



**BIRLA INSTITUTE OF
TECHNOLOGY MESRA RANCHI,
INDIA**

CHOICE BASED CURRICULUM

(As per CBCS & OBE)

**FOR
BACHELOR
IN
ARCHITECTURE**

**DEPARTMENT OF ARCHITECTURE
& PLANNING**

*Effective from academic year 2018 -19 onwards (including revisions of 2022
& 2025)*



Department of Architecture & Planning
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 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, inter-disciplinary and rigorous curriculum that will promote personal development and professional excellence. The Department is committed in:

- Imparting strong fundamental concepts to students and motivating 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 (PEO)

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, clients and other professionals.

Program Outcomes (PO)

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 their analysis
- c) Be able to design components of the built environment by applying relevant building byelaws and regulations.
- d) Be proficient in arriving at innovative solutions 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 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 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.

SYLLABUS STRUCTURE B.ARCH

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							
MA 104	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 201/ 202/ 203/ 204	NCC/ NSS/ CA/GAMES	0	0	2	1	2	MC
TOTAL CREDIT					27		
Total Contact hours						30	

FIRST YEAR [II SEMESTER]							
Subject Code	Subject	L (Period s/ week)	T (Periods/ week)	P (Period s/ 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
NON-DEPARTMENTAL THEORY SUBJECTS							
CE 24101	Environmental Science	2	0	0	2	2	FS
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 164	Architectural Rendering Techniques	0	0	4	2	4	PC
NON-DEPARTMENTAL SESSIONAL SUBJECT							
MT132	Communication Skill I	0	0	0	1.5	4	MC
MANDATORY COURSE							
MC 201/ 202/ 203/ 204	NCC/ NSS/ CA/GAMES	0	0	2	1	2	MC
TOTAL CREDIT					30.5		
Total Contact hours						31	

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 Lab	0	0	4	2	4	Other Dept L/S
MANDATORY COURSE							
MC 201/ 202/203/ 204	NCC/ NSS/ CA/GAMES	0	0	2	1	2	MC
TOTAL CREDIT					30		
Total Contact hours						28	

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	PC
NON-DEPARTMENTAL THEORY SUBJECTS							
CE 308	Structural Design II	4	0	0	4	4	CEE
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
NON-DEPARTMENTAL SESSIONAL SUBJECTS							
MT132	Communication Skill I	0	0	0	1.5	4	MC
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 361	Architectural Design - VI and Academic Field Trip	0	0	9	13.5	9	PC
AR 362	Working Drawing II	0	0	4	2	4	PC
TOTAL CREDIT					30		
Total Contact hours						30	

FOURTH YEAR [VII SEMESTER]							
Subject Code	Subject	L (Period s/ week)	T (Periods/ week)	P (Period s/ week)	Credit	Contact Hrs.	Category of Course
PROGRAM CORE - THEORY SUBJECTS							
AR 401	Housing and Settlement System	3	0	0	3	3	PC
AR 402	Structural Design and Systems	3	0	0	3	3	PC
AR 403	Energy Efficient Architecture	3	0	0	3	3	PC
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 ELECTIVES	3	0	0	3	3	OE
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 411	Architectural Design - VII	0	0	9	13.5	9	PC
AR 412	Interior Design	0	0	4	2	4	PC
TOTAL CREDIT					30.5		
Contact hours						28	

FOURTH YEART [VIII SEMESTER] [Architectural Apprenticeship/ Internship]							
Subject Code	Subject	L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	Credit	Contact Hrs.	Category of Course
PROGRAM CORE - 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 (Period s/ week)	T (Period s/ week)	P (Period s/ week)	Credit	Contact Hrs.	Category of Course
PROGRAM CORE - THEORY SUBJECTS							
AR 501	Urban Design	3	0	0	3	3	PC
AR 502	Human Settlements Planning	3	0	0	3	3	PC
DEPARTMENTAL/ PROGRAM ELECTIVES- Theory (02 offered; anyone)							
AR 503	Theory of Design	3	0	0	3	3	PE
AR 605	Urban Ecology and Environmental Planning (PG Subject)						
OPEN ELECTIVES/ MOOC COURSES							
	OPEN ELECTIVE/ MOOC COURSES	0	0	0	2	0	OE
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 511	Architectural Design - VIII	0	0	12	18	12	PC
AR 512	Introduction to Thesis Project & Research Methodology (Dissertation)	0	0	4	2	4	PC
TOTAL CREDIT					31		
Total Contact hours						25	
Note: 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	PC
AR 552	Construction Project Management	3	0	0	3	3	PC
OPEN ELECTIVES/ MOOC COURSES							
	OPEN ELECTIVES/ MOOC COURSES	0	0	0	2	0	OE
PROGRAM CORE - SESSIONAL SUBJECTS							
AR 561	Architectural Design Thesis/ Project	0	0	12	18	12	PC
TOTAL CREDIT					26		
Total Contact Hours						18	
Total credit - 277							

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:	3		
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 able:

1.	Define the domain and variety of the functions of an architect.
2.	Analyze the design elements and 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 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 architect 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 biomimicry).

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)

Textbooks:

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.

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

Mapping between Objectives and Outcomes

Mapping 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

COURSE INFORMATION SHEET

Course code:	AR 102		
Course title:	PRIMARY BUILDING MATERIAL		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	3	L: 3	T:0 P:0
Class schedule per week:	3		
Class:	B. Arch		
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 able:

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 buildings. 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 cement used in construction. OPC, PPC, PSC Storage of cement in site.

Sources of Sand, Classification, Test of Sand. Grades of sand and their uses

Module 4. Morter 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 and use.

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.

Reference books:

1. B. C. Punmia; *Building Materials and Construction*.
2. Bindra & Arora; *Building Materials and Construction*.
3. Rangwala; *Engineering Materials*
4. W.B. McKay, 'Building Construction', Vol. 1,2,3 Longmans, U.K. 1981.
5. Khanna; *Civil Engineer's Handbook*
6. Sushil-Kumar, T. B. (2003). *Building Construction*. 19th Ed. Delhi: Standard Publishers.

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
Lectures by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
guest lectures

Mapping between Objectives and Outcomes

Mapping 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

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:	3		
Class:	B. Arch		
Semester / Level:	I		
Branch:	Architecture		
Name of Teacher:	Ritu Agrawal		

Course Objectives: Knowledge about Indian culture, building art and construction techniques helps an architecture student to develop designs that are rooted in this country. Appreciation of our heritage buildings should lead to the understanding that architecture is the product of a particular culture, time and place.

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

- Indus Valley Civilization- the various towns, town planning principles, house construction, 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, Bhattargaoon 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 Sayyid/Lodhi dynasties.
- Provincial Styles of Sultanate Period – Punjab, Bengal, Jaunpur, Gujarat, Malwa, Bijapur and 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 – Rashtrapathi Bhavan & 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.

References:

1. Asher Catherine, *Architecture of Mughal India*.
2. Brown, P. *Indian Architecture (Buddhist Hindu)* Vol. 1: Taraporevala and Sons, Bombay 1983 & subsequent publications.
3. Brown Percy, *Indian Architecture (Islamic Period) Vol II*; Taraporevala and Sons, Bombay, 1983; and subsequent publications.
4. Fergusson, J.A. *A history of Indian and Eastern Architecture*, London 1876, revised 1891.
5. Grover, S. *The Architecture of India, Buddhist & Hindu*, Sahibabad, 1980.
6. Grover, S. *The Architecture of India (Islamic)* , Sahibabad, 1980.

7. Hardy, A., "Indian Temple Architecture: Form and Transformation", Abhinav Publication, 1995
8. Hillenbrand, Robert, *Islamic Architecture, Form, Function and Meaning*, Edinburgh University Press, 1994.
9. Michell, George; *The Hindu Temple*, London.
10. Michell, George; *Architecture of the Islamic World — (its history and social meaning)*, Thames and Hudson, London, 1978.
11. Sterlin Henry, *Architecture of World, India*, Germany, ISBN-38228-9658-6.
12. Sterlin Henry, *Architecture of World, India (Islamic)*, Germany ISBN- 38228-9658-6.
13. Tadgell Christopher, *The History of Architecture in India*, London 1990.
14. 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

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

COURSE INFORMATION SHEET

Course code:	MA 104		
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:	3		
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.

Textbooks

1. M.D. Weir, J. Hass and F. R. Giordano: Thomas' Calculus, 12th edition, Pearson Educations, 2008.
2. E. Kreyszig, Advanced Engineering Mathematics, Wiley International, 9th edition, 2006.
3. 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
Lectures 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

Mapping between Objectives and Outcomes

Mapping 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

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:	6		
Class:	B. Arch		
Semester / Level:	I		
Branch:	Architecture		
Name of Teacher:	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 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 judgements 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.	To apply 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, 02 sheets
appreciation of design criteria.
Critically appraise and Design of an object in everyday use like Table, Chair, Stool, Drawing Board, T-Scale, etc.
2. Exercises in Points & Lines. 02 sheets
Expressing a given theme in a geometric pattern.
3. Family of shapes - developing various shapes from a given geometric shape 03 sheets
– Working out composition with such developed shapes;
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 centre of interest in design using different textural elements.
Development of geometric patterns 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, 02 sheets
harmony, balance and relative proportions; the inherent visual properties of any physical object or enclosure.
Visualize techniques of graphic expression to present 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.

Recommended 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. George A Covington & 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, New York, 1977.
 10. Neufert's *Architect's Data*.
 11. 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.
 12. Von Meiss Pierree; *Elements of Architecture*.
 13. Francis D K Ching, *A Visual Dictionary of Architecture*, John Wiley & Sons, Inc.
 14. R.W Gill, *Manual of Rendering with Pen and Ink* (The Thames and Hudson Manuals), W. W. Norton & Co Inc.
 15. 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

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	-	-	-	-	-	-

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:	6		
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 students' 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 relationships 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

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

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

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:	4		
Class:	B. Arch		
Semester / Level:	I		
Branch:	Architecture		
Name of Teacher:	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 & Mortice 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 cardboard, 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

Textbooks:

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

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	-	-	-	-	-	-

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:	3		
Class:	B. Arch		
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 analyze 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 able to:

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:

Indian Patent Stone 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, plasticizers, 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, Polymers and Miscellaneous Materials:

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; Water Proofing materials; Heat and sound insulative materials, their trade name and uses.

Text Books:

1. B. C. Punmia; Building Materials and Construction. Laxmi Publications Pvt Ltd, New Delhi, 1993
2. Bindra & Arora; Building Materials and Construction.
3. W.B. McKay, 'Building Construction', Vol. 1,2,3 Longmans, U.K. 1981.
4. Arthur Lyons; Materials for Architects and Builders- An Introduction; Arnold, London 1997
5. Khanna: Civil Engineer's Handbook
6. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi: Standard Publishers.

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												

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

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:	3		
Class:	B. Arch		
Semester / Level:	II		
Branch:	Architecture		
Name of Teacher:	Apurv Ashish		

Course Objectives

Grossly divided, architecture of the World is 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 of Mesopotamian Architecture: 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 of Egyptian Architecture: 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 -
 - Early Greek Period (Minoan Period)- Barrow Tombs, Minoan Palace at Knossos, Crete and Lion Gate, Mycenae.
 - 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, Thermae of 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

- 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

Recommended Books:

1. Sir Banister Fletcher, A History of Architecture, University of London, the Antholone Press, 1986.
2. Kenneth Frampton, Modern Architecture: A Critical History; Thames and Hudson, London, 1994.
3. S. Lloyd and H.W. Muller, History of World Architecture – Series, Faber and Faber Ltd. London, 1986.
4. Watkin, D., “A History of Western Architecture”, Thames and Hudson. 1986.
5. Moffet, M., Fazio, M. and Wodehouse, L., “A World History of Architecture”, McGraw-Hill. 2008.

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

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

COURSE INFORMATION SHEET

Course code:	AR 153		
Course title:	STATICS AND STRENGTH OF MATERIALS		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	3	L: 3	T:0 P:0
Class schedule per week:	3		
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.

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.

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.

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.

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.

Textbooks:

1. J. L. Meriam and L. G. Kraige, Engineering Mechanics: Statics, John Wiley & Sons,
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,
2. I.B. Prasad, A textbook of Applied Mechanics: Dynamics and Statics, Khanna Publishers
3. S. Ramamurtham, Strength of Materials, Dhanpat Rai Publications
4. S. S. Rattan, Strength of Materials, Tata McGraw-Hill Publishers.

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

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: NA

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

Mapping between Objectives and Outcomes

Mapping 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		

COURSE INFORMATION SHEET

Course code:	CE 24101		
Course title:	ENVIRONMENTAL SCIENCE		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	2	L: 0	T:0 P:2
Class schedule per week:	2		
Class:	B. Arch		
Semester / Level:	II		
Branch:	Architecture		
Name of Teacher:			

Note: the course is offered by Department of Civil and Environmental Engineering and syllabus under CE 24101 to be followed.

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:	6		
Class:	B. Arch		
Semester / Level:	II		
Branch:	Architecture		
Name of Teacher:	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. Principal 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, New York, 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 Meiss Pierree; 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

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		

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:	4		
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.

SHALLOW FOUNDATION:

Types, Isolated, combined and raft foundations and their construction techniques.

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 based on 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.

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.

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.

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

Textbooks:

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:

Course Delivery methods
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Mini projects/Projects
Laboratory experiments/teaching aids

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

COURSE INFORMATION SHEET

Course code:	AR 164		
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:	4		
Class:	B. Arch		
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 able:

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

Syllabus

Module 1: Techniques for rendering various materials/textures

Brickwork, stone, plastering, timber, tiles, flooring types, flooring 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.

NB: All the above rendering techniques will be done with pencil, pen & ink on opaque paper using variant line (hatch) technique and dot rendering.

Module 2: Techniques for rendering an architectural plan

Rendering of trees, shrubs, hedges in a plan

Rendering of different earths capes (natural and man-made) in a plan.

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 inter-mixing.

Module 3: Techniques of rendering architectural elevation:

Human figures- proportions and styles

Landscaping- Trees, plants, hedges used in elevations

Different hard landscape materials (street furniture, automobiles)

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 inter-mixing.

Module 4: Techniques of rendering perspective views.

Perspective human figures; Trees and plants; Rendering of perspective views- indoor and outdoor. (One point and Two Point)

Concept of Computer Aided rendering techniques.

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 inter-mixing.

Textbooks:

1. Sherley W, MORGAN; Architectural Drawing, Mc Graw Hill
2. Arthur L. Guphill, Watson ; Rendering in Pen and Ink,– Guphill 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.

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												
Lecture by use of boards/LCD projectors/OHP projectors												
Tutorials/Assignments												
Mini projects/Projects												
Laboratory experiments/teaching aids												

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

COURSE INFORMATION SHEET

Course code:	MT 132		
Course title:	COMMUNICATION SKILL		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	1.5	L: 0	T:0 P-4
Class schedule per week:	4		
Class:	B. Arch		
Semester / Level:	II		
Branch:	Architecture		
Name of Teacher:			

Note: the course is offered by Department of Humanities and Social Science and syllabus under MT 132 to be followed.

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:	3		
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, Sun path 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 climates

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- Housing Climate & Comfort – Architectural Press, London, 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												
Self- learning such as use of NPTEL materials and internets												

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				

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:	3		
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.

Textbooks:

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. 1,2,3 longmans, 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												
Lecture by use of boards/LCD projectors/OHP projectors												
Seminars												
Mini projects/Projects												
Industrial/guest lectures												
Industrial visits/in-plant training												

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

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:	3		
Class:	B. Arch		
Semester / Level:	II		
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.	Build their 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, Auguste Perret.

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 Prairie 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)- Zaha Hadid, Norman Foster, Frank O. Gehry, I. M. Pei, Rem Koolhaas.

Module 5: Indian Architecture since Independence

B. V. Doshi, Charles Correa, Raj Rewal, A. P. Kanvinde and Laurie Baker

Recommended Books:

1. Sigfried Giedion ; 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.
5. Library of Contemporary Architects.
6. The Phaidon Atlas of Contemporary Architecture, Phaidon Press 2004
7. Gossel. P., “Architecture in the 20th Century”, Vol.1 & 2, Taschen. 2005
8. Ballard B. and Rank, V.P., “Materials for Architectural Design”, Laurance King. 2006

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												

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

COURSE INFORMATION SHEET

Course code:	AR 204		
Course title:	STRUCTURAL MECHANICS		
Pre-requisite(s):	ME XXX Statics and Strength of Materials		
Co- requisite(s):	None		
Credits:	3	L: 3	T:0 P:0
Class schedule per week:	3		
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.

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

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.

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.

Module 5: Columns

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

Textbooks:

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

Reference books:

1. S. Ramamurtham, Strength of Materials, Dhanpat Rai Publications
2. S. S. Rattan, Strength of Materials, Tata McGraw-Hill Publishers.
3. G. H. Ryder, Strength of Materials, Macmillan Publishers India Limited

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

POs met through Gaps in the Syllabus: NA

Topics beyond syllabus/Advanced topics/Design: NA

POs met through Topics beyond syllabus/Advanced topics/Desi

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

Mapping between Objectives and Outcomes

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		

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:9
Class schedule per week:	6		
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

8 hrs.

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

Viva voce

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

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/OHP projectors												
Tutorials/Assignments												
Seminars												
Projects												
Laboratory experiments/teaching aids												
Industrial/guest lectures												
Site visit												

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	

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:	4		
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 staircases
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 rainwater and provision for natural lighting and ventilation.

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.,

ROOFING:

Types of roofs, 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

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.

STAIRCASE

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

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

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												

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

COURSE INFORMATION SHEET

Course code:	AR 214		
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:	4		
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 explore innovative forms and geometry.
2.	Develop the concepts to produce 2D Architectural drawings.
3.	Apply the concepts in Architectural Design, Working Drawing and Landscape Design
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 3-D operation: Union, Subtraction and Intersection; 3-D operation: Rotate, Mirror and Array; - Material Attachment and Rendering. - 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

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.

Reference books:

1. AutoCAD Manual
2. AutoCAD Command Reference

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
Industrial visits/in-plant training

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

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:	3		
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 pipe etc), 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: Sewerage System

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 Swaffield 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												

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

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:	3		
Class:	B. Arch		
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 able:

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, overhead 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 their applications

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.
5. 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
guest lectures

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

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:	3		
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.

Syllabus

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:

The interconnection of areas, nodes, circulation, passive and active recreation spaces, and aesthetics in Residential parks, and Tot lots.

Recommended 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, Theodore D; Planting Design.
6. Bose, T.K. and Chowdhury, B., “Tropical Garden Plants in Colour”, Allied Publishers.
7. Black & Decker, “Landscape Design & Construction”, Creative Publishing International.
8. Thompson, W. and Sorvig, K., “Sustainable Landscape Construction: A Guide to Green”, Island Press.

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
Seminars
Mini projects/Projects
Laboratory experiments/teaching aids
Industrial/guest lectures
Self- learning such as use of NPTEL materials and internet

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

COURSE INFORMATION SHEET

Course code:	AR 261		
Course title:	ARCHITECTURAL DESIGN IV & ACADEMIC FIELD TRIP		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	9	L: 0	T:0 P:6
Class schedule per week:	6		
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:

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 Exercise. (Two Designs Mandatory)

	Exercise Duration (approx.)
1. Primary school / Hostel.	14 weeks
2. Nursing Home / Tourist-Lodge / Country Club-house.	5 weeks
3. Measured Drawing (based on architectural field trip)	2 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 external reviewer, i.e. expert practicing architect.

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. 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. Ranchi Municipal Corporation Byelaws.

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												

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	M	H	H	H	H
2	H	H	H	H	M	H	H	M	H	H	H	H

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:	4		
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.

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.

EXPANSION JOINTS:

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

ESCALATORS, RAMPS AND ELEVATORS:

Construction Details of Ramps and Elevators, Details of Escalators

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.

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

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

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

COURSE INFORMATION SHEET

Course code:	CE 212		
Course title:	SURVEYING LAB		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	2	L: 0	T:0 P:3
Class schedule per week:	3		
Class:	B. Arch		
Semester / Level:	IV		
Branch:	Architecture		
Name of Teacher:			

Note: the course is offered by Department of Civil and Environmental Engineering and syllabus under CE 212 to be followed.

SEMESTER V

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:	3		
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 defects along 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

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

COURSE INFORMATION SHEET

Course code:	AR 302		
Course title:	BUILDING SERVICES-IV (Mechanical & Fire Safety Services)		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	3	L: 3	T:0 P:0
Class schedule per week:	3		
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.
G.	To explain the function of mechanical equipment's for vertical transportation (elevators and escalators for buildings).
H.	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.

Module 2: 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, Psychrometric 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. National Building code.
4. William.K.Y.Tao; "Mechanical and Electrical Systems in Buildings"
5. V.P.Lang," Principles of air conditioning"
6. Rodney R.Alder ;"Vertical Transportation for Building"

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

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	H								
3	H	H	M	H	H	H						
4	H	H	H	H	H	H	M	H				M
5	H	H	H	M	H		H	H	M			H

COURSE INFORMATION SHEET

Course code:	CE 301		
Course title:	STRUCTURAL DESIGN I		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	2	L: 0	T:0 P:3
Class schedule per week:	3		
Class:	B. Arch		
Semester / Level:	V		
Branch:	Architecture		
Name of Teacher:			

Note: the course is offered by Department of Civil and Environmental Engineering and syllabus under CE 301 to be followed.

COURSE INFORMATION SHEET

Course code:	MT 204		
Course title:	CONSTITUTION OF INDIA		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	0	L: 0	T:0 P:3
Class schedule per week:	3		
Class:	B. Arch		
Semester / Level:	V		
Branch:	Architecture		
Name of Teacher:			

Note: the course is offered by Department of Civil and Environmental Engineering and syllabus under CE 301 to be followed.

COURSE INFORMATION SHEET

Course code:	AR 311
Course title:	ARCHITECTURAL DESIGN V
Pre-requisite(s):	Candidate should have cleared AR 211 Architectural Design III
Co- requisite(s):	Should have registered for AR 501 Urban Design
Credits:	13.5 L: 0 T:0 P:9
Class schedule per week:	9
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

9 weeks

OR

Any other mixed-use development

2. Exhibition Pavilion / Museum

6 weeks

OR

Public library building

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

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
Industrial visits/in-plant training

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

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.		
Co- requisite(s):	None		
Credits:	2	L: 0	T:0 P:4
Class schedule per week:	4		
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.	This will enable students to understand the basics in working drawings and its use and implementation on site.
2.	It will enable the students 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

A1 size sheet

Topics

Developing Key plans	1
Site plan and Layout plan of the whole complex	
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

Students will prepare the drawing in Auto Cad.

Text books:

Reference books:

- Joe, B. (Ed). (2002). Details in Architecture: Vol. I-V. Victoria: The Images Publishing group.
- Weston, R. (2004). Plans Sections Elevations – Key buildings of the twentieth century. London: Laurence King Publishing.
- 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
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures
Industrial visits/in-plant training

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

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:	3		
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-

2 weeks

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. Modelling and Rendering-

4 weeks

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 views, rendering an Exterior view, rendering an Interior, Creating and Recording Walkthroughs, creating 3D cutaways with Section Boxes.

3. Introduction to 3DS Max

3 weeks

An overview: Types of modelling, transforming objects, Compound objects, modifiers & modifier stack.

4. Introduction to Photoshop

3 weeks

Photoshop interface, creating and saving images, basic image editing, Photoshop toolbox and tools, using layers, special effects

5.Animation

2 weeks

Various animation techniques, editing animation using key frames, animation constraints/controller, rendering and special effects, walk -throughs.

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.

Recommended Books:

1. 3DS MAX- Advanced 3D modelling and animation – C & M, CADD Centre
2. 3DS MAX 8 Bible – Kelly C.Murdock
3. Photoshop CS Bible – Deke McClelland
4. Adobe Photoshop 7.0 classroom in a book – Adobe creative team

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												
Seminars												
Mini projects/Projects												
Laboratory experiments/teaching aids												
Industrial/guest lectures												

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

SEMESTER VI

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:	3		
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 relationship 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 to different types of tenders and their relationship 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 measurement.

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

Course Delivery methods												
Lecture by use of boards/LCD projectors												
Problem solving in the class												
Mini projects/Projects												
Industrial/guest lectures												

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	

COURSE INFORMATION SHEET

Course code:	CE 308		
Course title:	STRUCTURAL DESIGN II		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	2	L: 0	T:0 P:3
Class schedule per week:	3		
Class:	B. Arch		
Semester / Level:	V		
Branch:	Architecture		
Name of Teacher:			

Note: the course is offered by Department of Civil and Environmental Engineering and syllabus under CE 308 to be followed.

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:	3		
Class:	B. Arch		
Semester / Level:	VI		
Branch:	Architecture		
Name of Teacher:	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; Bodo Kachari tribe; Adi Gallong folk of Sian district, Arunachal and their settlement pattern; Naga house, Morung of Naga Community: Thadou Kukis 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, Dhajji Diwari 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, Andhra Pradesh; Contemporary Examples from the region.

Recommended Books:

1. Dawson Bary, Cooper Ilay : Traditional Buildings of India, 1998
2. Fathy Hassan – Architecture for the Poor. University of Chicago Press.
3. Michell, G., Penguin Guide to the Monuments of India, Vol I, Viking, London 1989.
4. Tadgell, The History of Indian Architecture, Design and Technology Press, London 1990.
5. Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997.
6. V.S. Praman, Haveli – Wooden Houses & Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
7. Kullrishan Jain & Minakshi Jain – Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad, 1992.
8. G.H.R. Tillotsum ; The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.
9. Richardson, Vicky; New Vernacular Architecture: Laurance King Publishing, 2001.
10. 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

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

COURSE INFORMATION SHEET

Course code:	AR. 354		
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:	3		
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 structures using practical techniques for conservation, repair and restoration.

Syllabus

Module 1: Definition an 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												
Lecture by use of boards/LCD projectors/OHP projectors												
Seminars												
Mini projects/Projects												
Industrial/guest lectures												

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

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 Semester IV		
Co- requisite(s):	Should have registered for AR 301 Acoustics		
Credits:	13.5	L: 0	T:0 P:9
Class schedule per week:	9		
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
Time Problem: Design 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 in Architectural Acoustics", 1972.

3. Richard H. Penner, Hotel Design, Planning 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 Housing and Residential Development", 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
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

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

COURSE INFORMATION SHEET

Course code:	AR 362		
Course title:	WORKING DRAWING II		
Pre-requisite(s):	Should have registered for AR 312 Working Drawing I		
Co- requisite(s):	None		
Credits:	2	L: 0	T:0 P:4
Class schedule per week:	4		
Class:	B. Arch		
Semester / Level:	VI		
Branch:	Architecture		
Name of Teacher:	Anila Smriti Surin		

Course Objectives

This course enables the students:

A.	To train the students 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 students 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.	The students will be 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

<i>Topics</i>	<i>A1 size sh</i>
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

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
Lecture by use of boards/LCD projectors/OHP projectors
Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures
Industrial visits/in-plant training

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

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:	3		
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.Chia 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. Poulouse 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

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

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

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:	3		
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 will be more 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.	The students were able to understand the various structural systems and their application in various buildings as per the requirement.
2.	The subjects will help the students to design and apply various modern structural systems in the high rise and large span structures in design.
3.	The subject helps the students to increase their ability to identify the structural forms suitable for architectural expression.
4.	The students were 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 York 1976.
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 City in History: Its Origins, Its Transformations, and Its Prospects by Lewis Mumford (1972)
10. The architecture of cities: Rossi, Aldo.

Reference books:

1. International Building Code 2009, International Code Council.
2. Bureau of Indian Standards. (2002). *Criteria for Earthquake Resistant Design of Structures - General Provisions and Buildings*. IS: 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
Lecture by use of boards/LCD projectors/OHP projectors

Tutorials/Assignments
Seminars
Mini projects/Projects
Industrial/guest lectures

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

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:	3		
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. Rangarajan,” 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: Nil

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												
Industrial/guest lectures												
Simulation												

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					

COURSE INFORMATION SHEET

Course code:	AR 405		
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:	3		
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 and flood-plain 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. Robert McNamara; Blundering into Disaster, 1987, Bloomsbury, 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. 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

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

COURSE INFORMATION SHEET

Course code:	MUP 202		
Course title:	SUSTAINABLE CITY PLANNING		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	3	L: 3	T:0 P:3
Class schedule per week:	3		
Class:	BARCH		
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.	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:

1. Corburn, J. 2009. Towards the Healthy City: People, Places, and the Politics of Urban Planning.
2. Moore, S. A. 2007. Alternative Routes to the Sustainable City: Austin, Curitiba, and Frankfurt. Lanham, MD: Lexington Books.
3. Wheeler, S.M., and T. Beatley eds. 2008. Sustainable Urban Development reader, 2nd ed. New York: Routledge.
4. Bell, S., and S. Morse. 1999. Sustainability Indicators; Measuring the immeasurable. London: Earthscan. (pp.9-32)
5. 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.
6. Bajpai, Jitendra N., “Building a foundation for smart Indian cities,” published in “Insight”, a Journal of Indian School of Business, Hyderabad, April 2015.
7. The Life and Death of American Cities, Jane Jacobs.
8. Gideon and Golany, New-Town Planning: Principles and Practice, Wiley-Interscience Publication, John Wiley & Sons, New York.
9. Jenks Mike, Joan Colin, “Dimensions of the Sustainable City”, Springerlink, 2010 (available as an e-book at the Columbia University Library).
10. 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
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

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

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
Co- requisite(s):	Should have cleared AR 251 Building Services I (Water Supply and Sanitation), & AR 251 Building Services I (Electrical & Lighting) and AR 302 Building Services III (Mech. & Fire Safety)
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)
(approx.)**

Exercise Duration

1. Group Housing Project- low rise low density/high rise high density, 9 weeks
(Covering neighbourhood housing, SOS village, corporate housing/ high end housing etc. based on enegy/sustainability aspect, with mapping of the various building services incorporated)
2. Design of complex multi-user buildings using steel/glass as laid 6 weeks
down by various architectural design competition/ by the design teachers

Time Problem: Design 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", MIT Press, Cambridge, 1984.
2. Mili Mazumdar, "Energy Efficient Buildings in India", TERI, New Delhi, 2012
3. Diane Tsang, "SPACE Shopping Mall", Pace Publishing, 2011
4. Lara Menzel, "Office Architecture and Design", Braua Publishers 2009.
5. Sheri Koonen, "Prefabulous and Sustainable: Building and Customizing an affordable, Energy efficient home", ABRAMS, 2010.

Reference books:

1. Joseph DeChiara, Michael J. Crosbie, "Time Savers Standards for Building Types", 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
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures
Site visits/ case study documentations

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

COURSE INFORMATION SHEET

Course code:	AR 412		
Course title:	INTERIOR DESIGN SESSIONAL		
Pre-requisite(s):	Should have cleared all Architectural Design Laboratories up to Semester V, 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:	4		
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 and develop 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

Syllabus

The students should be given theoretical inputs during the interior design sessional class regarding:

- Elements of Interior Design. Transformation of design elements. Optical illusion. Study of geometric patterns.

- Enveloping space, contained space and residual spaces, Spaces within space.
- Principles of lines; wall composition guidelines.
- 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.
- Exposure to eminent interior designers works.
- Presentation of interior design schemes with detail specification for the materials and technology used.

Sessional Input:

- Students must work on minimum two Interior Design projects (one residential and one non-residential) as a part of the studio exercise:
 - Non-residential Interior design projects can be considered for any one: 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 Exercises to be undertaken:

- Site visits, documentation exercises, workshops, guest-lectures, seminars to be organized including interactions with professionals, consultants, and skilled artisans etc.
- Submission of reports on various lectures, site visits etc

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 20th Century, 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 Gilliat Coyran, 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.

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

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

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 of working 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

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

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:

1. 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.
2. Site Supervision and practices: A detail report of any part of a building, which is 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

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

COURSE INFORMATION SHEET

Course code:	AR 463		
Course title:	COMPREHENSIVE VIVA & TIME TEST		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	3	L: 0	T:0 P:0
Class schedule per week:	Nil (This is the Grand Viva to evaluate overall learning)		
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
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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.
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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.

- All the subjects (both Theory and Sessional) thus taught in B Arch program, as well as practical knowledge earned during the Apprenticeship
- 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

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

SEMESTER IX

COURSE INFORMATION SHEET

Course code:	AR 501		
Course title:	URBAN DESIGN		
Pre-requisite(s):	None		
Co- requisite(s):	Should have registered for AR 511 Architectural Design VIII		
Credits:	3	L: 3	T:0 P:0
Class schedule per week:	3		
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: Introduction

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												
Lecture by use of boards/LCD projectors/OHP projectors												
Seminars												
Mini projects/Projects												
Industrial/guest lectures												

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

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:	3		
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 and Development 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:

1. C.A.Doxiadis, Ekistics, “An Introduction to the Science of Human Settlements”, Hutchinson, London, 1968.
2. “Urban Development Plans: Formulation & Implementation” , Guidelines, 1996.
3. Bacon, E. N., Design of Cities.
4. Cullen, G., Townscape.
5. Gallion A.B., Urban Pattern.
6. The City in History: Its Origins, Its Transformations, and Its Prospects by Lewis Mumford (1972)
7. The architecture of cities: Rossi, Aldo.

Reference books:

- 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

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					

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:	3		
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 able:

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 Websites:

1. <http://char.txa.cornell.edu/language/princip1/princip1.htm>
2. http://www.digital-web.com/articles/principles_of_design/

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	

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	H	M		L	L	M
2	H	H	H	L		M	H	M		L	L	M

COURSE INFORMATION SHEET

Course code:	MUP 105		
Course title:	URBAN ECOLOGY AND ENVIRONMENTAL PLANNING		
Pre-requisite(s):	None		
Co- requisite(s):	None		
Credits:	3	L: 3	T:0 P:3
Class schedule per week:	3		
Class:	MUP		
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.	Enhance abilities and skills relating to evaluation of environmental impacts of urban development.
3.	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, Concepts of Ecology and fundamentals of ecosystem; Components of natural and built environment, Ecosystems 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 Centre Environment, Housing areas, dereliction, Urban climatology and thermal pollution, factors causing heat sink effects, direct radiation, 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 for degradation, 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: Environmental Monitoring and Impact Assessment

Air Pollution-sources, causes/pollutants and their effects, emission sources, vehicular emissions, techniques of monitoring of emissions, emission standards, and ambient air quality. Concepts of relevant meteorological parameters, and interpolation of data, wind system measurement, turbulence; mixing height, plume use, dispersion, and dispersion models. Air pollution mitigation and abatement. Water Pollution – sources, water quality tests, minimum standards of disposal (for different uses), 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., JohnWiley 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 William
12. Handbook of Environmental Planning, McEnro James
13. Integrated Environmental Planning, Lein, J. K.
14. Sustainable Development, Khanna, D.D.
15. Man & the changing Environment, Frank, R. G. & Frank, D. N

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

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes
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	PO1	PO2	PO3	PO4	PO5	PO6
1	L	H	M	L	H	H
2	M	H	H	H	H	H
3	H	H	H	H	H	H

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

COURSE INFORMATION SHEET

Course code:	AR 511		
Course title:	ARCHITECTURAL DESIGN VIII		
Pre-requisite(s):	Should have cleared all Architectural Design Laboratories up to Semester VI		
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)

12 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:

1. C. Carney Strange, James H. Banning, Designing for Learning: Creating Campus Environments for Student Success, Wiley Publishers
2. Richard P. Dober, Campus Design, Wiley Publisher
3. David C. Perry, Wim Wiewe, The University as Urban Developer: Case Studies and Analysis, M. E. Sharpe
4. Richard Lyle Miller, Earl S. Swensson, Hospital and Healthcare Facility Design, W.W. Norton
5. Hilary Dalke, Paul J. Littlefair, David Loe, NHS Estates, Lighting and Colour for Hospital Design, Stationery Office, 2004
6. W. Paul James, William Tatton-Brown, Hospitals: design and development, Architectural Press,

Reference books:

7. Donald Watson, Alan J. Plattus, Robert G. Shibley; Time-saver standards for urban design, McGraw-Hill
8. 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
Seminars
Mini projects/Projects
Laboratory experiments/teaching aids
Industrial/guest lectures

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

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 till VI Semester.		
Co- requisite(s):	None		
Credits:	2	L: 0	T:0 P:4
Class schedule per week:	4		
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:

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:

- Title of Project
- Authority proposing the project
- Site area, location
- Brief about the project with scope of work.

Duration

3 weeks from the start of the semester

B. Minor Dissertation: Each student shall prepare a 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
Seminars
Mini projects/Projects
Laboratory experiments/teaching aids
Industrial/guest lectures
Self- learning such as use of NPTEL materials and internets

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

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:	3		
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; Fire insurance's definition, cover note; insurance for new work and additions; insurable value of property, claim for damage due to fire.

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
Group discussion / Seminar in the class
Industrial/guest lectures

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	

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:	3		
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 resource 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:

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. Mukhopadhyaya; “*Project Management for Architect and Civil engineers*”
3. Peurifoy & Schexnayder; “*Construction Planning, Equipment, and Methods*”
- 4 D. Upadhyay; “*Construction Management*”

Reference books:

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

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

COURSE INFORMATION SHEET

Course code:	AR 561		
Course title:	ARCHITECTURAL DESIGN THESIS/ PROJECT		
Pre-requisite(s):	Should have cleared all sessional subjects up till VIII semester		
Co- requisite(s):	None		
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 **AR 512 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
Lecture by use of boards/LCD projectors/OHP projectors
Seminars
Mini projects/Projects
Industrial/guest lectures

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