy
Components of Housing Cost & approach for affordable housing, Characteristics of Urban housing vis-à-vis Rural housing, Goals, Objectives & contents of National Housing & Habitat Policy (2007), Examples of housing schemes & programmes e.g., IAY, IHSDP etc.

Module 4: Urban Settlement Planning System & Processes
Recommended Planning system & inter-related plans, Scope, purpose & inter-relationship of various plans, Plan formulation process, Public sector & private sector actions & concept of joint venture, Contents of a Development plan

Module 5: Norms & Standards for Urban & Housing Development
Town & Residential density, FAR, Different types of codes/ norms affecting settlement development planning, Land –use Classification & compatibility of uses (e.g., compatible uses in residential zone), Factors affecting space standards / land requirements for facilities, Land area requirement for different uses in a town & for community facility in a sector/ residential planning area, Design Considerations based on subdivision norms / regulations

Text books:
1.J.D.Chiara et al; *Time Saver Standards For Housing & Residential Development*.
2. Bawa R. L., Fernandes B. G.*; Design for Living: A Guide for Planning of Residential Neighbourhoods; Galgotia Publishing Company; N. Delhi*
3.Modak& Ambedkar; *Town & Country Planning & Housing*

Reference books:
1.Poulose K T(compiled); *Reading Material on Housing; Institute of Town Planners, India; New Delhi; 2002*
2. The SAGE Handbook of Housing Studies.
3. URDPFI guidelines
4. National Building Code of India 2016

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Industrial/guest lectures
CD5	Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment	05

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	M	-	H	-	M	H	M	L	M	M	M
2	M	H	L	L	-	M	H	M	L	M	L	-
3	H	H	M	H	M	M	H	H	H	H	H	H
4	H	-	-	H	L	-	H	M	-	M	M	H
5	H	H	H	H	H	M	M	H	M	H	H	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2, CO3, CO4, CO5
CD2	Tutorials/Assignments	CO2, CO3
CD3	Seminars	CO3, CO4
CD4	Industrial/guest lectures	CO3, CO4
CD5	Self- learning such as use of NPTEL materials and internets	CO1, CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			Definition & concept of	T1,	CO1, CO3		Lecture by	

				Housing, Housing typologies	R1			use of boards/LCD projectors/OHP projectors	
1	L2			Form of Housing provision	T1, R1	CO1, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
1	L3			Special Housing types	T1, R1	CO1, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
2	L4			Concept of Neighbourhood and community	T1, T3, R1, R3	CO1, CO4		Lecture by use of boards/LCD projectors/OHP projectors Tutorials/Assignments	
2	L5			Neighbourhood planning principles & examples	T1, T3, R1, R3	CO1, CO4		Lecture by use of boards/LCD projectors/OHP projectors	
2	L6			Neighbourhood planning principles & examples	T1, T3, R1, R3	CO1, CO4		Lecture by use of boards/LCD projectors/OHP projectors	
3	L7			Overview of Housing situation in India	R1	CO1, CO2, CO3, CO4		Lecture by use of boards/LCD projectors/OHP projectors Tutorials/Assignments	
3	L8			Census classification of houses, Computation of Housing Shortage.	R1, R3	CO3, CO5		Lecture by use of boards/LCD projectors/OHP projectors Tutorials/Assignments	
3	L9			Understanding the	T3,	CO4, CO5		Lecture by	

				causes of growth of Slums	R1, R2			use of boards/LCD projectors/OHP projectorsSeminars	
4	L10			Squatter settlements & Urban sprawl	T3, R1, R2	CO4, CO5		Lecture by use of boards/LCD projectors/OHP projectors Seminars	
4	L11			Squatter settlements & Urban sprawl	T3, R1, R2	CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Seminars	
4	L12			Types and generic characteristics of slums	T3, R1, R2	CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
5	L13			An overview of measures & approaches to slums & squatter settlements	T3, R1. R2	CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
5	L14			Objectives of National Slum Policy (2002)	T3, R2	CO1, CO2, CO3, CO4, CO5		Lecture by use of boards/LCD projectors/OHP projectors Self-learning such as use of NPTEL materials and internets	
5	L15			Concept of few schemes e.g.: Site & Services, EIUS, BSUP, VAMBAY, IHSDP.	R1	CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Self-learning such as use of NPTEL	

								materials and internets	
6	L16			Concept of few schemes e.g.: Site & Services, EIUS, BSUP, VAMBAY, IHSDP.	R1	CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Self-learning such as use of NPTEL materials and internets	
6	L17			Components of Housing Cost	R1	CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
6	L18			Approach for affordable housing	T2, T3, R1, R2, R3	CO3		Lecture by use of boards/LCD projectors/OHP projectors	
7	L19			Characteristics of Urban housing vis-à-vis Rural housing	R1	CO3, CO4		Lecture by use of boards/LCD projectors/OHP projectors	
7	L20			Characteristics of Urban housing vis-à-vis Rural housing	R1	CO3, CO4		Lecture by use of boards/LCD projectors/OHP projectors	
7	L21			Goals, Objectives & contents of National Housing & Habitat Policy (2007)	R1	CO2, CO4		Lecture by use of boards/LCD projectors/OHP projectors	
8	L22			Goals, Objectives & contents of National Housing & Habitat Policy (2007)	R1	CO2, CO4		Lecture by use of boards/LCD projectors/OHP projectors	
8	L23			Goals, Objectives & contents of National Housing & Habitat Policy (2007)	R1	CO2, CO4		Lecture by use of boards/LCD projectors/O	

								HP projectors	
8	L24			Examples of housing schemes & programmes e.g., IAY, IHSDP etc.	R1	CO2, CO4		Lecture by use of boards/LCD projectors/OHP projectorsSelf- learning such as use of NPTEL materials and internets	
9	L25			Examples of housing schemes & programmes e.g., IAY, IHSDP etc.	R1	CO2, CO4		Lecture by use of boards/LCD projectors/OHP projectorsSelf- learning such as use of NPTEL materials and internets	
9	L26			Recommended Planning system & inter-related plans	R1, R3	CO2, CO4		Lecture by use of boards/LCD projectors/OHP projectors	
9	L27			Recommended Planning system & inter-related plans	R1, R3	CO1, CO2, CO3, CO4		Lecture by use of boards/LCD projectors/OHP projectors	
10	L28			Scope, purpose & inter-relationship of various plans	R1, R3	CO1, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
10	L29			Scope, purpose & inter-relationship of various plans	R1, R3	CO1, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
10	L30			Plan formulation process	R1, R3	CO1, CO3		Lecture by use of boards/LCD projectors/OHP projectors	

11	L31			Plan formulation process	R1, R3	CO1, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
11	L32			Public sector & private sector actions & concept of joint venture	T2, R1	CO1, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
11	L33			Contents of a Development plan	T2, R2, R3	CO3, CO5		Lecture by use of boards/LCD projectors/OHP projectors	
12	L34			Contents of a Development plan	T2, R1, R2, R3	CO3, CO5		Lecture by use of boards/LCD projectors/OHP projectors	
12	L35			Town & Residential density, FAR, Different types of codes/ norms affecting settlement development planning	R3, R4	CO3, CO5		Lecture by use of boards/LCD projectors/OHP projectors	
12	L36			Town & Residential density, FAR, Different types of codes/ norms affecting settlement development planning	R3, R4	CO3, CO5		Lecture by use of boards/LCD projectors/OHP projectors	
13	L37			Land –use Classification & compatibility of uses	R3, R4	CO4, CO5		Lecture by use of boards/LCD projectors/OHP projectors	
13	L38			Land –use Classification & compatibility of uses	R3, R4	CO3, CO4, CO5		Lecture by use of boards/LCD projectors/OHP projectors	
13	L39			Factors affecting space standards / land requirements for facilities	R3, R4	CO3, CO4, CO5		Lecture by use of boards/LCD projectors/OHP projectors	

14	L40			Land area requirement for different uses in a town & for community facility in a sector/ residential planning area	R3, R4	CO3, CO4, CO5		Lecture by use of boards/LCD projectors/OHP projectors	
14	L41			Design Considerations based on subdivision norms / regulations.	R3, R4	CO3, CO4, CO5		Lecture by use of boards/LCD projectors/OHP projectors	
14	L42			Design Considerations based on subdivision norms / regulations.	R3, R4	CO3, CO4, CO5		Lecture by use of boards/LCD projectors/OHP projectors - Board	

COURSE INFORMATION SHEET

Course code: AR 402
Course title: STRUCTURAL DESIGN AND SYSTEMS
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L:3 T:0 P:0
Class schedule per week: 03
Class: B. Arch
Semester / Level: VII
Branch: Architecture
Name of Teacher: Anila Smriti Surin

Course Objectives

This course enables the students:

A.	To identify the concept of various structural elements and system
B.	To inculcate and promote among students an awareness of structural principles involved in various building systems.
C.	To make students aware and understand the context of planning, designing and construction of High Rise buildings and other structures.
D.	Emphasis on structural concepts and stability of forms rather than intricate numerical calculations. While dealing with different structural concepts, their importance shall be related to architectural requirements by giving examples from history of architecture / contemporary architecture.

Course Outcomes

After the completion of this course, students will be:

1.	Able to understand the various structural systems and their application in various buildings as per the requirement.
2.	Able to design and apply various modern structural systems in the high rise and large span structures in design.
3.	Able to increase their ability to identify the structural forms suitable for architectural expression.
4.	Able to understand and explore about use of various structural systems for various building applications.

Syllabus

Module 1:
Introduction to structures and various structural elements. Various loads acting on a structure. Slabs (one way and two way); beams (simply supported, cantilever, vierendeel girders) ; grids (skew, rectangular and radial grids).Arch action and types of arches, its application. Shells, Vaults and Domes, their structural concept and classification and application.

Module 2:
Different structural systems: load bearing and framed system, Reinforced concrete structure, steel structure (different sections), pre stress concrete structure, their structural concept and classification and application.

Flat slab and coffered slab and their classification and application. Folded plate: structural concept and classification and application.

Module 3:
High Rise Buildings- Introduction, Historical perspective, Origin, Definition, Role, Importance , Limitations, Advantages and Disadvantages , Planning /Designing of High Rise Building ,structural concept and method of construction and application. Case study for each type. Fire Safety and Structural safety of High Rise Buildings

Module 4:
Trusses: classification and application in architecture. Their advantages, disadvantages and use in various parts of a structure.
Space frames: structural concept and application in buildings.
Tensile structures: concept, classification and application in architecture. Application of tensile and shell structures in long span structures. Material and construction method.

Module 5:
Special structures: pneumatic structures, kinetic structures and mobile structure: structural concept and application. Disaster resistant buildings. Case studies. Structure System for Seismic Zone Inflatable Structures**.**

Text books:

1. Engel H, Structure Systems
2. Salvadori Mario, Building of Building
3. Butler Robert B; Architectural Engineering Design: Structural Systems
4. Schierle G G. ; Architectural Structure
5. Moore Fuller, Understanding Structure.
6. Wolfgang Schuller- High Rise Building Structures, John Wiley & Sons; New York1976.
7. Frei Otto; Tensile Structures ; Vol-II, Pneumatic Structures, Cable Structures: The MIT Press London.
8. N.Subramaniam; Principles of Space Structures: Wheeler& Co.; Allahabad 1983.
9. The architecture of cities: Rossi, Aldo.

Reference books:

4- International Building Code 2009, International Code Council.
5- Bureau of Indian Standards. (2002). Criteria for Earthquake Resistant Design of Structures - General Provisions and Buildings. IS: 1893 (Part 1).
6- National Building Code, Bureau of Indian Standards.

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus : Nil

Topics beyond syllabus/Advanced topics/Design : Nil

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**
Mid Sem Examination Marks	√	√	√	√
End Sem Examination Marks	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√
Assignment	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	L	-	L	-	-	M	M	-	L
2	H	H	M	-	L	H	M	-	-	H	-	-
3	M	M	-	M	-		L	M	-	-	H	-
4	M	-	M	-	-	M	M	L	L	-	M	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2, CD3
CD2	Tutorials/Assignments		CO2	CD1, CD3, CD6
CD3	Seminars		CO3	CD2, CD3
CD4	Mini projects/Projects		CO4	CD2, CD4, CD6
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials			

	and internets			
CD9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1, L2			Introduction to structures and various structural elements.	T1,T4	CO2		PPT Digi Class	
1	L3, L4, L5			Various loads acting on a structure. Slabs (one way and two way); beams (simply supported, cantilever, vierendeel girders) grids (skew, rectangular and radial grids)	T2,T3, T5	CO2, CO4		PPT Digi Class/Chalk -Board	
2	L6, L7			Arch action and types of arches, its application.	T4	CO1		PPT Digi Class/Chalk -Board	
3	L8, L9			Shells, their structural concept and classification and application.	T3, T4, T5	CO1, CO2, CO3		PPT Digi Class/Chalk -Board	
4	L10, L11			Vaults and Domes, their structural concept and classification and application.	T3,T5	CO1, CO2, CO3		PPT Digi Class	
5	L12, L13, L14			Different structural systems: load bearing and framed system, Reinforced concrete structure, steel structure (different sections), their structural concept and classification and application.	T1, T5	CO1, CO4		PPT Digi Class/Chalk -Board	
5	L15, L16			pre stress concrete structure, their structural concept and classification and application	T2,T5	CO2, CO3, CO4		PPT Digi Class	
6	L17,L18			Flat slab and coffered slab and	T1, T4, T5	CO2, CO4		PPT Digi Class/Chalk	

				their classification and application				-Board	
7	L19			Folded plate: structural concept and classification and application.	T5	CO2, CO3, CO4		PPT Digi Class	
7	L20, L21			High Rise Buildings- Introduction, Historical perspective, Origin, Definition, Role, Importance , Limitations,	T6, T9	CO2, CO4		PPT Digi Class	
8	L22, L23, L24			Advantages and Disadvantages, Planning /Designing of High Rise Building. . Fire Safety and Structural safety of High Rise Buildings	T1,T6, R1, R2,R3	CO2, CO4		PPT Digi Class	
9	L25, L26			Structural concept and method of construction and application of high rise buildings. Case study of each type.	T4,T6	CO1, CO2, CO4		PPT Digi Class	
9	L27, L28			Trusses: classification and application in architecture. Their advantages, disadvantages and use in various parts of a structure.	T8,T5	CO1, CO2, CO4		PPT Digi Class/Chalk -Board	
10	L29, L30			Space frames: structural concept and application in buildings.	T5,T8	CO2, CO3, CO4		PPT Digi Class	
10	L31			Tensile structures: concept, classification and application in architecture.	T7,T8	CO2, CO3		PPT Digi Class	
11	L32, L33			Application of tensile and shell structures in long span structures. Material and construction method.	T7,T8	CO2, CO3, CO4		PPT Digi Class/Chalk -Board	
12	L34			Special structures:	T7,T8	CO2,		PPT Digi	

				pneumatic structures, structural concept and application.		CO3, CO4		Class	
12	L35, L36			kinetic structures and mobile structure: structural concept and application	T5,T8	CO2, CO3, CO4		PPT Digi Class	
13	L37, L38			Disaster resistant buildings. Case studies.	T2, T3, R1, R3	CO1, CO4		PPT Digi Class/Chalk -Board	
14	L39, L40			Structure System for Seismic Zone Inflatable Structures**.**	T2, T6, R2	CO1, CO2, CO4		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR 403
Course title: ENERGY EFFICIENT ARCHITECTURE
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: VII
Branch: Architecture
Name of Teacher: Dr. Manjari Chakraborty

Course Objectives

This course enables the students:

A.	To understand the impact of global energy crisis and accordingly commit to professional responsibilities involved in it.
B.	To acquire basic knowledge regarding various types of renewable Energy sources applicable in building industry
C.	To analyse the need for decreasing energy consumption in buildings and to incorporate specific measures accordingly
D.	To make students well equipped with scientific knowledge to conserve energy in the building sector.
E	To adopt and apply specific measures for energy conservation in building sector.

Course Outcomes

After the completion of this course, students will be able to:

1.	Interpret and apply technical knowledge related to energy conservation in building sector.
2.	Provide passive and active design solutions for energy efficient buildings.
3.	Conduct investigation to promote efficient use of energy, water and other resources related to the buildings.
4.	Demonstrate knowledge related to sustainable development.

Syllabus

Module 1 : Energy and Building

Energy Sources – renewable energy , Energy Crisis and Global Energy Scenario, Energy Consumption in Building, Factor Effecting Energy Consumption, Energy Conservation in Building, Energy Model, Energy Audit ,

Module 2: Energy Performance of a Building

Thermal Performance of a Building, Visual Performance of a Building, Ventilation & Air Movement, Performance of Building Materials, Solar Energy- the prime renewable energy source in Building Sector.

Module 3: Energy Conservation : Passive Solar Techniques

Basic Architectural Design Strategy, Thermal Comfort Criteria and Heat Flow within a building, Passive Heating and Cooling Techniques, Energy Efficient Landscaping , Daylighting

Module 4: Energy Conservation: Active Solar Techniques

Active Space Heating Techniques, Active Solar Water Heating, Solar Collectors, Storage of Solar Energy, Active Cooling Techniques, Swimming Pool heating

Module 5: Green Building Concept

Green Building – definition and attributes,Genesis of Green Building, Implementation and Application measures in Green Buildings, Green Buildings in India, Sustainability and Built Environment

Text books:

1. Bruce Anderson; "Solar Energy: Fundamental in Building Design"
2. Anna Main, S. Rangaranjan," Solar radiation over India."
3. B. J. Brinkworth "solar energy for Man"
4. H.P. Garg, "Advances in solar energy Tech."
5. Lunde; " Solar Thermal Engg."

Reference books: 1. Green Building - Guidebook for Sustainable Architecture | Michael ...
https://www.springer.com/in/book/9783642006340
2. Handbook of Green Building Design and Construction - ScienceDirect
https://www.sciencedirect.com/science/book/9780123851284

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus : Nil

Topics beyond syllabus/Advanced topics/Design : Nil

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**
Mid Sem Examination Marks	√	√	√	√
End Sem Examination Marks	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√
Assignment	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H		M				L					
2		H										
3				M	H	M						
4				M			H					

Lecture wise Lesson Planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			Energy Sources – renewable energy	T1,T4,	CO1		PPT Digi Class/Chalk -Board	
1	L2, L3			Energy Crisis and Global Energy Scenario, ,	T1,T4,	CO1, CO2		PPT Digi Class/Chalk -Board	
2	L4, L5			Energy Consumption in Building, Factor Effecting Energy Consumption,	T1,T4,	CO2		PPT Digi Class/Chalk -Board	
2	L6			Energy Conservation in Building,	T1, T4,	CO2		PPT Digi Class/Chalk -Board	
3	L7, L8			Energy Model, Energy Audit	T1,T4,	CO2		PPT Digi Class/Chalk -Board	
3	L9-10			Thermal Performance of a Building,	T1, T2, T3,	CO3		PPT Digi Class/Chalk -Board	
4	L11			Visual Performance of a Building,	T1,T2, T3,	CO3		PPT Digi Class/Chalk -Board	
4	L12, L13,			Ventilation & Air Movement,	T1,T2, T3,	CO3		PPT Digi Class/Chalk -Board	

5	L14			Performance of Building Materials,.	T1, T2, T3,	CO3		PPT Digi Class/Chalk -Board	
5	L15			Solar Energy- the prime renewable energy source in Building Sector	T1,T2, T3,	CO4		PPT Digi Class/Chalk -Board	
6	L16			Basic Architectural Design Strategy,	T1,T2, T3,T4,	CO3, CO4		PPT Digi Class/Chalk -Board	
6	L17, L18			Thermal Comfort Criteria and Heat Flow within a building,	T1,T2, T3,T4,	CO3, CO4, CO5		PPT Digi Class/Chalk -Board	
7	L19-L23			Passive Heating and Cooling Techniques,	T2,T4,	CO4, CO5		PPT Digi Class/Chalk -Board	
7	L24-L25			Energy Efficient Landscaping ,	T2,T4,	CO4, CO5		PPT Digi Class	
8	L26-L27			Daylighting	T2,T4,	CO4, CO5		PPT Digi Class	
8	L28, L29			Active Space Heating Techniques,	T2,T4,T5	CO4, CO5		PPT Digi Class	
9	L30			Active Solar Water Heating,	T2,T4,T5	CO4, CO5		PPT Digi Class	
9	L31-L33,			Solar Collectors,	T2,T4,T5	CO4, CO5		PPT Digi Class	
10	L34,			Storage of Solar Energy,	T2,T4,T5	CO5		PPT Digi Class	
10	L35,			Active Cooling Techniques,	T2,T3, T4,T5,	CO3, CO5		PPT Digi Class/Chalk -Board	
11	L36			Swimming Pool heating	T1,T2, T3,T4,T5	CO3, CO5		PPT Digi Class	
11	L37			Green Building – definition and attributes,	R1, R2	CO3, CO5		PPT Digi Class	
12	L38			Genesis of Green Building, .	R1, R2	CO4		PPT Digi Class	
13	L39			Implementation and Application measures in Green	R1, R2	CO1		PPT Digi Class/Chalk	

				Buildings,				-Board	
14	L40			Green Buildings in India,	R1, R2	CO1		PPT Digi Class/Chalk -Board	
15	L41-L42			Sustainability and Built Environment	R1, R2	CO1		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: **AR 404**
Course title: **DISASTER MANAGEMENT & RESILIENT STRUCTURES**
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 **L: 3 T:0 P:0**
Class schedule per week: **03**
Class: **B. Arch**
Semester / Level: **VII**
Branch: **Architecture**
Name of Teacher: **Dr. Smriti Mishra**

Course Objectives

This course enables the students:

A.	To be aware about natural disasters and factors that cause them;
B.	To be familiar with the characteristics and typologies of hazards and disasters
C.	To understand the significance, concept, components, and phases of disaster management cycle;
D.	To foster knowledge about and identify steps and methods of disaster risk assessment and disaster preparedness
E.	To develop an understanding about earthquake, cyclone and flood resilient building design aspects and features; and identify their role in design & planning solutions for reducing risk.
F.	To learn about disaster risk reduction through land use and zoning control, site planning and land management measures for natural hazards like earthquake, cyclones and floods.
G.	To learn about International and National Agencies in Relief

Course Outcomes

After the completion of this course, students will be able:

1.	To explain about natural disasters, factors that cause them and their types
2.	To explain about the significance, concept, components, and phases of disaster management cycle
3.	To identify and apply strategies for preparing effective disaster management plan
4.	To identify earthquake, cyclone and flood resilient building features and construction techniques and design regulations and codes and incorporate the same in designing a resilient building against these hazards
5.	To identify the role of land use and zoning control, site planning and land management measures for disaster risk reduction against natural hazards like earthquake, cyclones and floods.

Syllabus

Module 1: Fundamentals of Disaster and Disaster Management
Definitions and concepts related to disaster and the related terms– Hazards, Vulnerability, Capacity, Risk. Hazards: classification and types. Causal factors of disaster. Phases of Disaster. Social & Political Imperatives of Disaster: complex and compound disasters. Link between disaster and

development. Introduction to disaster management. Characteristics of some common hazards and disasters like Predictability, Factor contributing to vulnerability, Risk reduction measures, Management measures, Specific preparedness Plan. Aspects of Disaster Preparedness and Risk Assessment: Estimation of Risk, Objectives of assessment, Type of risk and risk assessment, Steps of risk assessment, Problems with risk assessment, Acceptable levels of risk, Assessing risk and vulnerability, Risk perception, Methods of Risk Assessment, Steps in Risk Assessment. Nature of disaster in India: Major disasters in the Indian context; Disaster profile of the country; Factors contributing to vulnerability of the Indian population.

Module 2: Resilient Building Design Concepts and Features for Earthquake Hazard
Causes of earthquake, plate tectonics, faults, seismic waves; magnitude, intensity, epicenter, energy release and ground motions. Earthquake effects– On ground, soil rupture, liquefaction, landslides. Performance of ground and buildings in earthquakes: Behaviour of various types of buildings, structures, and collapse patterns; Behaviour of Non-structural elements like services, fixtures, mountings- case studies. General Planning and design consideration: Building forms, horizontal and vertical eccentricities, mass, and stiffness distribution, soft storey etc.; Seismic effects related to building configuration. Plan and vertical irregularities, redundancy, and setbacks. Various Types and Construction details of: Foundations, soil stabilization, retaining walls, plinth fill, flooring, walls, openings, roofs, terraces, parapets, boundary walls, under-ground - overhead tanks, staircases, and isolation of structures; innovative construction material and techniques. BIS provisions on earthquake resistant built environment for non-engineered and reinforced concrete buildings. Fundamental of ductile detailing. Seismic retrofitting - Weakness in existing buildings, aging, concepts in repair, restoration, and seismic strengthening. Some traditional local/ regional responses. Risk reduction measures through land use control, site planning and land management. Case studies and study of some housing prototypes.

Module 3: Disaster Resistant Building Practices for Cyclone Hazards
Climate change and its impact on tropical cyclone, Nature of cyclonic wind, velocities and pressure, Cyclone effects, Storm surge, Floods, Landslides. Behaviour of structures in cyclones and wind storms. General planning/design considerations under wind storms & cyclones; Wind effects on buildings, towers, glass panels etc., & wind resistant features in design Cyclonic retrofitting, strengthening of structures and adaptive sustainable reconstruction. Codal Provisions, design wind speed, pressure coefficients; innovative construction material & techniques, traditional construction techniques in coastal areas. Life–line structures such as temporary cyclone shelter. Risk reduction measures through land use control, site planning and land management for cyclones. Zoning regulation for construction & reconstruction phase in the coastal areas. Case studies and study of some housing prototypes

Module 4: Disaster Resistant Building Practices for Flood Hazards
Causes of floods. Flood mitigation measures. Elements at risk of flood damage. Mechanism of damage to buildings. Categories of damage to housing. Protection from rain damage. General protection of habitat/ buildings from flood damage. Specific protection of houses against inundation effects. Specific protection of houses against flowing water. Recommendation for construction of flood resistant houses. Risk reduction measures through land use control, site planning and land management for floods and cyclones. Zoning regulation for construction & reconstruction phase in the flood-plain areas. Case studies and study of some housing prototypes.

Module 5: Concept of Resilient Cities and International and National Agencies in Relief:
Concept of Resilient Cities. Quick Reconstruction Technologies. Disaster Relief Shelters. Remote-sensing and GIS applications in real time disaster monitoring, prevention, and rehabilitation. UNs mandate for disaster management; UN-Disaster Management Team and their role in disaster management. International Landmarks in Disaster Management: International decade for Disaster Risk Reduction; Hyogo Framework; Sendai Framework. Mandate of India's Disaster Management

Act, 2005; Legal and Institutional Framework for Disaster Management; Mandate of National Disaster Management Authority (NDMA); National Disaster Management Plan (2016).

Text books:

Reference books:

1.Robest McNamara; Blundering into Disaster, 1987, Bloomsbusy, London.
2.Disaster Prevention and Mitigation, 1984, UNDRO Publication, Geneva.
3.Disaster Response- A Handbook for Emergencies, Babu Thomas, 1993
4.Office of the UN Disaster Relief Co-ordinator – Disaster prevention and mitigation, Vol 12, Social and Sociological aspects – UNO, NY, 1986.
5. Disaster Mitigation: Experiences and Reflections by Pradeep Sahni
6. McDonald, R. (2003). Introduction to Natural and Man-made Disasters and their Effects on Buildings. Burlington: Architectural Press.
7. S. Ramani, Disaster management – Advanced course on modern trends in housing – SERC, Vol 2, Chennai, 1980.
8. Building Urban Resilience: Principles, Tools, and Practice edited by Abhas K. Jha, Todd W. Miner, Zuzana Stanton-Geddes
9. Holmes, J. D. (2007). Wind Loading of Structures. 2nd Ed. Taylor & Francis.
10. Structural failures in Residential Buildings- Frich Schild & Others.
11. S. Rajagopal – Problems of housing in cyclone prone areas – SERC, Vol.2, Chennai, 1980
12.Talwar, A. K. and Juneja, S. (2009). Cyclone Disaster Management. Commonwealth Publishers.
13. Taranath, B. S. (2004). Wind and Earthquake Resistant Buildings: Structural Analysis and Design. CRC Press.
14. Agarwal, P. and Shrikhande, M. (2009). Earthquake Resistant Design of Structures. New Delhi : PHI Learning.
15. Burby, R. J. (1998). Cooperating with Nature. Confronting Natural Hazards with Land-Use Planning for Sustainable Communities. Washington: Joseph Henry Press.
16.Murthy, C. V. R., Earthquake Tips- Learning Earthquake Design and Construction, IITK – BMTPC, National Information Center of Earthquake Engineering, Indian Institute of Technology Kanpur
17. Dutta, S. C. and Mukhopadhyay, P. (2012). Improving Earthquakes and Cyclone Resistance of Structures: Guidelines for the Indian Subcontinent. TERI.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1							M	M				M
2							H		M			L
3			L	H	M	M	M	M	L	L	L	M
4	H	H	H	M	M	H	H	L		M	L	M
5	H	H	H			H				M	L	M

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD3, CD8
CD2	Tutorials/Assignments		CO2	CD1, CD3, CD6, CD8
CD3	Seminars		CO3	CD2, CD3, CD6, CD8
CD4	Mini projects/Projects		CO4	CD1, CD2, CD3, CD4, CD6, CD8
CD5	Laboratory experiments/teaching aids		CO5	CD1, CD2, CD3, CD4, CD6, CD8
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			Definitions and concepts related to disaster and the related terms– Hazards, Vulnerability, Capacity, Risk. Hazards: classification and types. Causal factors of disaster.	R1, R2, R3	CO1,		PPT Digi Class	
1	L2, L3			Phases of Disaster. Social & Political Imperatives of Disaster: complex and compound disasters. Link between disaster and development. Introduction to disaster management. Link between disaster and development. Introduction to disaster management.	R2, R3, R4	CO1		PPT Digi Class/Chalk -Board	
2	L4			Characteristics of some common hazards and disasters like Predictability, Factor contributing to vulnerability, Risk reduction measures, Management measures, Specific preparedness Plan.	R1, R2, R3, R4	CO1,		PPT Digi Class/Chalk -Board	
2	L5, L6			Estimation of Risk; Objectives of assessment; Type of risk and risk assessment; Steps of risk assessment; Problems with risk assessment;	R2, R3, R5, R10	CO1		PPT Digi Class/Chalk -Board	

				Acceptable levels of risk; Assessing risk and vulnerability; Risk perception;					
3	L7			Methods of Risk Assessment; Steps in Risk Assessment;	R2, R3, R10	CO1,		PPT Digi Class/Chalk -Board	
3	L8, L9			Nature of disaster in India: Major disasters in the Indian context; Disaster profile of the country; Regional Understanding of the Hazards to Which our Region May be Vulnerable and its Implication Factors contributing to vulnerability of the Indian population	R9, R12	CO1, CO2		PPT Digi Class/Chalk -Board	
4	L10, L11			Causes of earthquake, plate tectonics, faults, seismic waves; magnitude, intensity, epicenter, energy release and ground motions. Earthquake effects– On ground, soil rupture, liquefaction, landslides	R6, R13, R14, R16	CO1, CO2		PPT Digi Class	
4, 5	L12, L13			Performance of ground and buildings in earthquakes: Behaviour of various types of buildings, structures, and collapse patterns; Behaviour of Non-structural elements like services, fixtures, mountings-case studies	R6, R13, R14, R16	CO4		PPT Digi Class/Chalk -Board	
5	L14, L15,			General Planning and design consideration: Building forms, horizontal and vertical eccentricities, mass, and stiffness	R6, R13, R14, R16, R17	CO4		PPT Digi Class	

				distribution, soft storey etc.; Seismic effects related to building configuration. Plan and vertical irregularities, redundancy, and setbacks.					
6	L16, L17,			Various Types and Construction details of: Foundations, soil stabilization, retaining walls, plinth fill, flooring, walls, openings, roofs, terraces, parapets, boundary walls, under-ground - overhead tanks, staircases, and isolation of structures; innovative construction material and techniques.	R13, R14, R16, R17	CO4		PPT Digi Class/Chalk -Board	
6	L18,			BIS provisions on earthquake resistant built environment for non-engineered and reinforced concrete buildings. Fundamental of ductile detailing.	R13, R14, R16, R17	CO3, CO4		PPT Digi Class	
7	L19			Fundamental of ductile detailing. Seismic retrofitting - Weakness in existing buildings, aging, concepts in repair, restoration, and seismic strengthening. Some traditional local/ regional responses.	R6, R10, R13, R14, R16, R17	CO4		PPT Digi Class/Chalk -Board	
7	L20			Climate change and its impact on tropical cyclone, Nature of cyclonic wind, velocities and pressure, Cyclone effects, Storm surge, Floods, Landslides.	R9, R10, R11, R12, R13	CO1, CO3, CO4		PPT Digi Class	

7	L21			Behaviour of structures in cyclones and wind storms. General planning/design considerations under wind storms & cyclones; Wind effects on buildings, towers, glass panels etc., & wind resistant features in design	R9, R10, R11, R12, R13	CO4		PPT Digi Class/Chalk -Board	
8	L22, L23,			Cyclonic retrofitting, strengthening of structures and adaptive sustainable reconstruction. Codal Provisions, design wind speed, pressure coefficients;	R9, R10, R11, R12, R13	CO4		PPT Digi Class/Chalk -Board	
8	L24			Innovative construction material & techniques, traditional construction techniques in coastal areas.	R7, R9, R10, R11, R12, R13	CO4			
9	L25, L26			Life–line structures such as temporary cyclone shelter. Risk reduction measures through land use control, site planning and land management for cyclones.	R9, R10, R11, R12, R13, R17	CO4, CO5		PPT Digi Class/Chalk -Board	
9,10	L27, L28			Zoning regulation for construction & reconstruction phase in the coastal areas and flood-plain areas. Case studies and study of some housing prototypes	R9, R10, R11, R12, R13, R17	CO5		PPT Digi Class/Chalk -Board	
10	L29, L30			Causes of floods. Flood mitigation measures. Elements at risk of flood damage. Mechanism of damage to buildings. Categories of	R5, R8,	CO1, CO3, CO4		PPT Digi Class	

				damage to housing.					
11	L31			Protection from rain damage. General protection of habitat/ buildings from flood damage. Specific protection of houses against inundation effects. Specific protection of houses against flowing water. Recommendation for construction of flood resistant houses..	R15,	CO3, CO4, CO5		PPT Digi Class	
11	L32, L33			Risk reduction measures through land use control, site planning and land management for floods and cyclones.	R5, R8	CO5		PPT Digi Class/Chalk -Board	
12	L34			Zoning regulation for construction & reconstruction phase in the flood-plain areas. Case studies and study of some housing prototypes	R8, R15	CO5		PPT Digi Class	
11	L34, L35,			Concept of Resilient Cities. Quick Reconstruction Technologies. Disaster Relief Shelters.	R7, R8,	CO1, CO2, CO4, CO5		PPT Digi Class	
12	L36			Remote-sensing and GIS applications in real time disaster monitoring, prevention, and rehabilitation	R6	CO1			
13	L37, L38			UNs mandate for disaster management; UN-Disaster Management Team and their role in disaster management. International Landmarks in Disaster Management: International decade	R2, R4	CO1, CO3		PPT Digi Class/Chalk -Board	

				for Disaster Risk Reduction; Hyogo Framework; Sendai Framework.					
13, 14	L39, L40			Mandate of India's Disaster Management Act, 2005; Legal and Institutional Framework for Disaster Management; Mandate of National Disaster Management Authority (NDMA); National Disaster Management Plan (2016).	R9, R12	CO1, CO3		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR 703
Course title: SUSTAINABLE CITY PLANNING
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L:3 T:0 P:0
Class schedule per week: 03
Class: B.Arch
Semester / Level: VII
Branch: Architecture
Name of Teacher: Dr. Janmejoy Gupta

Course Objectives

This course enables the students:

A.	Understand what all constitutes "urban sustainability" and the potential ways to measure it, alongside understanding the complexities involved in measuring it.
B.	Understand historical timeline of development of sustainable urban planning concepts, beginning from ancient times to the twentieth century.
C.	Be aware of best practices in urban-planning related to urban sustainability and appropriate spatial measures for sustainable city planning.
D.	Understand infrastructural systems to ensure healthy water supply, sanitation, and waste disposal
E.	To review urban-planning policies and methods to promote city sustainability and reduced GHG emissions from buildings and transportation.

Course Outcomes

After the completion of this course, students will be able:

1.	To analyse sustainability metrics and indicators for urban centres in India.
2.	To connect urban sustainability concepts and technology to actual urban planning challenges faced.

Syllabus

Module 1: Introduction to Sustainable Built Environment: Principles of Sustainability, Sustainable Urbanization of natural and built environment, Sustainable City Planning: Checklist and Priorities, Social, Cultural and Economic aspects of Urban Sustainability.

Module 2: Sustainable Architecture - Historical Perspective: India & Global Scenario: Sustainable Planning Principles used in Ancient Indian Cities, Sustainable Human Settlement Planning and housing, Global Utopian Visions – Garden Cities, Neighbourhood Concept, etc- Contributions of Ebenezer Howard, Clarence Perry, Clarence Stein, etc.

Module 3: Concept of Sustainable Urban development: Slums- Causes and effect, Urban Development Plan**,** Community Participation in Developing Sustainable Design, Clean City Initiatives: Swach Bharat Initiative.

Module 4: Sustainable Infrastructure for cities: Resource use in urban areas: Water, waste, energy conservation, Appropriate infrastructural systems to ensure healthy water supply, sanitation, and waste disposal, The probability of acute drinking water crisis soon – infrastructure related issues.

Module 5: Urban Sustainability Appraisal in cities: Appropriate Sustainability Indicators for Urban India, Urban Planning Policy Interventions to enhance urban-sustainability, developing appropriate Sustainability-Matrix for Cities, how to make Indian Cities Smart and Sustainable.

Reference books:

R1 - Corburn,J. 2009. Towards the Healthy City: People, Places, and the Politics of Urban Planning.
R2 - Moore,S. A. 2007. Alternative Routes to the Sustainable City: Austin, Curitiba, and Frankfurt. Lanham, MD: Lexington Books.
R3 - Wheeler,S.M., and T.Beatley eds. 2008. Sustainable Urban Development reader, 2nd ed. Ew York: Routledge.
R4 - Bell, S., and S.Morse.199. Sustainability Indicators; Measuriing the immeasurable. London: Earthscan. (pp.9-32)
R5 - Campbell Scot, "Green Cities, Growing Cities and Just Cities: Urban Planning and the Contradictions of Sustainable Development", Journal of American Planning Association 62:3, 296-312, 1996.
R6 - Bajpai, Jitendra N., "Building a foundation for smart Indian cities," published in "Insight", a Journal of Indian School of Business, Hyderabad, April 2015.
R7 - The Life and Death of American Cites, Jane Jacobs.
R8 - Gideon and Golany, New-Town Planning: Principles and Practice, Wiley-Interscience Publication, John Wiley & Sons, New York.
R9 - Jenks Mike, Joan Colin, "Dimensions of the Sustainable City", Springerlink, 2010 (available as an e-book at the Columbia University Library).
R10 - World Bank, 'China Low Carbon Cities Book, Chapter 1:3: Low Carbon Cities in China: Characteristics, Roadmap and Indicators., September 2011.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Components	**CO1**	**CO2**
Mid Sem Examination Marks	√	√
End Sem Examination Marks	√	√

Quiz (02 nos. of 10 marks each)	√	√
Assignment	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes.

Course Outcome #	Program Outcomes					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
1	H	H	M	L	H	M
2	H	H	H	L	H	M

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2
CD2	Tutorials/Assignments	CO1, CO2
CD3	Seminars	CO1, CO2
CD4	Industrial/guest lectures	CO2

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by Faculty if any
1	L1, L2			Principles of Sustainability. Sustainable Urbanization of natural and built environment.	T1,T2.	CO1		PPT Digi Class	
1	L3, L4			Sustainable City Planning: Checklist and Priorities. Social, Cultural and Economic aspects of Urban Sustainability.	T1,T2, T3.	CO1		PPT Digi Class	
2	L5, L6			Sustainable Planning Principles used in Ancient Indian Cities.	T8	CO2		PPT Digi Class/Chalk -Board	

2	L7, L8, L9			Sustainable Human Settlement Planning and housing.	T5, T7, T8.	CO1, CO 2.		PPT Digi Class/Chalk -Board	
3	L10, L11.			Global Utopian Visions – Garden Cities, Neighbourhood Concept, etc- Contributions of Ebenezer Howard, Clarence Perry, Clarence Stein, etc.	T7,T8, T9.	CO2		PPT Digi Class/Chalk -Board.	
4	L12, L13.			Slums- Causes and effect. Urban Development Plan.	T5, T6, T7,T8,	CO1, CO2		PPT Digi Class	
4	L14, L15.			Community Participation in Developing Sustainable Design.	T6, T9, T10.	CO1, CO2		PPT Digi Class	
4				Clean City Initiatives- Swach Bharat Initiative.	T6, T9.	CO2		PPT Digi Class/Chalk -Board	
5	L16, L17.			Resource use in urban areas: Water, waste, energy conservation.	T1, T4, T5, T9	CO2		PPT Digi Class/Chalk -Board	
6	L18, L19, L20.			Appropriate infrastructural systems to ensure healthy water supply, sanitation, and waste disposal.	T1, T4, T5, T9	CO2		Chalk -Board	
7	L21, L22, L23.			The probability of acute drinking water crisis in the near future – infrastructure related issues.	T1, T4, T5, T9	CO2		Chalk -Board	
8	L24, L25, L26			Appropriate Sustainability Indicators for Urban India.	T4	CO1		Chalk -Board	
9	L27,			Urban Planning	T1,T2,	CO1,		Chalk	

	L28			Policy Interventions to enhance urban-sustainability.	T3,T5	CO2		-Board	
10	L29, L30,			Developing appropriate Sustainability-Matrix for Cities.	T2,T3, T4.	CO1, CO2		PPT Digi Class/Chalk -Board	
11	L31, L32.			How to make Indian Cities Smart and Sustainable.	T6, T8,T9, T10.	CO1, CO2		PPT Digi Class/Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR 411
Course title: Architectural Design-VII
Pre-requisite(s): Should have cleared all Architectural Design Laboratories up to Semester V; AR 2051 Building Services I (Water Supply and Sanitation), & AR 2052 Building Services II (Electrical & Lighting) and AR 3002 Building Services III (Mech. & Fire Safety)
Co- requisite(s):
Credits: 13.5 **L: 0** **T: 0** **P: 9**
Class schedule per week: 9
Class: B. Arch
Semester / Level: VII
Branch: Architecture
Name of Teacher: Dr. Bimal Chandra Roy

Course Objectives

This course enables the students:

A.	To apply the design theory and principles in the design of a multi-functional, service (advanced services) oriented buildings.
B.	Low rise / medium rise /high rise buildings with complex issues to be tackled covering functional relationship, climatic condition, public spaces, physical infrastructure, socio-cultural aspects along with structural considerations and building services.
C	To apply and use the relevant building bye-laws and provisions of National Building Code in the design assignments
D	To estimate the approximate cost of the areas

Course Outcomes

After the completion of this course, students will be able:

1.	Design of various components and aspects associated with the urban environment in terms of physical infrastructure, socio cultural aspects etc, with an integration of the various building services.
2.	Development of site planning/ constructional details with a focus on understanding the designing of a complex building with all aspect of site planning and services in urban setting.

Syllabus

Activities:

Main Design (Two Designs mandatory)	**Exercise Duration (approx.)**
1. Group Housing Project- low rise low density/high rise high density, (Covering neighbourhoodhousing,SOS village, corporate housing/ high end housing etc. based on enegy/sustainability aspect, with mapping of the various building services incorporated)	10 weeks

2. Design of complex multi-user buildings using steel/glass as laid down by various architectural design competition/ by the design teachers — 4 weeks

Design (Time) Exercise Duration Any one of the above, not covered in the class 8 hrs.

Viva voce : Final Viva-vice on all the design assignments to be conducted at the end of the semester by experts from the field.

Text books:

1. Kevin Lynch, "Site Planning", MITPress, Cambridge, 1984.
2. MiliMazumdar, "Energy Efficient Buildings in India",TERI, New Delhi, 2012
3. DianeTsang, "SPACE Shopping Mall", Pace Publishing, 2011
4. Lara Menzel, "Office Architecture and Design", Braua Publishers 2009.
5. Sheri Koones, "Prefabulous and Sustainable: Building and Customizing an affordable, Energy efficient home",ABRAMS, 2010.

Reference books:

1. JosephDeChiara,MichaelJ.Crosbie,"TimeSaversStandards for Housing and Residential Development",McGraw Hill Professional 2001.
2. Ernst Neuferts, "Architects Data", Blackwell, 2002.
3. National Building Code of India,Vol 1-5, 2005.
4. Daniel Williams, "Sustainable Design: Ecology, Architecture & Planning", John Wiley & sons Inc, NJ, 2007.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus:NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	60
End Sem Evaluation	40

Assessment Components	**CO1**	**CO2**
Progressive Evaluation	√	√
End Sem Evaluation	√	√

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	H	H	H	M	M	H	H	H	H
2	H	H	H	H	H	H	H	H	H	H	H	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2
CD2	Mini projects/Projects	CO1, CO2
CD3	Laboratory experiments/teaching aids	CO2
CD4	Industrial/guest lectures	CO1, CO2

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1,2			Introduction to the problem	T1-T5, R1-R4	CO1, CO2	Details of Planning and services for Main design	PPT, Chalk & talk, Illustrations	
1	3			Internal evaluation of case studies / Literature studies	NA	CO1		PPT	
2	4,5,6			Site study, Conceptual Design, Layout planning	T1-T5, R1-R4	CO2	site planning and Design of building	Compuertised drawing tool	
3	7,8,9			Design, Layout planning	T1-T5, R1-R4	CO2	Design of building and site planning	Compuertised drawing tool	
4	10			Internal evaluation of design development	NA	CO2		PPT	
4	11, 12			Design, Layout planning	T1-T5, R1-R4	CO2	Design of building and site planning	Compuertised drawing tool	
5-6	13-			Design,	T1-T5,	CO2	Design of	Compuertise	

	18			Layout planning	R1-R4		building and site planning	d drawing tool	
7	19,20			Internal evaluation of design development	NA	CO2		PPT	
7	21			Design, Layout planning	T1-T5, R1-R4	CO2	Design of building and site planning	Compuertised drawing tool	
8-9	22-27			Internal evaluation of design development	NA	CO2		PPT	
10	28, 29			Preparation of elevation, section & view	T1-T5, R1-R4	CO2	Design of building and site planning	Compuertised drawing tool	
10	30			Submission of Final design					
11	31			Floating of new problem based on the use of steel and glass	T1-T5, R1-R4	CO1, CO2	Introduction to problems and describing various methods of approach	PPT, Chalk & talk, Illustrations	
11	32, 33			Case study, literature study, site analysis, site zoning	T1-T5, R1-R4	CO1, CO2	Design of building and site planning	Compuertised drawing tool	
12	34, 35			Design Layout, site planning	T1-T5, R1-R4	CO1, CO2	Design of building and site planning	Compuertised drawing tool	
12	36			Proposal	T1-T5, R1-R4	CO1, CO2	Proposal on analysis	Compuertised drawing tool	
13	37			Internal evaluation of Case study, literature study, site zoning, area programming	T1-T5, R1-R4	CO1, CO2		PPT	
13	38, 39			Design methodology and constructional details	T1-T5, R1-R4	CO1, CO2	Design of constructional details	Compuertised drawing tool	
14	40			Internal	NA	CO1,		PPT	

				evaluation of Design methodology and constructional details		CO2			
14	41, 42			Submission of Final design		CO1, CO2			

COURSE INFORMATION SHEET

Course code: AR 412
Course title: INTERIOR DESIGN
Pre-requisite(s): Should have cleared all Architectural Design Laboratories up to V Semester, AR 102 Primary Building Materials and AR 151 Advanced Building Materials
Co- requisite(s): None
Credits: 2 L: 0 T: 0 P: 4
Class schedule per week: 04
Class: B. Arch
Semester / Level: VII
Branch: Architecture
Name of Teacher: Dr. Smriti Mishra

Course Objectives

This course enables the students:

A.	To know the definition, scope, and necessity of Interior design and complete set of expected deliverables in a comprehensive Interior Design project.
B.	To study the visual language of interiority by exploring the elements and principles of design; explore elements and devices used for manipulation of the interior space: texture, pattern, colour, light, paintings, sculptures and their psychological effects in interior spaces
C.	To know and understand various materials and surface treatments used in Interiors along with its technology of application and specification
D.	To explore different styles of Interiors – Italian, English, French, Japanese styles
E.	To familiarise the students with latest technological aspects of building services anddevelop their skills to assimilate various aspects of interior space to design functional and meaningful spaces which meets the expected ambience
F.	To build the capacity of students to generate creative and functional solutions for residential and non-residential interior design problems including programming, schematic concept development, design development and construction documentation for mid to large-scale multi-functional interior spaces
G.	To use 2D and 3D media to clearly and evocatively communicate and document design ideas

Course Outcomes

After the completion of this course, students will be able:

1.	To demonstrate the application of design principles, building services and construction systems in developing and providing contextual interior design solutions.
2.	To demonstrate capabilities of research, analysis, and synthesis gained through the course work to generate appropriate and creative design solutions for the interior projects undertaken.
3.	To develop knowledge, abilities and attitudes essential to the practice of Interior Design

Sessional Input:

The students should be given theoretical inputs during the interior design sessional class regarding:

- Elements of Interior Design; transformation of design elements
- Enveloping space, contained space and residual spaces, Spaces within space.
- Colour for interiors: hue, chroma and tonal values, Effect of light on colour, various colour schemes like analogues, complementary, triadic etc. Colour symbolism. Colour planning process.

- Interior lighting: direct and indirect lighting, location and light grid systems, luminaire types, quality of lighting. Ambient, task and accent lighting.
- Various systems of Air Conditioning.
- Furniture design. Modular approach in system furnishings. Selection and design of accessories.
- Principles of interior landscaping, texture, height grouping and layout. Plant species specifications.
- Open office system, Industrial interiors and specialized interior space design. Styles of Interiors: Italian, English, French, Japanese styles etc.
- Presentation of interior design schemes with detail specification for the materials and technology used.

Syllabus

Activities:

- Students must work on minimum two Interior Design projects, one residential and one non-residential, as a part of the studio exercise;
    - Residential Interior design projects: *6 weeks*
    - Non-residential Interior design projects can be considered for any one: *8 weeks*
        - offices, factories, library, hospitals, hotels, shopping malls, showrooms, Hotel lobbies, Banquet halls, cinema, and exhibition halls.
- The studio exercises undertaken should demonstrate the knowledge assimilated during the course and give design solutions that include:
    - multiple interrelated activity spaces designed for functional and ergonomic efficiency and ambience, and
    - identifies appropriate building materials, furnishings, furniture, illumination, services, fixtures, hardware, plants etc for the proposed interior design solution

Other activities to be undertaken:

- Study and exposure to eminent interior designers works;
- Site visits, documentation exercises, workshops, guest-lectures, seminars to be organized including interactions with professionals, consultants, and skilled artisans;
- Submission of reports on various lectures, site visits; market surveys

Viva voce: Final Viva-vice on the Interior design assignments to be conducted at the end of the semester by experts from the field.

Text books:

Reference books:

1. Francis .D.K. Ching. (1987). Interior Design Illustrated, V.N.R. Pub., NY 1987.
2. Ching, Francis D K. and Binggeli, Corky. (2012). Interior design illustrated, 3rd ed, John Wiley, N. Jersey:
3. Steport-De Van Kness, Logan and Szebely., (1980). Introduction to Interior Design. Macmillan Publishing Co., NY
4. Allen Tate and C. Ray Smith. (1986). Interior Design in the 20thCentury, Harpercollins College Div
5. Reznikoff, S. C. (1986).Interior Graphic & Design Standards. Watson-Guptill
6. Beginnings of Interior Environment by Phyllis Sloan, Allen & Miriam F. Stimpson (10th edition).
7.John F. Pile, Interior Design, Published by Harry N. Abrams, Inc., Publishers, New York, 1995.
8. Interior Design Course, Mary GilliatCoyran, Octopus Ltd. London
9. Time Savers Standard for Interior Design, Joseph De Chiara, McGraw Hill New York

10. Archi World Interior Best Collection: Residence, Commerce, Office, Restaurant Asia I-IV.Archi World Co., Korea, 2003.
11. Sethi, S. Indian Interiors: Intaerieurs De L'Inde (Interiors (Taschen),
12. Whito, S., (2010). Elements of Interior Design and Decoration. Read Books
13. Caan, S. Rethinking Design and Interiors: Human Beings in the Built Environment,
14. Starmer, A. (2012). The Color Scheme Bible: Inspirational Palettes for Designing Home Interiors.
15. Linda O'Shea, Chris Grimley, Mimi Love. (2013). The Interior Design Reference & Specification Book: Everything Interior Designers Need to Know Every Day (Indispensable Guide)

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus : NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	**CO1**	**CO2**	**CO3**
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	H	H	M	M	M	M	L	L	M	M
2	M	H			H	H	H	L	L			H
3	H	H			H	L	L	L	M	H	H	M

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1 and CD2
CD2	Tutorials/Assignments		CO2	CD1 and CD2
CD3	Seminars		CO3	CD1 and CD2
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1,2			Introduction on Aspects of Interior Design: Elements of Interior Design; transformation of design elements Enveloping space, contained space and residual spaces, Spaces within space	R1, R2, R3	CO1		PPT, Chalk & talk, Illustrations	
1	3,4			Introduction to the problem:	NA	CO1		PPT,	

				Interior solutions for a residential space; selection of appropriate case and literature based aspect study					
2	5,6			Internal evaluation of case studies / Literature studies	NA	CO1, CO2		PPT	
2	7, 8			Internal evaluation of case studies / Literature studies	NA	CO1, CO2		PPT,	
3	9, 10			Analysis of project site	NA	CO2		PPT, Compuertised drawing tool	
3	11, 12			Conceptual design: space planning/ development & volumetric study	R1, R2, R3, R11	CO1, CO2, CO3		Compuertised drawing tool	
4	13, 14			Conceptual design: space planning/ development & volumetric study	R1, R2, R3, R11	CO1, CO2, CO3		Compuertised drawing tool	
4	15, 16			Internal evaluation of design development	NA	CO2, CO3		PPT	
5	17, 18			Design of fixed items of work, loose furniture & interior related civil works	R9, R12	CO1, C02, CO3		Compuertised drawing tool	
5	19, 20			Design of fixed items of work, loose furniture & interior related civil works	R9, R12	CO1, C02, CO3		Compuertised drawing tool	
6	21, 22			Discussion on colours and illumination scheme and	R14	CO1, C02,		PPT	

				design.					
6	23, 24			Internal evaluation of design development	NA	CO1, C02, CO3		PPT; Compuertised drawing tool	
7	25, 26			Internal evaluation of design development	NA	CO1, C02, CO3		PPT; Compuertised drawing tool	
7	27, 28			Development and preparation of Plan, sectional elevations, details and specification of materials as per the design & view	R1, R2, R3, R11	CO1, C02, CO3		Compuertised drawing tool	
8	29, 30			Submission of Final design	NA	CO1, C02, CO3		Hard Copy Submittals/ Dwg. Sheets	
8	31, 32			Introduction to the second problem: Interior solutions for a non-residential space as listed above; selection of appropriate case and literature based aspect study	NA	CO1		PPT, Chalk & talk, Illustrations	
9	33, 34			Case study, literature study, space planning/ development & volumetric study	R10	CO1, CO2		PPT; Compuertised drawing tool	
9	35, 36			Design Layout,	R1, R2, R3, R11	CO1, C02, CO3		Computerised drawing tool	
10	37, 38			Proposal for fixed items of work, loose furniture & interior related civil works	R1, R2, R3, R11	CO1, C02, CO3		Computerised drawing tool	
10	39,			Internal	NA	CO1,		PPT	

	40			evaluation of Case study, literature study, site zoning, area programming		C02, CO3			
11	41, 42			Design methodology and constructional details	R1, R2, R3, R11, R15	CO1, C02, CO3		Computerised drawing tool	
11	43, 44			Internal evaluation of Design methodology and constructional details	NA	CO1, C02, CO3		PPT	
12	45, 46			Presentation of interior design schemes with detail specification for the materials and technology used.	R1, R2, R3, R11	CO1, C02, CO3		PPT; Compuertised drawing tool	
12	47, 48			Design of fixed items of work	R15	CO1, CO2		Compuertised drawing tool	
13	49, 50			Design of fixed items of work	R15	CO1, CO2		Compuertised drawing tool	
13	51, 52,			Selection and design of accessories.	R15	CO1, C02, CO3		Compuertised drawing tool	
14	53, 54			Development and preparation of Plan, sectional elevations, details and specification of materials as per the design & view	R4, R5, R9, R15	CO1, C02, CO3		PPT; Compuertised drawing tool	
14	55, 56			Submission of Final design and review	NA	CO1, C02, CO3		Hard Copy Submittals/ Dwg. Sheets	

SEMESTER VIII

COURSE INFORMATION SHEET

Course code: **AR 461**
Course title: **ARCHITECTURAL APPRENTICESHIP**
Pre-requisite(s): **None**
Co- requisite(s): **None**
Credits: 6 **L: 0 T: 0 P: 0**
Class schedule per week: Nil (Apprenticeship in Architectural Firms)
Class: **B. Arch**
Semester / Level: **VIII**
Branch: **Architecture**
Name of Teacher: **Dr. D.J. Biswas**

Course Objectives

This course enables the students:

A	To introduce students to the fundamental processes of designing of buildings and its execution at site, through live projects and handling of issues related to construction and construction management.
B.	To develop apprentice's confidence in interacting with various key players in building design and construction processes
C.	To harness skill in related to preparation of Working and detail drawings, quantity survey, etc and the usual conflict of various building services and the possible solutions for the project, both at design stage and execution at site.

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand the various aspects of design and execution of a real life project
2.	Exposure ofworking in practical field with the usual complexities
3	Exposure to various aspects of Tendering process and its relevance in the construction field and interaction with various key players in construction process.

Syllabus / Course Content:
Each candidate shall have to prepare a detailed report along with necessary drawings, readings, observations, log sheets about the following aspects:

1. Log Sheet and Office Certificate: A student shall fill the log sheets, as a record of his every day work with due authentication and shall submit the same, along with the certificate and confidential report from the Employer.
2. Students have to submit all the working details prepared by each of them, during the apprenticeship period, duly authenticated by the office, along with quantity survey of a small project / part of a project or any special work done during this period such as lighting scheme, glazing details for energy efficiency, acoustical details, etc.

For preparing the reports, students have to follow the guidelines as stated below:

- They have to prepare separate reports strictly as per the subject and content stated in the syllabus
- They have to submit hard copies of all the documents on the date of submission at the department for evaluation by the panel of faculty members.

Students have to start preparing these reports while working in the office where they are undergoing the apprenticeship, as no separate time will be provided after completion of the apprenticeship period for preparing these reports.

Further, they will also have to be ready for the Grand Viva, which will cover their overall knowledge for both on academic and practical aspects thus learned during the apprenticeship period after the evaluation of the reports.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Practical experience gained in Architectural office including field training

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	
End Sem Examination Marks	
Assignment / Quiz (s)	
Viva	

Assessment Components	CO1	CO2	CO3		
Mid Sem Examination Marks					
End Sem Examination Marks					
Assignment					

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	M	L	L	M	M	H		L	M
2	M	M	H	L		L	L	H	M	L	M	L
3	M	L	M	L		M	M	M	H	L	H	L

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD7
CD2	Tutorials/Assignments		CO2	-do-
CD3	Seminars		CO3	-do-
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details. NA, as the students will be on training during the entire semester

COURSE INFORMATION SHEET

Course code: **AR 462**
Course title: **FIELD STUDIES**
Pre-requisite(s): **None**
Co- requisite(s): **None**
Credits: 3 **L: 0 T: 0 P: 0**
Class schedule per week: Nil (Apprenticeship in Architectural Firms)
Class: **B. Arch**
Semester / Level: **VIII**
Branch: **Architecture**
Name of Teacher: **Dr. D.J. Biswas**

Course Objectives

This course enables the students:

A	To develop ability to critically appraise a completed and already used building
B.	To develop the skill of translating the user feedback for the built environment in the design process
C.	To develop ability to supervise and execute work at site.

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand the various aspects of building or project in terms of basic function, services, aesthetics etc which are in use
2.	Understand the built environment from user point of view and translate the findings in future design
3	Exposure to various aspects of supervision in construction process.

Syllabus / Course Content:
Each student shall have to prepare a detailed report along with necessary drawings, sketches, measurement records, readings, observations, survey analysis about the following aspects:

3. Critical appraisal of any building that his office has designed and executed. The building should be in use and the students may record the reactions of the users to support his appraisal in addition to photographs, drawings etc.
4. Site Supervision and practices: A detail report of any part of a building, whichis to be supervised in person, by the student/ his supervisor. If the student does not get an opportunity to supervise their office work, he can give site report of any other work. It may include checking site measurements, preparation of a bill, Site instructions and checking of the executed work.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Practical experience gained in Architectural office including field training

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	60
Assignment / Quiz (s)	15

Assessment Components	CO1	CO2	CO3		
Mid Sem Examination Marks					
End Sem Examination Marks					
Assignment					

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	M	M	H	M	H	M	M	M	H	L	M
2	H	M	M	H		M	M		L	M	L	L
3	H	H	L	L		H	H	M	M	L	H	M

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD7
CD2	Tutorials/Assignments		CO2	-do-
CD3	Seminars		CO3	-do-
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details. NA, as the students will be on training during the entire semester

COURSE INFORMATION SHEET

Course code: **AR 463**
Course title: **COMPREHENSIVE VIVA**
Pre-requisite(s): **None**
Co- requisite(s): **None**
Credits: 3 **L: 0 T: 0 P: 3**
Class schedule per week: 0
Class: **B. Arch**
Semester / Level: **VIII**
Branch: **Architecture**
Name of Teacher: **Dr. D.J. Biswas**

Course Objectives

This course enables the students:

A	To evaluate the overall development of a student in various aspects of Architectural Design, detailing, services, execution, etc. covering various subjects of the program

Course Outcomes

After the completion of this course, students will be able to:

1.	Self-understanding of the overall knowledge base of the student, who is about to step in to the job market, after graduating from the institute on successful completion of the program.

Syllabus / Course Content:
The Comprehensive / Grand Viva to be held in the Architecture department after completion of all the formalities and evaluation process for Architectural Apprenticeship and Field Studies. This exercise to be conducted by a panel of faculty members of the department, chaired by the HOD.

1. All the subjects (both Theory and Sessional) thus taught in B Arch program, as well as practical knowledge earned during the Apprenticeship
2. Additional knowledge on new development in terms of technology, material, regulations etc, which may have direct or indirect effect on the architectural profession.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Practical experience gained in Architectural office including field training

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	60
Assignment / Quiz (s)	15

Assessment Components	CO1	CO2	CO3		
Mid Sem Examination Marks					
End Sem Examination Marks					
Assignment					

Indirect Assessment –

1. Student Feedback on Faculty

2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	H	H	H	H	H	H	H	H	H

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD7
CD2	Tutorials/Assignments			
CD3	Seminars			
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details. NA, as the students will be on training during the entire semester

SEMESTER IX

COURSE INFORMATION SHEET

Course code: AR 501
Course title: URBAN DESIGN
Pre-requisite(s): Nil
Co- requisite(s): Should have registered for AR 511 Architectural Design VIII
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: IX
Branch: Architecture
Name of Teacher: Dr. Satyaki Sarkar

Course Objectives

This course enables the students:

A	To develop concepts of urban design at various urban scales
B.	To engage in an effective design process; that entails holistic approach
C.	To apply and use of relevant urban design techniques considering legal tools;

Course Outcomes

After the completion of this course, students will be able to:

1.	To demonstrate design capabilities in approaching urban design at various scales;
2.	To apply and use urban design knowledge contextually
3	To design live urban pockets / squares / blights taking local parameters and issues into consideration, adding contemporary layer to urban aesthetics

Syllabus
Module 1: Introductio:
Introduction to urban design – ideology/theory, Role of an urban designer, Scope of urban design projects, Urban Design through history, Principles of urban design. Techniques of Urban Design,

Module 2: Theories, concepts and elements
What makes a successful urban space - theories and concept of Jacob, Christopher Alexander and Kevin Lynch, Characters of an urban area, Elements of urban design – Image of the city, zoning regulations, urban morphology, public realm, urban pattern, grain, texture, Land use, scale of urban design an principles of mass,

Module 3: Planning processes and design
Planning process and Survey - Visual survey, Physical survey; Building bye-laws and zoning regulations, Urban design at city scale, regional scale, Urban lighting, urban landscape programme, signage, street furniture and hardware, skyline, views, vistas, Emerging concepts in urban design, salient examples, Townscape elements, Waterfront Development; Streetscape design

Module 4: Designing parts of the city
Designing parts of the city – central areas, town areas, civic areas, shopping centers, Industrial areas, residential areas and housing, Formal and natural urban spaces in urban design, urban blights, urban renewal/ rejuvenation of urban form, Case study / appraisal of an Urban center / central business district /Town center in view of the above issues related to Urban Design.

Module 5: Legal tools
Zoning and subdivision regulation;; Introduction to the Principles of Urban Conservation, Introduction to Planning bye laws and acts, Urban Arts Commission – structure and function

Text books:
1. Bacon, E. N., Design of Cities, Penguin Publishers
2. Cullen, G., Townscape, London Architectural Press
3. Gallion A.B. & Simon Eisner, Urban Pattern City Planning and Design, CBS Publishers
4. Fransesc Zamora; Source of Contemporary Urban Design, Harper Collins Publisher
5. Kevin Lynch, Image of a city, MIT Press
6. Spreiregen, Paul. D., Urban Design: The architecture of towns & cities /

Reference books:
1. Donald Watson, Alan J. Plattus, Robert G. Shibley; Time-saver standards for urban design, McGraw-Hill
2. Stephen Marshall, Streets and Patterns, Routledge.

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Industrial/guest lectures
CD5	Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment	05

Assessment Components	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –
1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H		H	L	L	M	L			L	M
2	H	H	H	H	M		M	M	L			
3	H	H	H	H	H	M			H	H	L	L

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2, CO3
CD2	Tutorials/Assignments	CO2, CO3
CD3	Seminars	CO3
CD4	Industrial/guest lectures	CO3
CD5	Self- learning such as use of NPTEL materials and internets	CO1, CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1-3			Introduction to urban design	T1,6, R-1	CO1	Ideology, role, scope, Principles	Chalk-board, PPT	
2	4-6			Introduction to urban design	T1,6, R-1	CO1	History and techniques	Chalk-board, PPT	
3	7-9			Theories, concepts and elements	T2,5, R-2	CO1	Urban Space – theories of legends	Chalk-board, PPT	
4	10-12			Theories, concepts and elements	T2,5, R-2	CO1	Character of an urban area, urban pattern, morphology,	Chalk-board, PPT	
5	13-15			Theories, concepts and elements	T2,5, R-2	CO1	Scale, mass, landuse, zoning regulations	Chalk-board, PPT	
6	16-18			Planning processes and design	T-4, R-1	CO1, CO2	Survey, byelaws, design at city scale	Chalk-board, PPT	
7	19-21			Planning processes	T-4, R-1	CO1, CO2	Emerging concepts,		

				and design			lighting, landscape		
8	22-24			Planning processes and design	T-4, R-1	CO1, CO2	Townscape elements, waterfront and streetscape design	Chalk-board, PPT	
9	25-27			Designing parts of the city	T2,5, R-1	CO3	Designing parts of the city, urban renewal/ rejuvenation of urban form	Chalk-board, PPT	
10	28-30			Designing parts of the city	T2,5, R-1	CO3	Case study / appraisal of an Urban center / central business district /Town center	Chalk-board, PPT	
11	31-33			Legal tools	T-2,3,6	CO3	Principles of Urban Conservation, laws and acts	Chalk-board, PPT	
12	34-36			Legal tools	T-2,3,6	CO3	Urban Arts Commission	Chalk-board, PPT	
13	37-39			Assignments & Guest lecture		CO1			

COURSE INFORMATION SHEET

Course code: AR 502
Course title: HUMAN SETTLEMENT PLANNING
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T:0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: IX
Branch: Architecture
Name of Teacher: Anila Smriti Surin

Course Objectives

This course enables the students:

A.	To have an overview on the vocabulary of Human settlements to understand the various elements of Human Settlements and the classification of Human Settlements.
B.	To familiarize the students with Planning concepts and process in Urban and Regional Planning.
C.	Explain the importance of the subject of Town Planning in the evolution of Human Settlements and Urban Forms and the scope of a Town Planner.
D.	The course aims to give an introductory and over all understanding of the relationship between Architecture and urban and regional planning and the various aspects involved in the planning and development of cities and regions.
E.	To make the students understand the philosophies and basic components of town planning, and to enable them to develop concepts on preparation of town plan

Course Outcomes

After the completion of this course, students will be:

1.	To explore the students about the dynamics of Urban Form and various Human Settlements pattern
2.	To understand the interrelationship between Human Settlements structure and Social Dynamics
3.	The main aim of the subject is to make the student aware of the factors that constraint and assist in architectural design of the settlements
4.	The students were able to understand the factors which determine formation of settlements from prehistoric to the contemporary era.
5.	The students understood the expressions of settlements in terms of cultural, social, economic and political context of a region.
6.	The students were able to understand how sustainability is important in the future of any settlement.

Syllabus

Module 1:
Evolution and Elements of the origin of early human settlements and factors responsible
Planning Principals of Human Settlement of cities and towns of various historical periods like Egyptian, Greek, Roman, Medieval, Renaissance, Neo-classical, Baroque.
Town Planning in India- Vedic period, Indus Valley, Islamic, Medieval and Colonial Period.
Major functions of a city, city forming and city serving functions. Problems faced by a typical city.

Module 2:
Industrial revolution and Planning concepts given by Ebenezer Howard, Patrick Geddes, Clarence Perry, Frank Lloyd Wright, Le Corbusier, Soria Y Mata, Lewis Mumford, Clarence Stein, Clarence Perry, Henry Wright and C.A. Doxiadis. Evolution of cities.

Module 3:
Structure and form of Human settlements – Linear, non-linear and circular, Combinations – reasons for development, advantages and disadvantages, case studies, factors influencing the growth and decay of human settlements. Case studies of some recent planned cities like New Delhi, Canberra, Brazillia, Chandigarh, Gandhinagar, and Bhubaneswar. Sustainable City and Neighborhood.

Module 4:
Introduction to the various levels of planning National, Regional, Urban, Rural, Local etc. emphasizing the differences and relationship among them Basic terms & definitions used by town planners in describing urban areas and their development – such as gross density, net density, floor space index, central business district, land use and land use classification for cities and rural settlements, analysis of land uses in Indian cities Municipal governance, Current Planning Process in India: the concept of Perspective Plan andDevelopment Plan. Land use planning and Scope and Content of Master plan. Zoning regulations, zonal plan, need, linkage to master plan and land use plan .Need, applicability and development regulations. Urban Development Authorities, its setup and functions.

Module 5:
Urbanisation, emergence of new forms of developments – self sustained communities , SEZ, transit development , integrated townships , case studies.Brief introduction to the town planning organization in India (national and local) and contemporary policies/programmes related to urbanization and urban development at the national level in India.
Components of a settlement – activity pattern and land use, traffic and road network, density of population and population distribution. Central business district of a city, other business districts, urban nodes, rest of the city, fringe area and suburbs.

Text books:

10. C.A.Doxiadis, Ekistics, "An Introduction to the Science of Human Settlements", Hutchinson,London, 1968.
11. Bacon, E. N., Design of Cities.
12. Gallion A.B., Urban Pattern.
13. Spiro Kostof, The City Shaped: Urban Patterns and Meanings Through History
14. Kevin Lynch; **Good City Form**
15. Lewis Mumford ; The City in History: Its Origins, Its Transformations, and Its Prospects
16. Abir Bandopadhyay; Town Planning
17. The architecture of cities: Rossi, Aldo.
18. Peter Geoffrey Hall; **Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century**
19. Amiya Kumar Das, Urban Planning in India
20. Justin Bishop, Building Sustainable Cities of the Future
21. Mike Jenks, Colin A Jones; Dimensions of the Sustainable City

Reference books:

1. URDPFI Guidelines – Ministry of Urban Development

Gaps in the syllabus (to meet Industry/Profession requirements) : nil

POs met through Gaps in the Syllabus : nil

Topics beyond syllabus/Advanced topics/Design : nil

POs met through Topics beyond syllabus/Advanced topics/Design : nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**
Mid Sem Examination Marks	√	√	√	√	√	√
End Sem Examination Marks	√	√	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√	√	√
Assignment	√	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	M	L	M	-	-	-	-	-	-	-	-	-
2	H	H	-	-	-	M	M	M	-	-	-	-
3	-	L	H	M	-	M	-	H	-	-	-	M
4	-	-	-	-	-	-	-	-	-	M	-	M
5	-	-	-	-	-	-	-	H	-	L	M	-
6	H	M	-	-	-	-	H	-	-	-	--	-

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD	Lecture by use of boards/LCD projectors/OHP		CO1	CD1, CD2

1	projectors			
CD 2	Tutorials/Assignments		CO2	CD3, CD6
CD 3	Seminars		CO3	CD2, CD3, CD4
CD 4	Mini projects/Projects		CO4	CD1, CD2, CD3
CD 5	Laboratory experiments/teaching aids		CO5	CD2, CD6
CD 6	Industrial/guest lectures		CO6	CD2, CD4
CD 7	Industrial visits/in-plant training			
CD 8	Self- learning such as use of NPTEL materials and internets			
CD 9	Simulation			

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / Refere nces	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1		1	Evolution and Elements of the origin of early human settlements and factors responsible	T3, T6	CO1		PPT Digi Class	
1	L2, L3			Planning Principals of Human Settlement of cities and towns of historical periods like Egyptian, Greek, Roman	T3, T6	CO1, CO4		PPT Digi Class	
2	L4, L5, L6			Planning Principals of Human Settlement of cities and towns of various historical periods like Medieval, Renaissance, Neo-classical, Baroque	T3, T6	CO1, CO4		PPT Digi Class	
3	L7, L8			Town Planning in India- Vedic period, Indus Valley, Islamic, Medieval and Colonial Period. Major functions of a city, city forming and city serving functions. Problems faced by a typical city.	T6, T10	CO1, CO2, CO4		PPT Digi Class	
3	L9			Industrial revolution and Planning concepts given by Ebenezer Howard	T3, T2, T6	CO1, CO2, CO5		PPT Digi Class	
4	L10, L11,			Planning concepts given by Patrick Geddes,	T6, T7,	CO2, CO3,		PPT Digi Class/Cha	

	L12			Clarence Perry, Frank Lloyd Wright, Le Corbusier	T10	CO4, CO5		lk -Board	
5	L13, L14, L15			Planning concepts given by Soria Y Mata, Lewis Mumford, Clarence Stein, Clarence Perry, Henry Wright and C.A. Doxiadis. Evolution of cities.	T1, T2, T4, T7	CO2, CO3, CO4, CO5		PPT Digi Class/Cha lk -Board	
6	L16, L17			Structure and form of Human settlements – Linear, non-linear and circular, Combinations – reasons for development, advantages and disadvantages, case studies factors influencing the growth and decay of human settlements.	T4, T5, T7, T9	CO1, CO3		PPT Digi Class/Cha lk -Board	
7	L18, L19,L 20			Case studies of some recent planned cities like New Delhi, Canberra, Brazillia, Chandigarh, Gandhinagar, and Bhubaneswar	T4, T9, T10,	CO3, CO5		PPT Digi Class	
7	L21, L22			Sustainable City and Neighborhood. Case studies.	T11, T12	CO5, CO6		PPT Digi Class	
8	L23, L24, L25			Introduction to the various levels of planning National, Regional, Urban, Rural, Local etc. emphasizing the differences and relationship among them Basic terms & definitions used by town planners in describing urban areas and their development – such as gross density, net density, floor space index, central business district	T8, T10, R1	CO2, CO5		PPT Digi Class/Cha lk -Board	
9	L26, L27			Land use and land use classification for cities and rural settlements. Analysis of land uses in Indian cities.	T10, R1	CO2, CO5		PPT Digi Class	
10	L28, L29, L30			Current Planning Process in India: the concept of Perspective Plan and Development Plan. Land use planning and Scope	T8, T10, R1	CO5		PPT Digi Class/Cha lk -Board	

				and Content of Master plan. Zoning regulations, zonal plan, need, linkage to master plan and land use plan .Need, applicability and development regulations.					
11	L31, L32			Municipal governance, Urban Development Authorities, its setup and functions.	T8, T10, R1	CO5		PPT Digi Class	
12	L33, L34, L35			Urbanisation, emergence of new forms of developments – self sustained communities, SEZ, transit development, integrated townships, case studies.	T9, T11, T12,	CO4, CO5		PPT Digi Class	
13	L36, L37, L38			Brief introduction to the town planning organization in India (national and local) and contemporary policies/programmes related to urbanization and urban development at the national level in India.	T8, T10, R1	CO5		PPT Digi Class	
14	L39, L40			Components of a settlement – activity pattern and land use, traffic and road network, density of population and population distribution. Central business district of a city, other business districts, urban nodes, rest of the city, fringe area and suburbs.	T6, T10, T1	CO2, CO5		PPT Digi Class	

COURSE INFORMATION SHEET

Course code: AR 503
Course title: THEORY OF DESIGN
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: IX
Branch: Architecture
Name of Teacher: Dr.Janmejoy Gupta

Course Objectives

This course enables the students:

A.	Define Designing as a process.
B.	Evaluate historical progress of designing.
C.	Review and assess different design principles and methods, both, historical and contemporary.
D.	Understanding role of Design-Analogies in the designing process.
E.	Analyse the process of design as a series of small steps culminating into the finished design.

Course Outcomes

After the completion of this course, students will be:

1.	Critically incorporate the various design methods taught in their design exercises.
2.	Choose and adopt different Design Methods for given set of situation and design problems, depending on design situation and design context.

Syllabus

Module 1: Design Process:
Designing today, Design as a process, various thoughts and definition, Design methodology, Philosophies, and approaches to design process, (Traditional & Modern-Day) KISS principles by Kelly Johnson, Use-centered design by John Flach and Cynthia Dominguez, Challenges of designer, User-centered design.

Module 2: Brief History of Design:
The era of Craft evolution, era of Design by drawing, era of System Designers The era of "Technological Change (or Socio-technical Innovation)", Designers as Black Boxes, Designers as Glass Boxes, Designers as Self Organizing Systems, Criteria for Design Project Control.

Module 3: Different Design Methods & Stages of Design:
Different design methods, Pre-fabricated strategies, Methods of exploring design situation. Parametric Architecture, Designing as a three-stage process: Divergence, Transformation, Convergence.

Module 4: Collaborative strategy for adaptive architecture:
Enabling everyone concerned with the designing of a building influencing decisions that affect both the adaptability of the building and the compatibility of its components, Biophilic Architecture.

Module 5: Selection of Strategies and Design Methods:
Criteria for choosing design method, input output chart for selecting design methods, Design strategies, linear strategies, Cyclic Strategies, Branching strategies, adaptive strategies.

Text books:
1. Design Methods by John Chris Jones, John Wiley & Sons, New York.
2. Experiencing Architecture by Steen Eliel Rasmussen.
3. Urban Experience by Raymond J. Curran.
4. The death of Drawing, Architecture in the Age of Simulation, David Ross Scheer, Routledge.

Reference books/websites:
1.http://char.txa.cornell.edu/language/principl/principl.htm
2.http://www.digital-web.com/articles/principles_of_design/

Gaps in the syllabus (to meet Industry/Profession requirements): None
POs met through Gaps in the Syllabus: None
Topics beyond syllabus/Advanced topics/Design: None
POs met through Topics beyond syllabus/Advanced topics/Design: None

Course Delivery methods
1. Lecture by use of boards/LCD projectors/OHP projectors
2. Tutorials/Assignments
3. Seminars
4. Mini projects/Projects
5. Industrial/guest lectures
6. Self- learning such as use of NPTEL materials and internets
7. Simulation

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	CO1	CO2
Mid Sem Examination Marks	√	√
End Sem Examination Marks	√	√
Quiz (02 nos. of 10 marks each)	√	√
Assignment	√	√

Indirect Assessment –
1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	M	L	M	H	H	M	L	L	L	M
2	H	H	H	L	L	M	H	M	L	L	L	M

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD 1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1
CD 2	Tutorials/Assignments		CO2	CD1, CD2
CD 3	Seminars		CO 1, CO 2	CD1,CD2,CD3
CD 4	Mini projects/Projects		CO1, CO2	CD 1,2,3,4.
CD 5	Laboratory experiments/teaching aids		-	-
CD 6	Industrial/guest lectures		CO1,CO2	CD6
CD 7	Industrial visits/in-plant training		-	-
CD 8	Self- learning such as use of NPTEL materials and internets		CO1,CO2	CD8
CD 9	Simulation		CO2	CD9

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1,2			Designing today, Design as a process, various thoughts, and definition.	T1, R1,R2	1		PPT Digi Class/Chalk-Board	
1	3			Design methodology, Philosophies	T1, R1,R2	1		PPT Digi Class/Chalk-Board	
2	4,5,6			approaches to design process, (Traditional & Modern-Day)	T1, T4,R1,R2	1,2		PPT Digi Class/Chalk-Board	
3	7,8,9			KISS principles by Kelly Johnson, Use-centered and, User-centered design.	T1	1		PPT Digi Class/Chalk-Board	

				design by John Flach and Cynthia Dominguez					
4	10,11			Challenges of designer.	T1,R2	1,2		PPT Digi Class/Chalk-Board	
4	12			The era of Craft evolution	T1	1		PPT Digi Class/Chalk-Board	
5	13,14			era of Design by drawing	T1,T4	1		PPT Digi Class/Chalk-Board	
5	15			era of System Designers The era of "TechnologicalChange (or Socio-technical Innovation)	T1,R2	1,2		PPT Digi Class/Chalk-Board	
6	16,17			Designers as Black Boxes, Designers as Glass Boxes	T1,R2	1,2		PPT Digi Class/Chalk-Board	
6	18			Designers as Self Organizing Systems, Criteria for Design Project Control.	T1,R1,R2.	1,2		PPT Digi Class/Chalk-Board	
7	19,20			Different design methods, Methods of exploring design situation.	T1,R2	1,2		PPT Digi Class/Chalk-Board	
7	21			Pre-fabricated strategies	T2,T3,R1	2		PPT Digi Class/Chalk-Board	
8	22,23			Parametric Architecture	T2,T3	1,2		PPT Digi Class/Chalk-Board	
8	24			Designing as a three-stage process: Divergence, Transformation,Convergence.	T1,R1,R2	1,2		PPT Digi Class/Chalk-Board	
9	25,26,27			Enabling everyone concerned with the designing of a building influencing decisions that affect both the adaptability of the building and the compatibility of its components	T2,T3	2		PPT Digi Class/Chalk-Board	
10	28,29			Bio-philic Architecture.	T2	1,2		PPT Digi Class/Chalk-Board	
				Criteria for choosing design method, input output chart for selecting design methods.	T1,R2	1,2		PPT Digi Class/Chalk-Board	

11	30,31			Linear & Cyclic Design strategies.	T1,R1 ,R2	1,2		PPT Digi Class/Chal k-Board	
11	32			Branching strategies.	T1,R1 ,R2	1		PPT Digi Class/Chal k-Board	
12	33,34 ,35.			Adaptive strategies.	T1,R1 ,R2	1		PPT Digi Class/Chal k-Board	

COURSE INFORMATION SHEET

Course code : **AR 605**
Course title : **URBAN ECOLOGY AND ENVIRONMENTAL PLANNING**
Pre-requisite(s) : **None**
Co- requisite(s) : **None**
Credits : **3** **L: 3** **T: 0** **P: 0**
Class schedule per week : **03**
Class : **BARCH**
Semester / Level : **IX**
Branch : **Architecture**
Name of Teacher : **Dr. Smriti Mishra**

Course Objectives

This course enables the students:

A.	To understand and discuss how humans are components of urban ecosystems
B.	To be aware of the impact of urbanization and industrialization on natural environment
C.	To introduce the concepts and theories of ecology in urban context
D.	To explain the principles and strategies for natural resource conservation and management and the associated conflicts.
E.	To gain knowledge on evaluating the environmental impacts of urban development
F.	To be aware of best practices in urban-planning related to urban ecological planning.

Course Outcomes

After the completion of this course, students will be able:

1.	To gain a wider understanding of urban ecological and environmental issues and appreciate potential approaches for cities to deal with ecological and environmental challenges and threats.
2.	To enhance abilities and skills relating to evaluation of environmental impacts of urban development.
3.	To make scientifically informed decisions about environmental issues related to urban areas

Syllabus

Module 1: Man-Environment Relationship and Concept of Urban Ecosystem
Man, and Environment - Changing Perspectives in Man-Environment Relationship with Focus on Issues of Population, Urbanization, Resource Depletion and Pollution, Conceptsof Ecology andfundamentals of ecosystem; Components of natural and built environment, Eco-systems and their relevance to environment, resources and human settlements, Environmental Zones (Hill, coastal, arid, characteristics, resources, settlements pattern,problems and potentials. Impact of urbanization and industrialization on nature and modifications in natural environment, causes and consequences, Issues of the urban environment: pedestrian-vehicular conflict, City CentreEnvironment, Housing areas, dereliction, Urban climatology and thermal pollution, factors causing heat sink effects, directradiation, climatic effects on urban areas, Need for urban ecosystem approach, its evolution and significance.Resource analysis for various ecosystems and development imperatives (land, geology,soil, climate, water, vegetation) characteristics, exploitation, causative factors fordegradation, analytical techniques.

Module 2: Ecological Principles in Planning

Concepts and relevance of Environmental Planning, Integrated resource planning approach,Preparation and analysis of resource inventories and resource matrices, Resource regions in India, their problems and potentials,Sustainability, and environmental criteria for location of human settlements, Ecological parameters for planning at different levels: site planning, settlement planning and regional planning, Carrying Capacity Based Planning- Concept, Parameters, and Indicator Measures; Models and Case Studies in Urban and Regional Development

Module 3:EnvironmentalMonitoring and Impact Assessment

Air Pollution-sources, causes/pollutants and their effects, emission sources, emission standards, and ambient air quality. Air pollution mitigation and abatement; Water Pollution – sources, water quality tests, performance criteria, Water pollution mitigation and abatement.Noise Pollution- sources, techniques of measurement, noise level standards, noise levels; Noise attenuation; EPA Guidelines, Land Pollution -sources, soil erodibility tests, minimum standards of disposal (minimum standards for different uses), performance criteria. Interpretation of analytical trends of various parameters of quality of environment.

Role of EIA in the planning and decision-making process; definition, need, evolution and objectives, tasks and scope; Methods of EIA; advantages and limitations; Assessment of impacts on resources (Including air, water, flora and fauna); Assessment of impacts on Land use; Case studies. Environmental Impact and Strategic Environmental Assessment for Urban Areas; Ecological Footprint Analysis of Cities; Sustainable Lifestyle Assessment

Module 4:Urban Environmental Management and Planning

Objectives of environmental planning and design, Integration of environmental assessments and planning options, Environmental management approach;

Environmental Protection Techniques: Role of Government and Non-Government Organizations in Environmental Protection; Best practices in Environmental Protection and Conservation; International Co-operation for Environmental Protection.

Environmental Management: Resource Management: Including management of land, water bodies and water channels, forests and wildlife, minerals; Management of Urban Areas; Management of sensitive areas – hills, coasts, arid, wetlands etc. (including participatory approaches); Management of Watersheds; Human activities and energy in cities;Contribution to GHGs

Appropriate Technologies and Applications: Techniques and case studies related to water harvesting, water treatment, recycling, waste disposal, waste minimization, and their implications, Low cost and cleaner technologies, Environmental Management in the Indian context;

Module 5: Environmental Legislation, Policies and Practices:

Global concerns for environment and bio-diversity, International Environmental Policies and initiatives including policies, strategies, protocols, treaties, and agreements; Overview of Government of India's policies.

Text books:

1. Fundamentals of Ecology, Odum, E.P., Barrett, G.W., Brewer, R., Thomson Brooks,
2. Ecology, Impact Assessment and Environmental Planning, Westman W., John Wiley and Sons
3. Integrated Environmental Planning, James K. Lein, Blackwell Publishing

Reference books:

1. Ecoscience: Population, Resources, Environment, Paul R. Ehrlich et al.
2. The ecology of urban habitats, O. L. Gilbert, Chapman & Hall
3. Cities and Natural Process: A Basis for Sustainability, Michael Hough
4. AITP Reader on Ecology & Resource Development, AITP
5. AITP Reading Material on Environmental Planning and Design, Prof A. K. Maitra, SPA Delhi
6. Ecology and Equity - The Use and Abuse of Nature in Contemporary India, Gadgil, M. and Guha, R., Penguin

7. Environment Crisis and Sustainable Development, Bahuguna, S., Natraj, Dehradun,
8. Environmental Issues and Researches in India, Agarwal, S.K. and Garg, R.K (eds), Himanshu Publications
9. Environmental Law and Policy in India - Cases Materials and Statutes, Divan, S. and Rosencranz A., Oxford
10. Environmental Problems in Third World Cities, Hardoy, J.E., Mitlin, D., and Satterthwaite,D., Earthscan
11. Energy, Ecology & Environment, Wilson Richards & Jones Willium
12. Handbook of Environmental Planning, McEnro James
13. Sustainable Development, Khanna, D.D.
14. Man & the changing Environment, Frank, R. G. & Frank, D. N
15. Nathanson J.A. (2009). Basic Environmental Technology: Water Supply, Waste Management and Pollution Control, 4th ed., New Delhi, PHI Learning.
16. Nirmalkhandan N. (2001) Modeling Tools for Environmental Engineers and Scientists, CRC Press, Boca Raton, Florida

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	H	H	M	H	H	L	M		M
2	H	H	M	M	H	M	H	L	L	M		L
3	H	M	M	H	H	M	H	L	L	L		L

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2, CO3
CD2	Tutorials/Assignments	CO2
CD3	Seminars	CO3
CD4	Industrial/guest lectures	CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tenta-tive Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Method-ology used	Remarks by faculty if any
1	L1,			Man, and Environment - Changing Perspectives in Man-Environment Relationship with Focus on Issues of Population, Urbanization, Resource Depletion and Pollution,	T1	CO1,		Chalk -Board	
1	L2			Concepts of Ecology and fundamentals of ecosystem; Components of natural and built environment, Eco-systems and their relevance to environment, resources and human settlements,	T1, T2, R1	CO1,		Chalk -Board	
1, 2	L3, L4			Environmental Zones (Hill, coastal, arid, characteristics, resources, settlements pattern, problems and potentials. Impact of urbanization and industrialization on nature and modifications in natural environment, causes and	T1, T2 R1 R3	CO1, CO3		PPT Digi Class/ Chalk -Board	

				consequences,Issues of the urban environment: pedestrian-vehicular conflict, City Centre Environment, Housing areas, dereliction, Urban climatology and thermal pollution, factors causing heat sink effects, direct radiation, climatic effects on urban areas,					
2	L5, L6,			Need for urban ecosystem approach, its evolution and significance.	T1, T2 R3,	CO1, CO2		PPT Digi Class	
3	L7, L8			Resource analysis for various ecosystems and development imperatives (land, geology, soil, climate, water, vegetation) characteristics, exploitation, causative factors for degradation, analytical techniques.	T1, T2, R4	CO1, CO2		PPT Digi Class	
3, 4	L9, L10,			Concepts and relevance of Environmental Planning, Integrated resource planning approach, Preparation and analysis of resource inventories and resource matrices,	T1, T2, R2	CO1, CO2		PPT Digi Class	
4	L11,			Resource regions in India, their problems and potentials,	T1, R2, R5	CO1, CO2		PPT Digi Class	
4	L12,			Sustainability, and environmental criteria for location of human settlements, Ecological parameters for planning at different levels: site planning, settlement planning and regional planning,					
5	L13,			Carrying Capacity Based Planning- Concept, Parameters, and Indicator Measures	T2, T3, R12	CO1, CO2, CO3			
5	L14, L15			Models and Case Studies in Urban and Regional Development	T1, T2, R5	CO1, CO2, CO3		PPT Digi Class	
6	L16 L17			Air Pollution-sources, causes/pollutants and their effects, emission	R4, R5,	CO1, CO2, CO3		Chalk -Board	

				sources, emission standards, and ambient air quality.					
6	L18,			Air pollution mitigation and abatement.	T1, T2, R5	CO1, CO2,		PPT Digi Class	
7	L19, L20			Water Pollution – sources, water quality tests, minimum standards of disposal (for different uses), performance criteria, Water pollution mitigation and abatement.	T1, T2, R5	CO1, CO2, CO3		PPT Digi Class	
7	L21			Noise Pollution- sources, techniques of measurement, noise level standards, noise levels; Noise attenuation; EPA Guidelines, Land Pollution -sources, soil erodibility tests, minimum standards of disposal (minimum standards for different uses), performance criteria.	T1, T2, R3 R5	CO1 , CO2		PPT Digi Class/ Chalk -Board	
8	L22, L23			Interpretation of analytical trends of various parameters of quality of environment.	T1, T2, R1 R3	CO1, CO2		PPT Digi Class	
8, 9	L24 L25			Role of EIA in the planning and decision-making process; definition, need, evolution and objectives, tasks and scope; Methods of EIA; advantages and limitations;	T1, T2, R3 R5	CO1, CO2		PPT Digi Class/ Chalk -Board	
9,	L26, L27			Assessment of impacts on resources (Including air, water, flora and fauna);	T1, T2, R5	CO1, CO2		PPT Digi Class/ Chalk -Board	
10	L28, L29			Assessment of impacts on Land use; Case studies. Environmental Impact and Strategic Environmental Assessment for Urban Areas;	T1, T2, R6	CO1, CO2, CO3		PPT Digi Class	
10	L30			Ecological Footprint Analysis of Cities; Sustainable Lifestyle Assessment	T1, T2	CO3, CO4		PPT Digi Class/ Chalk -Board	

11	L31, L32			Objectives of environmental planning and design, Integration of environmental assessments and planning options, Environmental management approach; Environmental Protection Techniques: Role of Government and Non-Government Organizations in Environmental Protection; Best practices in Environmental Protection and Conservation; International Co-operation for Environmental Protection	T3, R5 R12 R15	CO1, CO2 CO3		PPT Digi Class/ Chalk -Board	
11, 12	L33, L34			Environmental Management: Resource Management: Including management of land, water bodies and water channels, forests and wildlife, minerals; Management of Urban Areas; Management of sensitive areas – hills, coasts, arid, wetlands etc. (including participatory approaches); Management of Watersheds;	R1, R6	CO1,, CO2, CO3		PPT Digi Class/ Chalk -Board	
12	L35, L36			Human activities and energy in cities; Contribution to GHGs	R10, R11	CO1, CO2		PPT Digi Class/ Chalk -Board	
13	L37			Appropriate Technologies and Applications: Techniques and case studies related to water harvesting, water treatment, recycling, waste disposal, waste minimization, and their implications,	R15	CO1, CO2, CO3		PPT Digi Class/ Chalk -Board	
13	L38			Low cost and cleaner technologies, Environmental	R15	CO1, CO2, CO3		PPT Digi Class/	

				Management in the Indian context;				Chalk -Board	
14	L39, L40			Global concerns for environment and bio-diversity, International Environmental Policies and initiatives including policies, strategies, protocols, treaties, and agreements;	R7, R14	CO1		PPT Digi Class/ Chalk -Board	
14	L41, L42			Overview of Government of India's policies.	R8, R9	CO1,		PPT Digi Class/ Chalk -Board	

COURSE INFORMATION SHEET

Course code: AR 511
Course title: ARCHITECTURAL DESIGN VIII
Pre-requisite(s): Should have cleared all Architectural Design Laboratories up to VI Semester
Co- requisite(s): Should have registered for AR 501 Urban Design
Credits: 18 L: 0 T: 0 P: 12
Class schedule per week: 12
Class: B. Arch
Semester / Level: IX
Branch: Architecture
Name of Teacher: Dr. Satyaki Sarkar

Course Objectives

This course enables the students:

A	To develop concepts that integrate site, human activity, structure and building materials
B.	To engage in an effective design process; that entails solving complex issues covering functional relationship, climatic condition, social aspects along with structural considerations and building services
C.	To apply and use of relevant building bye-laws and provisions of National Building Code;
D.	To introduce students to design involving group members and to approach real life urban issues through design intervention.

Course Outcomes

After the completion of this course, students will be able to:

1.	To demonstrate design capabilities in designing of service oriented building or user centric building involving complex structural systems, services and construction systems;
2.	To apply and use building byelaws and codal provision contextually.
3	To design live urban pockets / squares / blights taking local parameters and issues into consideration, adding contemporary layer to urban aesthetics.

Syllabus

Activities: Main Design Exercise	**Duration** (approx.)
1. Design of an Institutional campus OR Design of a medical facility campus (Hospital of not less than 200 beds)	11 weeks
2. Urban Design of an urban pocket / square / plaza / blighted area (Group Work – Group of 5/6 students recommended))	3 weeks

Viva voce
Final Viva-vice on the main design assignments to be conducted at the end of the semester.

Text books:

6. C. Carney Strange, James H. Banning, Designing for Learning: Creating Campus Environments for Student Success, Wiley Publishers
7. Richard P. Dober, Campus Design, Wiley Publisher
8. David C. Perry, Wim Wiewe, The University as Urban Developer: Case Studies and Analysis, M. E. Sharpe
9. Richard Lyle Miller, Earl S. Swensson, Hospital and Healthcare Facility Design, W.W. Norton
10. Hilary Dalke, Paul J. Littlefair, David Loe, NHS Estates, Lighting and Colour for Hospital Design, Stationery Office, 2004
11. W. Paul James, William Tatton-Brown, Hospitals: design and development, Architectural Press,

Reference books:

3. Donald Watson, Alan J. Plattus, Robert G. Shibley; Time-saver standards for urban design, McGraw-Hill
4. Stephen Marshall, Streets and Patterns, Routledge.

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	**CO1**	**CO2**	**CO3**
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	H	H	M	M	L	H	H	L	M
2	H		H	M			L					
3	H	H	H	H	H	M			H	H	L	L

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2, CO3,
CD2	Mini projects/Projects	CO2, CO3,
CD3	Laboratory experiments/teaching aids	CO3,
CD4	Industrial/guest lectures	CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1,2,3			Introduction to the problem	1,2,3,4,5,6	CO1, CO2	Details of Planning and services for Main design	PPT, Chalk & talk, Illustrations	
1	4			Internal evaluation of case studies / Literature studies	NA	CO2		PPT	
2	5,6,7, 8			Site study, Conceptual Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Compuertised drawing tool	
3	9,10,11			Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Compuertised drawing tool	
4	12			Internal evaluation of design development	NA	CO2		PPT, Compuertised drawing tool, paper	
4	13 ,14 , 15			Design, Layout planning	1,2,3,4,5,6	CO2	Design of building and site planning	Compuertised drawing tool	
5-7	16-24			Design,	1,2,3,4,5	CO2	Design of	Compuertis	

				Layout planning	,6		building and site planning	ed drawing tool	
7	25-26			Internal evaluation of design developme nt	NA	CO2		PPT, Compuertis ed drawing tool, paper	
7-9	27-40			Design, Layout planning	1,2,3,4,5 ,6	CO2	Design of building and site planning	Compuertis ed drawing tool	
9-10	41			Internal evaluation of design developme nt	NA	CO2		PPT, Compuertis ed drawing tool, paper	
`10-11	42-47			Preparatio n of elevation, section & view	1,2,3,4,5 ,6	CO2	Design of building and site planning	Compuertis ed drawing tool	
11	48			Submissio n of Final design					
12	49			Staring of new problem on urban design	R-1 & R-2	CO3	Introducti on to problems and describing various methods of approach	PPT, Chalk & talk, Illustrations	
12	50-51			Site visit for data collection	R-1 & R-2	CO3	Data collection and visual analysis		
13	52-55			Data analysis	R-1 & R-2	CO3	Analysis of various urban level data	Compuertis ed drawing tool	
14	56-58			Proposal	R-1 & R-2	CO3	Proposal on analysis	Compuertis ed drawing tool	

COURSE INFORMATION SHEET

Course code: AR 512
Course title: INTRODUCTION TO THESIS PROJECT & RESEARCH METHODOLOGY (Dissertation)
Pre-requisite(s): Should have cleared all Architecture Laboratories up to VI Semester.
Co- requisite(s): None
Credits: 2 L:0 T:0 P: 4
Class schedule per week: 04
Class: B. Arch
Semester / Level: IX
Branch: Architecture
Name of Teacher: Dr. Satyaki Sarkar

Course Objectives

This course enables the students:

A	To identify a thesis / dissertation project and a related field of minor research in coherence with identified thesis.
B.	To apply scientific methods / tools and techniques in conducting the minor research.
C.	To identify / list / evolve through research at design criteria for spaces / people / characters of buildings for application in design in the next phase of Thesis project
D.	To apply knowledge on application of presentation techniques [for presenting dissertation / outcome of the study] and techniques of Thesis / Dissertation / Project Report writing

Course Outcomes

After the completion of this course, students will be able to:

1.	To understand the basics of research and its related methodological approach
2.	To inculcate ideas to do literature survey; record and analyze the development of the aspect of research on a time-line and understand its current trends.
3	To evolve on one or more aspect of design in form of a report and linking the same with future thesis.

Syllabus

Activities:	**Duration**
A. Thesis Project Proposal Each student shall submit three proposals for the project, he/she wants to undertake in order of preference from which the final topic may be selected. The project shall be LIVE as far as possible. Each of the proposals should be furnished with the following information: (a) Title of Project (b) Authority proposing the project (c) Site area, location (d) Brief about the project with scope of work.	3 weeks from the start of the semester
B. Minor Dissertation: Each student shall prepare aa minor research / dissertation on any topic in architecture relevant to any chosen objective or any aspect of the Thesis Project. The minor dissertation shall be a research –based conceptual study directly associated with the thesis topic. It shall be submitted in the form of a report with appropriate referencing, bibliography etc. and the highlights shall be also presented as a seminar.	12 weeks following activity A

Text books:

1. Becker, Howard S., Writing for Social Scientists: How to Start and Finish Your Thesis, Book, or Article
2. Zeisel, John. Inquiry by Design: Tools for Environment: Behavior Research. Monterey, CA: Brooks/Cole Publishing Co.

Reference books:

1. Linda Groat and David Wang, Architectural Research Methods, John Wiley and Sons
2. Turabian, Kate L. A Manual for Writers of Research Papers, Theses, and Dissertations: Chicago Style for Students and Researchers

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	**CO1**	**CO2**	**CO3**
Progressive Evaluation	√	√	√
End Sem Evaluation	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1		H			H	H						M
2	H	M	M	H	H	H	M					
3				H	M	M	M	L	L	H	L	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2, CO3,
CD2	Mini projects/Projects	CO2, CO3,
CD3	Laboratory experiments/teaching aids	CO3,
CD4	Industrial/guest lectures	CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	1			Each	T-2,	CO1,	Details of	Compuertise	

				student shall submit three proposals for the project	R-1	CO2	proposal to be formulated by students	d formats	
2 -4	2 -4			Developme nt of research methodolog y	T-2, R-1	CO1, CO2	Details of methodolog y to be formulated by students	Compuertise d formats	
5	5			Internal evaluation of progress					
6-9	6-9			Data collection and analysis	T-2, R-1	CO1, CO2	Details of data collection and analysis to be prepared by students	Compuertise d formats	
10-13	10-13			Final analysis and report writing	T-1,2, R-1,2	CO1, CO2, CO3	Detailed report prepared at the end	Compuertise d formats and hard copy report	
14				Internal evaluation of progress					

SEMESTER X

COURSE INFORMATION SHEET

Course code:	**AR 551**
Course title:	**PROFESSIONAL PRACTICE & TENDERING PROCESS**
Pre-requisite(s):	Should have registered for AR 351 Specification, Estimation & Costing
Co- requisite(s):	None
Credits: 3	**L: 3 T: 0 P: 0**
Class schedule per week:	**03**
Class:	**B. Arch**
Semester / Level:	**X**
Branch:	**Architecture**
Name of Teacher:	**Dr. D.J. Biswas**

Course Objectives

This course enables the students:

A	To introduce various aspects of architectural practice, along with scope of services to be provided and project responsibilities during design and construction, which will include professional ethics and social responsibilities of an architect
B.	To understand a know-how about the establishment and management of a private architectural office and familiarize with project and office management aspects
C.	To inform about the different types of tenders and contracts, its merits and demerits, tendering process and suitability w.r.t different types of architectural projects. Also to expose on the significance, purpose and types of architectural competitions.

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand the various aspects of Professional Practice and intricacies of execution of a project
2.	Exposure to the entire Tendering procedures for construction field
3	Exposure to the merits and demerits of different options available for an architect to enter into the profession
4	Understand the basic requirements of taking part in Architectural competitions,and also to organize such competitions.

Syllabus

Module 1: Architectural Profession in India and abroad:
Architectural profession as compared to other professions, its overall acceptability in society, Professional Ethics, Social Responsibility.
Salaried employment in India, Private, Public & Govt. Sectors.
Private Practice in India at individual capacity and partnership, along with different aspects of office management & various taxation systems, like professional tax, GST etc.

Module 2: Role of Professional body in Architectural field:
Necessity and role of such Professional body in India and abroad. In case of India, the working system, constitution and bye laws, categories of membership, election procedures, Role of its conventions, its publications, etc. Architects approach to works; various ways of getting works; types of works, Code of conduct, works partly executed by other architect; conditions of engagement of

architect by client. Architects relation with other parties connected with works such as client, contractor, suppliers, consultants / vendors, municipal and public authorities. Approval of drawings from various authorities.

Module 3: Architects act 1972 and role of Council of Architecture, India:

Detailed study of the act, its provisions and recent amendments, Role and responsibilities of Council of Architecture, selection process and role of its members, procedure of registration.
Preparation of Design Brief, Scope of work, Architects (Professional Conduct) Regulations, Minimum Standard of Architectural Education, Architects' Professional Responsibility and Liability; Professional Negligence; Copy rights; Scale of charges; Mode of payment; Schedule of payment; Termination of services; Specialized building services.

Module 4: Tendering process for construction works:

Notice Inviting Tender, various types of Tender such as Item rate, Lump-sum, etc. along their merits and demerits. Prequalification in Tendering process, Selection of Tender, Preparation of tender documents, method of writing tenders, opening of tenders. Tender evaluation process, Contracts; General principles of Indian contract Act; General conditions of contract, Special condition of contract.
Various certificates issued by the Architect, EMD, security deposits, defect liability periods, retention amount, mobilization money, Indemnification, etc.

Module 5: Architectural Competitions & various rules, regulations, codes related to the field:

Architectural Competitions: Its purpose, types, eligibility and guidelines for participation, prizes, assessment, etc.
Rules and Regulations: Various rules, regulations and acts related to construction, environmental clearance and subsequent approval of respective authorities. Definition of worker and PF rules for engagement of worker at site, workmen's compensation Act about the affected persons and properties. Land acquisition Acts; Consumer protection Act and related acts on Architects.
Arbitration: Necessity of Arbitration in India, Selection, Powers and duties of arbitrators, umpire, award etc.
Easement: Definition; various types of easements; document and servant owners; essential conditions for enjoyment of easement.

Reference books:

1. Dr. Roshan Namavati: Professional practice.
2. Indian Institute of Architects: Code of Professional Practice.
3. Architect Act 1972.
4. Council of Architecture, India: Handbook of Professional Documents.

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	CO1	CO2	CO3	CO4
Mid Sem Examination Marks	√	√	√	√
End Sem Examination Marks	√	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√	√
Assignment	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	L		L	L	M	H	H	M	M	H	M
2	L	M	L			L	L	M	M	H	H	L
3	L			L	L	M	M	M	H	L	L	L
4	H	H	M	M	L		H		H	M	M	

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2, CD3
CD2	Tutorials/Assignments		CO2	CD1, CD3, CD6
CD3	Seminars		CO3	CD2, CD3
CD4	Mini projects/Projects		CO4	CD2, CD4, CD6
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

Lecture wise Lesson planning Details

Wk. No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any

1	1			Architectural profession, its overall acceptability in society	R1	CO1, CO3		Chalk boards/LCD projectors	
1	2,3			Professional Ethics, Social Responsibility	-do-	-do-		-do-	
2	4			Salaried employment in India, Private, Public & Govt. Sectors	-do-	-do-		-do-	
2	5,6			Private Practice in India at individual capacity and partnership	-do-	-do-		-do-	
3	7			Selection criteria of office to map with individual aspiration	-do-	-do-		-do-	
3	8,9			Office management along with various tax mechanism	-do-	-do-		-do-	
4	10			Necessity and role of Professional body in Architectural profession	R1, R3	CO1,CO3		-do-	
4	11,12			Working system, constitution and bye laws of such bodies	-do-	-do-		-do-	
5	13			Code of conduct, conditions of engagement of architect by client	-do-	-do-		-do-	
5	14,15			Categories of membership, election procedures, Role of its conventions, publications, etc.	-do-	-do-		-do-	
6	16			Architects relation with	-do-	-do-		-do-	

				other parties connected with works					
6	17,18			Architects act 1972, Detailed study, its provisions	R1, R3	CO1, CO2,		-do-	
7	19			Role & responsibility of Council of Architecture, India	-do-	-do-		-do-	
7	20,21			Architects (Professional Conduct) Regulations, Minimum Standard of Architectural Education,	-do-	-do-		-do-	
8	22			Architects' Professional Responsibility and Liability;	-do-	-do-		-do-	
8	23,24			Scale of charges; Mode of payment; Schedule of payment	-do-	-do-		-do-	
9	25			Notice Inviting Tender, various types of Tenders for construction works	R1, R4	CO1, CO2		-do-	
9	26,27			-do-	-do-	-do-		-do-	
10	28			Prequalification in Tendering process, Selection of Tender, Preparation of tender documents	-do-	-do-		-do-	
10	29,30			-do-	-do-	-do-		-do-	
11	31			Tender evaluation process, General conditions of contract	-do-	-do-		-do-	
11	32,33			EMD, security deposits, defect liability periods, retention amount, etc					
12	34			Architectural	R4	CO4		-do-	

				Competitions: Its purpose, types, eligibility, etc					
12	35,36			Various rules, regulations and acts related to construction, environmental clearance and other approval	-do-	-do-		-do-	
13	37			Definition of worker and PF rules for engagement of worker	-do-	-do-		-do-	
13	38,39			Necessity of Arbitration, Selection, Powers and duties of arbitrators, umpire, award etc.	-do-	-do-		-do-	
14	40			Various types of easements; document and essential conditions for enjoyment of easement.	-do-	-do-		-do-	

COURSE INFORMATION SHEET

Course code: AR 552
Course title: CONSTRUCTION PROJECT MANAGEMENT
Pre-requisite(s): None
Co- requisite(s): None
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: B. Arch
Semester / Level: X
Branch: Architecture
Name of Teacher: Rajan Chandra Sinha

Course Objectives

This course enables the students:

A.	To develop a bar chart for construction project of medium scale
B.	To analyze the recourse allocation and cost requirement from bar chart
C.	To apply the network theory to assess the critical path for a project
D.	To compare the financial feasibility of various project options
E.	To evaluate the optimum cost-time relation of a small-scale project
F.	To explain and adopt the concept of different project monitoring technique

Course Outcomes

After the completion of this course, students will be able to :

1.	**Enumerate** the attributes of a project, phases in project cycle, stakeholders involved and their management.
2.	**Describe** the time, cost, quality, safety and contract management processes involved in a construction project.
3.	**Prepare** project schedule through identification of critical tasks and path in a project.

Syllabus

Module 1: Introduction and various stages of Construction Management
Introduction to Management Principles. Introduction and objective of Construction Management. Types of construction Projects. Responsibilities of Project Manager. Life cycle of Project and various stages of Construction Management.

Module 2: Bar Chart & Milestone chart
Introduction to Construction Planning & Scheduling techniques. Traditional techniques: concept of Bar Charts and Milestone charts. Cost & Resource Scheduling through Bar Chart Examples. Merits and demerits of Bar Chart.

Module 3: Network Theory (CPM & PERT)
Introduction of Network Theory. Definitions and different types of: Event, activity, dummy, Network rules, Network event numbering (Fulkerson Rule), Hierarchies of complex network, Examples. CPM. Different element of CPM network with examples, Floats, Numerical Problems. Introduction of Project management software.
Introduction to PERT, Conceptual difference between PERT and CPM, Time Estimates, Event times, Slack, Time Computations with normal probability theory. Numerical Problems.

Module 4: Project Feasibility & Monitoring Technique

Project alternative selection technique, Time value of money, Investment Criteria: Pay Back Period, IRR NPV, Benefit Cost Ratio, and Break-Even Analysis.
Project Monitoring Technique: Work Breakdown Structure, Progress Curve Method, Line of Balance.

Module 5: Cost & Resource Optimization Techniques
Cost Model: Direct & Indirect Cost component of Project, Cost Slope. Project Cost-Time analysis and optimization. Resource Usage Profile, Histograms. Resource allocation, smoothing & levelling Techniques. Project Updating

Text books:
1. Dr. B. C. Punmiya and K. K. Khandelwal – *Project Planning and Control with PERT\CPM*
2. S. P. Mukhopadhaya; "*Project Management for Architect and Civil engineers"*
3. Peurifoy&Schexnayder; "*Construction Planning, Equipment, and Methods"*
4 D.Upadhayay; "*Construction Management"*

Reference books:
Nil

Gaps in the syllabus (to meet Industry/Profession requirements): Nil

POs met through Gaps in the Syllabus :NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Tutorials/Assignments
CD3	Seminars
CD4	Industrial/guest lectures
CD5	Self- learning such as use of NPTEL materials and internets

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (02 nos. of 10 marks each)	20
Assignment / Quiz (s)	05

Assessment Compoents	**CO1**	**CO2**	**CO3**
Mid Sem Examination Marks	√	√	√
End Sem Examination Marks	√	√	√
Quiz (02 nos. of 10 marks each)	√	√	√
Assignment	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	L	L	-	M	M	M	M	L	H	H	H	H
2	H	M	L	M	M	L	M	M	H	H	H	H
3	L	M	-	M	M	M	M	L	L	L	H	H

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1, CO2, CO3
CD2	Tutorials/Assignments	CO2, CO3
CD3	Seminars	CO1, CO2
CD4	Industrial/guest lectures	CO1, CO3
CD5	Self- learning such as use of NPTEL materials and internets	CO1, CO2, CO3

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1	L1			Introduction to Management Principles	T2, T4	CO1		Lecture by use of boards/LCD projectors/OHP projectors	
1	L2			Introduction and objective of Construction Management	T2, T4	CO1		Lecture by use of boards/LCD projectors/OHP projectors	
1	L3			Introduction and objective of Construction Management	T2, T4	CO1		Lecture by use of boards/LCD projectors/OHP projectors	
2	L4			Types of construction Projects.	T1, T2, T4	CO1		Lecture by use of boards/LCD projectors/OHP projectors Tutorials/As	

								signments	
2	L5			Types of construction Projects.	T1, T2, T4	CO1		Lecture by use of boards/LCD projectors/OHP projectors	
2	L6			Responsibilities of Project Manager.	T1, T2, T4	CO1		Lecture by use of boards/LCD projectors/OHP projectors	
3	L7			Life cycle of Project	T1, T2, T3, T4	CO1		Lecture by use of boards/LCD projectors/OHP projectors Tutorials/Assignments	
3	L8			Various stages of Construction Management	T1, T2, T3, T4	CO1		Lecture by use of boards/LCD projectors/OHP projectors Tutorials/Assignments	
3	L9			Introduction to Construction Planning & Scheduling techniques	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Seminars	
4	L10			Traditional techniques: concept of Bar Charts and Milestone charts	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Seminars	
4	L11			Cost & Resource Scheduling through Bar Chart Examples. Merits and demerits of Bar Chart.	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Seminars	
4	L12			Introduction of Network Theory	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP	

								projectors	
5	L13			Introduction of Network Theory	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
5	L14			Hierarchies of complex network, Examples	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Self-learning such as use of NPTEL materials and internets	
5	L15			Hierarchies of complex network, Examples	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Self-learning such as use of NPTEL materials and internets	
6	L16			Different element of CPM network with examples, Floats	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Self-learning such as use of NPTEL materials and internets	
6	L17			Different element of CPM network with examples, Floats	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
6	L18			Numerical Problems	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	

7	L19			Numerical Problems	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
7	L20			Introduction of Project management software.	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
7	L21			Introduction of Project management software.	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
8	L22			Introduction to PERT, Conceptual difference between PERT and CPM	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
8	L23			Time Estimates, Event times, Slack, Time Computations with normal probability theory	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
8	L24			Time Estimates, Event times, Slack, Time Computations with normal probability theory	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Self-learning such as use of NPTEL materials and internets	
9	L25			Time Estimates, Event times, Slack, Time Computations with normal probability theory	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors Self-learning such as use of NPTEL materials and internets	
9	L26			Numerical Problems	T1,	CO1, CO2,		Lecture by	

					T2, T3, T4	CO3		use of boards/LCD projectors/OHP projectors	
9	L27			Numerical Problems	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
10	L28			Numerical Problems	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
10	L29			Project alternative selection technique	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
10	L30			Time value of money	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
11	L31			Investment Criteria: Pay Back Period, IRR NPV, Benefit Cost Ratio, and Break-Even Analysis.	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
11	L32			Investment Criteria: Pay Back Period, IRR NPV, Benefit Cost Ratio, and Break-Even Analysis.	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
11	L33			Investment Criteria: Pay Back Period, IRR NPV, Benefit Cost Ratio, and Break-Even Analysis.	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
12	L34			Numerical Problems	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
12	L35			Numerical Problems	T1, T2,	CO1, CO2, CO3		Lecture by use of	

					T3, T4			boards/LCD projectors/OHP projectors	
12	L36			Project Monitoring Technique: Work Breakdown Structure, Progress Curve Method, Line of Balance	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
13	L37			Project Monitoring Technique: Work Breakdown Structure, Progress Curve Method, Line of Balance	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
13	L38			Cost Model: Direct & Indirect Cost component of Project, Cost Slope.	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
13	L39			Project Cost-Time analysis and optimization.	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
14	L40			Resource Usage Profile, Histograms.	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
14	L41			Resource allocation, smoothing & levelling Techniques. Project Updating	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors	
14	L42			Resource allocation, smoothing & levelling Techniques. Project Updating	T1, T2, T3, T4	CO1, CO2, CO3		Lecture by use of boards/LCD projectors/OHP projectors - Board	

COURSE INFORMATION SHEET

Course code: AR 561
Course title: ARCHITECTURAL DESIGN THESIS/ PROJECT
Pre-requisite(s): Should have cleared all sessional subjects up to VIII Semester
Co- requisite(s): Nil
Credits: 18 L: 0 T: 0 P: 12
Class schedule per week: 12
Class: B. Arch
Semester / Level: X
Branch: Architecture
Name of Teacher: Dr. Satyaki Sarkar

Course Objectives

This course enables the students:

A	To apply scientific methods / tools and techniques for conducting post – occupancy evaluation of buildings / built complexes / built-environment [case studies] and drawing inferences for application as design guidelines
B.	To develop concepts of architectural design at various scales
C.	To apply all theory and principles learned as well as skills acquired in the previous semesters in a design project for academic as well as professional evaluation to indicate readiness for professional induction
D	To apply techniques for Thesis / Dissertation / Project Report writing

Course Outcomes

After the completion of this course, students will be able to:

1.	To demonstrate design capabilities in approaching complex design at various scales;
2	To design live projects taking local parameters and issues into consideration, adding contemporary layer to urban aesthetics
3	To apply knowledge of services, working drawing and special attributes in a complete design of their own.
4	To comprehend the entire solution in the form of a report and present the same through appropriate medium.

Syllabus

Activities:
Students have to submit and present their work for this project in following stages:
In continuation to the Thesis project presentations made in Stage I, as part of the subject **Introduction to Thesis Project & Research Methodology**, the next stages will follow:

Stage II:
Site Analysis, Case Studies and Project Requirements

- 'Detailed site analysis', which will reflect complete physical and environmental characteristics of the project site as detailed in 'Guidelines for sequence of Project presentation'
- Case Studies [minimum 2] and literature case study [minimum 1] in the form of post-occupancy evaluation to draw drawing inferences for application as design guidelines
- 'Project requirements', which should have complete requirement of the project under the scope, in terms of facilities and area (as detailed) in the guidelines, with reference to the case studies made earlier

Stage III:
Concept Design
This stage will have the following:-

- Basic concept/principal ideas leading to the design
- Site Plan, Zoning of activity spaces, movement pattern and building blocks/ envelopes
- Schematic floor plans of all the buildings under the scope of the project
- Conceptual built form, in terms of elevations, sections, views, study models etc.

Stage IV:
Design Development
This stage will have detail design of the projects, which will comprise the following drawings in suitable scale:

- Site plan
- Building plans of all the building units and all floors.
- 'Furniture layout' of typical areas.
- Elevations and sections of all building units.
- Working Drawings (min 2 nos) and services drawing (min 2 nos) in a scale of 1:50 or 1:100
- Study model
- Perspective/view of interior
- Walk through (optional)

Stage V:
Finalization of Project drawings

- Students have to produce all the drawings of the previous review along with the corrected drawings based on the comments of that review for final approval on the design
- Stage VI:

Project Synopsis

- Students have to submit a Thesis synopsis in the form of a report (3 copies) comprising the salient points /features of their project

Stage VII:
Thesis report

- Students have to submit Thesis report (3 copies) comprising write ups, case studies and drawings in the specified format as stated in guidelines

Stage VIII:
Final presentation to external jury

- Final design, comprising project introductions, case study/literature study, site analysis and the final proposal and model, is to be put up and presented to a panel of jury members comprising external experts

Text books: NA

Reference books:

1. Linda Groat and David Wang, Architectural Research Methods, John Wiley and Sons
2. Turabian, Kate L. A Manual for Writers of Research Papers, Theses, and Dissertations: Chicago Style for Students and Researchers

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

	Course Delivery methods
CD1	Seminars
CD2	Mini projects/Projects
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation	50
End Sem Evaluation	50

Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**
Progressive Evaluation	√	√	√	√
End Sem Evaluation	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	**Program Outcomes**											
	a	b	c	d	e	f	g	h	i	j	k	l
1	H	H	H	H	H	M	M	L	L			
2	H	H	H	H	H	M	M	L				
3	H	H	H	H	H	M	M	L				
4	H	H	H	H				L	H	H	M	L

Mapping Between COs and Course Delivery (CD) methods		
CD	**Course Delivery methods**	**Course Outcome**
CD1	Seminars	CO1, CO2, CO3,
CD2	Mini projects/Projects	CO2, CO3,
CD3	Laboratory experiments/teaching aids	CO3, CO4
CD4	Industrial/guest lectures	CO2, CO3, CO4

Lecture wise Lesson planning Details.

Week No.	Lect. No.	Tentative Date	Ch. No.	Topics to be covered	Text Book / References	COs mapped	Actual Content covered	Methodology used	Remarks by faculty if any
1-2	1-17			Case study & Literature study	R-1	CO1	Case study & Literature study	Compuertised drawing tool	
2	18			Internal evaluation					
3-6	19-53			Concept design		CO1, CO2	Basic layout preparation	Compuertised drawing tool	
6	54			Internal evaluation					
7-10	55-89			Design Development		CO1, CO2	Building design, site plan and detailing	Compuertised drawing tool	
10	90			Internal evaluation					
11-12	91-107			Finalisation of project drawings		CO2,CO3	Elevation, section, view preparation	Compuertised drawing tool	
12	108			Internal evaluation					
13-14	109-126			Preparation of synopsis and project report	R-2	CO4	Detailed report proparation	Compuertised tool	