

**FACULTY OF ARCHITECTURE
&
EKISTICS**

Syllabus for B.Arch Program



JAMIA MILLIA ISLAMIA

(A Central University established by an Act of Parliament)

**Maulana Mohammed Ali Johar Marg
Jamia Nagar, New Delhi-110025 (INDIA)**

Architect under whose Training was completed as well a detailed report on the work carried out by him during the training in a format prescribed by the Department of Architecture.

- 13.5 The marks for Practical training will be awarded to each student by the Head of the Department in consultation with the course coordinator,
- On the basis of the performance report from the Architect under whom the training was carried out.
 - On the assessment of the report of works rendered by the student during the training.

14.0 THESIS EVALUATION

- 14.1 On the commencement of the Fifth year the student shall submit two synopses for Thesis projects. HOD / Coordinator appointed by HOD will approve One out of the Two synopses, as well assign a Guide amongst the faculty members to each student which shall be evaluated by the panel of jury, where the student will be present to defend the Thesis presented by him. The supervisor of the student may be also present in the jury.
- 14.2 The jury shall include Five Members in all. Dean/Head will be the Chairman. Minimum three members shall be external and one internal member from the faculty, in addition to the chairman.
- 14.3 A student who fails in the Thesis evaluation will be allowed to resubmit the modified Thesis after a minimum period of Three month with due approval of the Head of the Department.

15.0 USE OF UNFAIR MEANS IN EXAMINATION

The cases of students using 'Unfair means' at the examinations shall be dealt in accordance with the Provisions of Ordinance- X

Abbreviations

- AC : Academic Council of Jamia Millia Islamia
 AICTE : All India Council of Technical Education
 B.Arch. : Bachelor of Architecture
 COA : Council of Architecture
 JMI : Jamia Millia Islamia, New Delhi.
 Ordinance : Ordinances for the B.Arch Program of JMI.

DEPARTMENT OF ARCHITECTURE JAMIA MILLIA ISLAMIA

BACHELOR OF ARCHITECTURE SCHEME OF EXAMINATION

YEAR I

CODE	SUBJECT	CLASSES		MARKS				EXAM HOURS
		L	T/ST	IA	WR	VV	TOT	
AR 101	ARCHITECTURAL DESIGN-I	1	5	300	150	150	600	6
AR 102	BUILDING CONSTRUCTION-I	1	2	150	75	75	300	3
AR 103	BUILDING MATERIALS & SCIENCES	2	-	50	50	-	100	3
AR 104	ARCHITECTURAL DRAWING-I	1	5	125	75	50	250	3
AR 105	WORKSHOP PRACTICES-I**	-	4	50	-	50	100	-
AR 106	THEORY OF STRUCTURES-I	3	-	50	50	-	100	3
AR 107	SURVEY AND LEVELLING*	1	3	50	50	-	100	3
AR 108	VISUAL COMMUNICATION SKILLS*	1	1	50	-	50	100	-
AR 109	COMPUTER APPLICATIONS-I	-	1	50	25	25	100	3
AR 110	DISSERTATION: INDIAN ARTS & CRAFTS**	2	-	50	-	50	100	-
AR 111	ARTS AND GRAPHICS-I	1	2	50	50	-	100	3
	GENERAL PROFICIENCY	-	-	-	-	-	50	-
TOTAL		-	-	975	525	450	2000	27

NOTATIONS:

- L-LECTURES T-TUTORIALS ST-STUDIO
 IA-INTERNAL ASSESSMENT WR-WRITTEN EXAM VV-VIVA VOCE

NOTE:

Each session will be of 2 terms of 16 teaching weeks each.
 Number of Classes per week = 30 (in each term).
 Subjects with * against them will be taught only for one term in TERM 1.
 Subjects with ** against them will be taught only for one term in TERM 2.
 Exams will be held after 32 weeks of teaching (excluding exams) in each academic year.
 All exams would be conducted at the end of the academic year.

DEPARTMENT OF ARCHITECTURE
JAMIA MILLIA ISLAMIA

BACHELOR OF ARCHITECTURE
SCHEME OF EXAMINATION

YEAR 2

CODE	SUBJECT	CLASSES			MARKS			EXAM HOURS
		L	T/ST	IA	WR	VV	TOT	
AR 201	ARCHITECTURAL DESIGN - II	1	5	300	150	150	600	12
AR 202	BUILDING CONSTRUCTION - II	1	3	150	75	75	300	3
AR 203	HISTORY OF ARCHITECTURE - I	2	-	50	50	-	100	3
AR 204	ARCHITECTURAL DRAWING - II	1	5	100	50	50	200	3
AR 205	WORKSHOP PRACTICES - II	-	2	50	-	50	100	-
AR 206	THEORY OF STRUCTURES - II	3	-	75	75	-	150	3
AR 207	BUILDING SERVICES - I	1	-	50	50	-	100	3
AR 208	VIRTUAL ARCHITECTURE - I**	2	-	50	-	50	100	-
AR 209	COMPUTER APPLICATIONS - II	1	1	50	25	25	100	3
AR 210	DISSERTATION: INDIAN ARCHITECTURE**	2	-	50	-	50	100	-
AR 211	ARTS AND GRAPHICS - II*	1	3	50	50	-	100	3
	GENERAL PROFICIENCY	-	-	-	-	-	50	-
TOTAL		-	-	975	525	450	2000	33

NOTATIONS:

L-LECTURES T-TUTORIALS ST-STUDIO
IA-INTERNAL ASSESMENT WR-WRITTEN EXAM VV-VIVA VOCE

NOTE:

Each session will be of 2 terms of 16 teaching weeks each.
Number of Classes per week = 30 (in each term).
Subjects with * against them will be taught only for one term in TERM 1.
Subjects with ** against them will be taught only for one term in TERM 2.
Exams will be held after 32 weeks of teaching (excluding exams) in each academic year.
All exams would be conducted at the end of the academic year.

DEPARTMENT OF ARCHITECTURE
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BACHELOR OF ARCHITECTURE
SCHEME OF EXAMINATION

YEAR 3

CODE	SUBJECT	CLASSES			MARKS			EXAM HOURS
		L	T/ST	IA	WR	VV	TOT	
AR 301	ARCHITECTURAL DESIGN - III	2	6	300	150	150	600	18
AR 302	BUILDING CONSTRUCTION - III	1	4	150	75	75	300	6
AR 303	HISTORY OF ARCHITECTURE - II	2	-	75	75	-	150	3
AR 304	PRINCIPLES OF HUMAN SETTLEMENT	2	-	50	50	-	100	3
AR 305	ESTIMATION AND COSTING	2	-	75	75	-	150	3
AR 306	THEORY OF STRUCTURES - III	4	-	75	75	-	150	3
AR 307	BUILDING SERVICES - II	2	-	75	75	-	150	3
AR 308	VIRTUAL ARCHITECTURE - II*	2	-	50	-	50	100	-
AR 309	COMPUTER APPLICATIONS - III	1	2	75	50	25	150	3
AR 310	DISSERTATION: INDIAN ARCHITECTS**	2	-	50	-	50	100	-
	GENERAL PROFICIENCY	-	-	-	-	-	50	-
TOTAL		-	-	975	625	350	2000	42

NOTATIONS:

L-LECTURES T-TUTORIALS ST-STUDIO
IA-INTERNAL ASSESMENT WR-WRITTEN EXAM VV-VIVA VOCE

NOTE:

Each session will be of 2 terms of 16 teaching weeks each.
Number of Classes per week = 30 (in each term).
Subjects with * against them will be taught only for one term in TERM 1.
Subjects with ** against them will be taught only for one term in TERM 2.
Exams will be held after 32 weeks of teaching (excluding exams) in each academic year.
All exams would be conducted at the end of the academic year.

DEPARTMENT OF ARCHITECTURE
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BACHELOR OF ARCHITECTURE
SCHEME OF EXAMINATION

YEAR 4

CODE	SUBJECT	CLASSES		MARKS				EXAM
		L	T/ST	IA	WR	VV	TOT	HOURS
		AR 401	ARCHITECTURAL DESIGN - IV	2	6	300	150	150
AR 402	BUILDING CONSTRUCTION - IV	1	5	200	100	100	400	6
AR 403	ELECTIVE - I	1	-	50	-	50	100	3
AR 404	TOWN PLANNING	2	-	50	50	-	100	3
AR 405	LANDSCAPE	2	-	50	-	50	100	-
AR 406	THEORY OF STRUCTURES - IV *	3	-	50	-	50	100	-
AR 407	BUILDING SERVICES - III	2	-	50	50	-	100	3
AR 408	HUMANITIES	2	-	50	50	-	100	3
AR 409	BUILDING BYE LAWS **	1	-	25	25	-	50	3
AR 410	SEMINAR: INDIAN HABITAT **	2	-	50	-	50	100	-
AR 411	INTERIOR DESIGN	1	1	50	-	50	100	-
AR 412	MANAGEMENT	2	-	50	50	-	100	3
GENERAL PROFICIENCY		-	-	-	-	-	50	-
TOTAL		-	-	975	475	500	2000	51

NOTATIONS:

L-LECTURES T-TUTORIALS ST-STUDIO
IA-INTERNAL ASSESMENT WR-WRITTEN EXAM VV-VIVA VOCE

NOTE:

Each session will be of 2 terms of 16 teaching weeks each.
Number of Classes per week = 30 (in each term).
Subjects with * against them will be taught only for one term in TERM 1.
Subjects with ** against them will be taught only for one term in TERM 2.
Exams will be held after 32 weeks of teaching (excluding exams) in each academic year.
All exams would be conducted at the end of the academic year.

ELECTIVES: Rural Habitat Vastu Shastra
 Vernacular Architecture Language
 History of Indian Architecture

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BACHELOR OF ARCHITECTURE
SCHEME OF EXAMINATION

YEAR 5

CODE	SUBJECT	CLASSES		MARKS				EXAM
		L	T/ST	IA	WR	VV	TOT	HOURS
AR 501	THESIS *	5	15	600	-	600	1200	-
AR 502	PROFESSIONAL PRACTICE **	6	-	50	50	-	100	3
AR 503	ELECTIVE - II **	4	-	50	-	50	100	-
AR 504	TRAINING ***	-	-	275	-	275	550	-
GENERAL PROFICIENCY		-	-	-	-	-	50	-
TOTAL		-	-	1000	50	950	2000	3

NOTATIONS:

L-LECTURES T-TUTORIALS ST-STUDIO
IA-INTERNAL ASSESMENT WR-WRITTEN EXAM VV-VIVA VOCE

ELECTIVES:

Conservation Islamic Architecture
Building Services for Intelligent Buildings. Earthquake Resistant Architecture

NOTE:

Number of Classes per week = 30 (in first term).

All exams would be conducted at the end of the academic year.
Each session will be of 2 terms of 16 weeks each.
The first session will be for teaching and the second session will be for practical training.

Exams will be held after 32 weeks of the academic session.

* Thesis shall be completed in the first term of the fifth year. Assessment and Viva-Voce for the same shall be completed before the students proceed for Practical training in the second term.

** Exam for these subjects will be conducted at the end of the academic year after the successful completion of Practical Training.

*** Students are expected to complete 16 weeks of full - time Practical Training with an architecture firm. Students will be awarded the credits for the same only after they submit a letter from the firm confirming the same and substantiate it with documentation of work done.

AR 101: ARCHITECTURAL DESIGN - I

TEACHING HOURS

L/TU	ST	TOTAL
1	5	6

EXAMINATION MARKS

IA	WR	VV	TOTAL
300	150	150	600

OBJECTIVES

- Orientation to the architectural profession with a focus on creating a mindset for the student towards the profession, its scope and demands.
- Sensitizing students to be more observant to their surroundings and promoting it as a basic creative instinct in the students.

METHODOLOGY

- Orientation about the profession with the help of Audio/Video presentations.
- Studio lectures.
- Individual studio exercises and one group project (measured drawing).

CONTENTS

TERM 1

Introduction

Introduction to profession of architecture, and professional organizations like IIA, COA, AICTE, CAA, ARCSIA

Introduction to Design

Principles of design and elements of design.
Functionality of space and sequential function.
Exploration of patterns with 2 D compositions.
Exploration of form through 3 D compositions.

Study of Anthropometrics

Exercises to increase perception and sensitivity of the students about space. This can be best understood through one or two short exercises in anthropometrics. Presentations should be made through simple sketches and drawings.

Short exercises in design and layout of personal space, rooms etc.

TERM 2

Measured Drawing

A measured drawing of an existing / historic building and its features. It would allow for students to learn working in a team, studying different aspects of the same building.

Short exercises in design of milk booth, tea stall, shelter in park, bus stop.

Design exercises to be coupled with parallel drafting and drawing exercises to encourage use of the skills of isometric and axonometric, sciagraphy, perspective drawing and rendering techniques for opaque and transparent mediums. This aspect of the curriculum should proceed parallel to AR 104 - I.

AR 102: BUILDING CONSTRUCTION -I

TEACHING HOURS

L/TU	ST	TOTAL
1	2	3

EXAMINATION MARKS

IA	WR	VV	TOTAL
150	75	75	300

OBJECTIVE

Introduction to elementary building construction methods and their applications.

METHODOLOGY

- Introduction to materials and construction through lectures and studio exercises.
- Site visits to gain knowledge about construction details.
- Introduction to some basic construction methods and elements through exercises at the construction yard.

CONTENTS

TERM 1

Construction

- Basic Tools: Introduction to Basic tools used by masons and carpenters.
- Elementary Carpentry: Different types of common joints.
- Brick Work: Terminology: Bricks, bats and closures
- Bonding: Types of bonds: English, Single and double Flemish
- Offset functions and quoins: right angled and angular quoins, tee and cross-junctions for various thickness, attach and other piers, coping.
- Corbelling, String courses and decorative brickwork.
- Stonework: Stone masonry, dressing, Random Rubble, Coursed Rubble, Ashlar.

Materials

- Bricks- specifications of bricks and types of bricks most commonly used.

TERM 2

Construction

- Foundations: Need for foundations, preliminary design criteria. Foundation brickwork and concrete.
- Detail of spread foundation for load bearing walls of various thicknesses.
- DPC: Laying of Horizontal D.P.C.
- Arches: Elementary principles of Arch construction. Definition of various technical terms and Types of Arches. Construction of Brick and Stone Arches.

Materials

- Timber- seasoning of wood, types of wood used in construction.
- Identification of basic woods like teak, *sal*, *sheesham*, mango, eucalyptus etc.

AR 103: BUILDING MATERIALS & SCIENCE

TEACHING HOURS

L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS

IA	WR	W	TOTAL
50	50	0	100

OBJECTIVE

Introduction to elementary principles of building sciences. The focus would be on bio-climatic behavior of building materials with respect to human comfort in buildings.

METHODOLOGY

- Lectures introducing various concepts of building sciences and materials.
- Studio assignments for understanding practical implications.
- Site visits to understand the use and behavior of contemporary and old buildings

CONTENTS

TERM 1

Introduction

Basic building materials like lime, sand, brick, cement, grit, steel, stone etc.

Importance of climate in architecture

Factors affecting climate. Measurement and recording of elements of climate like solar radiation, temperature, wind, humidity, and precipitation.

Different types of climatic zones and their characteristics.

Macro and microclimate. Application of climatic principles for design of buildings in hot and dry, warm, humid, composite and tropical climates.

Thermal behavior of buildings and materials:

Study of body's heat production and heat loss.
Time lag of different materials for heat transfer.

Thermal comfort, effective temperature, bio-climatic analysis, Isopleths,

Direct and indirect insulation, Reflectivity and emissivity.

TERM 2

Lighting

Solar geometry and shading devices

Radiation gains on walls and roof in different directions.

Natural lighting, glare, daylight factor, effect of size and shape of openings in different planes. Design of buildings for daylight.

Wind

Study of seasonal variations in wind and effect of topography.

Effect of wind on location of industrial area, airports and other land uses.

Requirements, size and position of openings, airflow patterns inside and outside buildings.

Site selection and site planning in relation to climatic factors

Passive systems, evaporative and ground cooling.

Effect of trees and plants.

Understanding of constituents and properties of building materials and study of their properties with relation to climate.

AR 104: ARCHITECTURAL DRAWING - I

TEACHING HOURS

L/TU	ST	TOTAL
1	5	6

EXAMINATION MARKS

A	WR	W	TOTAL
150	75	50	250

OBJECTIVES

- Introduction and familiarization with drafting tools and accessories.
- To give basic knowledge of good drafting and lettering techniques.
- To develop comprehension and Visualization of geometric forms.

METHODOLOGY

Studio assignments and lectures. Demonstration of 3D Geometrical objects and their 2D representation on sheets

CONTENTS

TERM 1

Introduction

Drawing Instruments and their uses.
Sheet layout and sketching.
Lettering: - Exercises in drafted and freehand architectural lettering.
Lines: Concept and types of lines. Line thickness. Dimension lines.

Scales

Scales: Engineers scale, Graphical scale and Representation factor (R.F.)
Scales on drawings. Types of scales: Plain scale and Diagonal scale.

Orthographic Projections

Definition, Meaning & concept. Principles and Methods of projection.
Orthographic projection. Planes of projection.
Four Quadrants. First angle projection. Third angle projection.
Projection of points, lines & planes.

Development Of Surfaces

Introduction and Methods of development of surfaces.

Development of lateral surfaces of right solids like Cubes, Prisms, Cylinders.

Method of drawing the development of the lateral surface of a pyramid & Cone.

TERM 2

Projections of solids

Axis perpendicular to the H.P., Axis perpendicular to the V.P.

Axis parallel to both the H.P. & V.P.

Projection of solids- axis inclined to one reference plane and parallel to other.

Projections of solids with axis inclined to H.P. and V.P.

Section Of Solids

Section plans, Sections, True shape of a section.

Section of solids (Prisms, Pyramids, Cylinders, Cones, Spheres.)

Sciagraphy

Introduction/ Meaning of sciagraphy

Projection of sciagraphy in plan and elevations.

AR 105: WORKSHOP PRACTICES - I

TEACHING HOURS

L/TU	ST	TOTAL
0	4	4

EXAMINATION MARKS

A	WR	W	TOTAL
50	0	50	100

OBJECTIVE

To equip students with the basic skills necessary to represent their ideas in a rudimentary model format using simple materials like paper, thermocol, hardwood, Metals, glass fiber etc.

METHODOLOGY

Exercises in cutting, finishing and joinery etc. with simple blocks, composition of basic geometrical forms etc. Introduction to the various tools and equipment available for executing these exercises. The section on joinery details will be dealt with in an engineering lab.

CONTENTS

Joinery

- Simple joinery details in wood.
- Pipes and sleeve joints.
- Metal- welded joints, nut-bolt joints. Types of welded joints.

Architectural Modeling

- General information about various materials and tools to be used in model making. Development of the skill to use the tools with precision to obtain desired results in model making.

Introduction to types of model

- Block models, detailed model, construction model and interior models etc.

Introduction to various materials

- Experimentation with these materials for different geometries and scales of models.

AR 106: THEORY OF STRUCTURES - I

TEACHING HOURS

L/TU	ST	TOTAL
3	0	3

EXAMINATION MARKS

A	WR	W	TOTAL
50	50	0	100

OBJECTIVE

To understand the basic principles of structural mechanics that would be pertinent to simple design elements. To also understand the structural behavior of building elements.

METHODOLOGY

Lectures and computation exercises.

CONTENTS

TERM I

Simple stresses and Strains

- Elasticity. Stress. Strain.
- Types of stress.
- Elastic limit.
- Hook's Law.
- Modulus of Elasticity.
- Stresses in Composite Bars.
- Linear Strain
- Poisson's ratio
- Shear stress, principal stresses and strains.

Center of Gravity

- Calculating Center of Gravity of figures.
- Center of Parallel Forces.

Moment of Inertia

- Section Modulus.
- Calculation of Moment of inertia by first principle and its application.
- Moment of Inertia of Composite sections.

Elements of Static

- Parallelogram Law of Forces.

Resolution of forces- Triangular Law of forces, Polygon Forces.
Theorem of Resolved Parts.
Resultant of concurrent coplanar forces.
Equilibrium.
Moment of a Force.
Moment and Arm of a Couple.

Shearing force and bending moments

Beams.
Shearing force and bending moment.
Shear Force and Bending Moment diagrams of simple cases for concentrated and distributed loads.

TERM 2

Stresses in Trusses

Forces in members- analytical method
Method of joints
Method of sections

Bending stresses

Bending equation
Bending stresses in symmetrical and unsymmetrical sections

Shear Stress

Shear stress distribution in various sections.

Deflection of Beams

Differential Equation of deflected beam.
Double Integration method,
Macaulay's method.
Statically determinate beams and propped Cantilever.
Moment Area Method.
Conjugate beam method.

Column and Struts

End conditions
Effective length
Slenderness ratio.
Euler's formula

AR 107: SURVEY AND LEVELLING

TEACHING HOURS

L/TU	ST	TOTAL
1	3	4

EXAMINATION MARKS

A	WR	W	TOTAL
50	50	0	100

OBJECTIVES

- To illustrate the role of Surveying and Leveling in Architecture
- Introduction to the Tools and equipment for Land Surveying.

METHODOLOGY

Lectures and Practical exercises involving fieldwork and working with survey equipments.

CONTENTS

Introduction

Introduction to surveying, understanding land topography and its relevance in Architecture.
Types of surveys in practice
Introduction to survey equipments.

Chain Surveying

Principles of survey, equipment required, selection of station, methods of taking offsets. Booking the field notes, obstacles in chaining, errors in chaining, chaining on sloping ground and reciprocal ranging.

Compass Surveying

The prismatic compass, its construction and uses. Other types of compasses.
Reduced and whole circle bearing, magnetic declination, effects of local attraction. Compass traverse and balancing the closing error.

Leveling

Different types of levels, their temporary and permanent adjustment, leveling staff. Book of the readings and reduction of levels. Errors in leveling.

Curvature and refraction reciprocal leveling profile, leveling cross sections.

Plane Tabling

Equipment and methods. Two points and three points problems.

Contouring

Characteristics of contour lines, direct and indirect methods of contouring and interpolation of contours. Interpretation and preparation of contour maps. Site modeling with total station. Exercises in setting out of building works.

Theodolite Surveying

Theodolite, its temporary and permanent adjustment, measuring of magnetic bearings, horizontal and vertical angles. Theodolite traverse and balancing the closing error.

Tacheometric Surveying

General instruments, different systems of tacheometric measurements, stadia method, Subtense method.

AR 108: VISUAL COMMUNICATION SKILLS

TEACHING HOURS

L/TU	ST	TOTAL
1	1	2

EXAMINATION MARKS

IA	WR	W	TOTAL
50	0	50	100

OBJECTIVES

- Attuning students to a pictorial understanding of spaces.
- Exploring methods of presentation for design through photographs.
- Understanding the language and aesthetics of photography, as an inter-disciplinary art form and its relevance in architectural communication.
- Brainstorming on ideas of representing spaces through photographs.

METHODOLOGY

- Lecture and post lecture discussions.
- Practical assignments and student presentations.
- Presentation by students on different themes.

CONTENTS

Introduction to Devices

Introduction to devices used for visual communication.
Introduction to different types of cameras, (still and moving), optical and magnetic, their parts and their use.

Communication Graphics

Introduction to the elements, principles, and techniques that underlie and inform the analysis, creation, and evaluation of visual organizations and are crucial to the process and product of form-making.

Translation of concept into form using word, image, and layout.

Presentation of Designs through photographs, understanding the language and aesthetics of photography, as an inter-disciplinary art form and its relevance in modern architecture.

Photographic studies

A practical introduction to the theory and application of cameras, metering devices and lighting

Studio and darkroom techniques, developing a print and processing.

Using digital cameras.

Mounting of photographs.

Slide presentation.

AR 109: COMPUTER APPLICATIONS - I

TEACHING HOURS

L/TU	ST	TOTAL
0	1	1

EXAMINATION MARKS

IA	WR	W	TOTAL
50	25	25	100

OBJECTIVES

- General Historical background of computer development.
- Brief description of various Hardware and Software.
- Basic knowledge of different operating systems i.e. Windows, Unix, Linux etc.

METHODOLOGY

Brief lectures followed by application in individual lab exercises.

CONTENTS

TERM 1

Introduction of various software available for documentation, presentation & drawing purposes.

Familiarizing the use of scanners, printers plotters etc.

Introduction of Auto CAD as drafting tool.

TERM 2

Applications of M.S. Office in presentation:

Microsoft Word

Microsoft Power Point

Microsoft Excel

Adobe Page Maker

AR 110: DISSERTATION - INDIAN ARTS & CRAFTS

TEACHING HOURS

L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS

A	WR	W	TOTAL
50	0	50	100

OBJECTIVES

- To stimulate art appreciation and development of aesthetic sense.
- To introduce vernacular art and craft forms.
- To introduce a sense of exploration, research and documentation.

METHODOLOGY

After orientation classes and lectures, the student must submit to the concerned teacher the synopsis of one research project for approval. Each student is expected to complete and submit a report (20-25 pages) based on the research conducted. Classes are to be used for introductory lectures, site visits, interviews and library work.

SCOPE OF STUDY

Study a particular Art / Craft form belonging to a specific region / period or a school of thought in India. Students have the flexibility to choose from a wide range of topics that may be historic or contemporary.

AR 111: ARTS AND GRAPHICS - I

TEACHING HOURS

L/TU	ST	TOTAL
1	2	3

EXAMINATION MARKS

A	WR	W	TOTAL
50	50	0	100

OBJECTIVES

- To develop a sense of composition and design.
- To introduce the relevance of art and appreciation of fine arts in architecture.
- To develop basic (freehand) visual communication skills.

METHODOLOGY

- Brief lectures and studio exercises
- Nature studies through sketching and water color exercises.
- Visits to art galleries and museums.

CONTENTS

Theory

Brief introduction of art in terms of architecture.

Basic elements of composition and design.

Color theory: primary colors, secondary colors, hue, intensity, value, harmonious and contrast colors.

Appreciating a piece of art on the basis of aesthetic value.

Practical

Exercises based on basic shapes- triangle, circle and square.

Brief introduction of color theory and exercises based on the theory.

Exercises related with the patterns of nature and compose them graphically.

Exercises based on the concept and elements of Design.

Exercises in collage to develop an understanding of the relationship between different shapes, colors, overlapping and grouping etc.

Sketching: rapid sketches from daily life (10 sketches per week)

Nature studies with pencil, ink and watercolors.

AR 201: ARCHITECTURAL DESIGN - II

TEACHING HOURS		
L/TU	ST	TOTAL
1	5	6

EXAMINATION MARKS			
IA	WR	W	TOTAL
300	150	150	600

OBJECTIVES

- To foster understanding about land and landforms and the elements of built space. Experimentation with shapes and forms to evolve sensitivity to built volumes.
- Focus on studying patterns in horizontal circulation in built areas.
- Introduction to vernacular architecture, use of local materials and appreciation of the socio-economics of the users.

METHODOLOGY

- Site analysis at the beginning of each design problem. This would develop sensitivity to existing site conditions and context and help students evolve design directives to guide the design process.
- Block models at every design stage for three-dimensional visualization.

CONTENTS

TERM 1

Design projects related to different climatic conditions (4 week duration)

The projects would address the study of built form and its relationship to the site, surroundings and climatic setting. Design proposals to address sensitivity to climatic and physical settings. The design problem would induce students to experiment with built and open spaces.

Seminar

These presentations would highlight national and international design projects to give the students a visual experience about interior and exterior space planning and increase their awareness about the contemporary world of architecture. The research would be done over the winter break

and the presentations would be made in the first two weeks of the second term while the design problem is being introduced.

TERM 2

One complex design problem (12 week duration)

The project would involve the study of simple repetitive type of spaces like schools, hostels, shops and offices. The focus would be on the evolution of form through a detailed site analysis. Other design issues that the problem must address are:

- Detailing of selected areas to introduce a working understanding of services.
- Integration of design ideas with structural feasibility.
- Evolving working solutions for parking and circulation patterns.

Two short time problems (1 week duration each)

Design exercises could be free standing structures like war memorial etc.

AR 202: BUILDING CONSTRUCTION -II

TEACHING HOURS		
L/TU	ST	TOTAL
1	3	4

EXAMINATION MARKS			
IA	WR	W	TOTAL
150	75	75	300

OBJECTIVE

To introduce construction principles and materials used for the basic elements of a building like doors, windows, stairs etc.

METHODOLOGY

- Lectures and Studio assignments for understanding construction details.
- Site visits and library studies to supplement the studio work regarding materials and construction methods.

CONTENTS

TERM 1

Construction

- Doors: Types of doors, construction techniques, decorative panel doors, glazed doors, flush doors, doors with fanlight, and calculation of woodwork.
- Windows: Detail of timber frames & shutters, fixed shutters, Calculation of woodwork.
- Roofs and Trusses: Timber roofs: lean to roof, closed couple roof, collar roof for small spans. Large timber trusses (12 meter span).

Materials

- Glass and glass products: Plain, sheet, plate, textured, laminated, wired and shock resistant glass. Glass blocks, glass tiles, mirrors, heat reflecting glasses and Glass wool.
- Plastics, Nylon, PVC, Bakelite, Polythene, glass fiber reinforced plastic.
- Paints and surface finishes: Composition, properties and methods of application of different types of paints: Oil, synthetic enamels, acrylic and other plastic emulsions and formulations, interior and exterior grade paints, Cement based paints.

TERM 2

Construction

- Pitched bamboo & timber roofs.
- Staircases: Design and details of construction of staircases in timber, stone and RCC. Different types of staircases-Dog legged, Circular, Open Well, Spiral etc.
- Lift well details.
- Partitions: Construction of partition in timber and timber products, gypsum boards etc. for use in offices and restaurants.

Materials

- Varnishes: Natural and synthetic clear varnishes, French polish.
- Floor finishes: PCC, terrazzo, stone slabs, brick and terracotta tiles, Synthetic materials (PVC, Timber). Floors of industrial buildings & warehouses. Ceramic wall & floor tiles
- Roofing materials: Burnt clay tiles, slates, AC sheets, GI and Aluminium sheets.

AR 203: HISTORY OF ARCHITECTURE - I

TEACHING HOURS		
L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS			
IA	WR	W	TOTAL
50	50	0	100

OBJECTIVE

Introduction to the architecture of the ancient world. To generate an understanding about the development of civilization and its architectural implications.

METHODOLOGY

Visually intensive lectures using power point presentations to acquaint students with historic sites and buildings. Site visits and seminar presentations and model making

CONTENTS

TERM 1

Civilizations of the Ancient Western World

- Growth of early civilizations from Stone Age to Neolithic settlements in Europe. Examples – Carnec, Stonehenge etc.
- Egyptian: Early tomb architecture and later temple architecture, great pyramids of Giza, Mastabas, Funerary temples and later temples like Khons etc.
- Mesopotamia: Cities of Mesopotamia like Ninveh, Khorsabad and Babylon.]
- Greek: Hellenistic period, classical orders, temples and public buildings, geometry and symmetry in their buildings, Acropolis, Agora, temples, tombs and house forms.
- Roman: Construction systems using vaults and domes. Building types like temples, forums, basilica, theatres, aqua ducts, bridges, roads, sewage system and fountains.
- Early Christian: Basilican churches, centralized and longitudinal churches, interiors and articulation of the churches, pictures and biblical scenes.
- Byzantine: Development of dome over square or polygonal plans.

- Romanesque: New construction methods, massiveness, verticality and ornamentation of churches, integration of centralized and longitudinal plans.
- Gothic: Continued integration of centralized and longitudinal plans, flying buttress, ribbed vault, sensitivity towards light, use of stained glass. Cathedrals and churches.
- Central Asia: cities of Bukhara, Samarkand etc.

TERM 2

Civilizations and Architecture of Ancient India

- Indus Valley Civilization: Town planning principles, typical building layouts, sewage system, public buildings, the Great Bath etc. Examples from Harappa and Mohenjodaro
- Aryan Civilization: Vedic culture, town planning, its motifs and patterns.
- Buddhist Architecture: Pillars, edicts, stupas, viharas and chaityas.
- North Indian Temple forms: Three Schools -Gujarat, Khajuraho & Orissa.
- South Indian temple forms: Chalukya, Pallava, Pandya and Chola Rulers.
- Jain architecture: Jain temples and temple cities such as Palitana and Girnar.

AR 204: ARCHITECTURAL DRAWING - II

TEACHING HOURS

L/TU	ST	TOTAL
1	5	6

EXAMINATION MARKS

IA	WR	W	TOTAL
100	50	50	200

OBJECTIVES

- To introduce the students to graphic treatment of two-dimensional drawings.
- To develop perception and presentation of simple architectural forms and building.
- To familiarize the students with preparation of perspectives by innovative methods.
- To introduce the students with perspectives of interiors.
- To develop innovative presentation techniques.

METHODOLOGY

Studio assignments and lectures.

CONTENTS

TERM 1

Metric drawing

Types used & advantage

Isometric, Axonometric & oblique view.

Metric drawings, projections and their dimensions.

Perspective Drawing

Difference with metric projections.

Anatomy of perspective: Station point, Eye level, Cone of vision, Picture plane,

Horizon line, Ground line, Vanishing points,

Types of perspectives : One point, Two point, Three point

Perspectives of simple and complex blocks

Perspectives of simple household furniture items

Perspectives of Residences.

TERM 2

Perspective Drawing By Innovative Methods

Preparation of Perspective by innovative methods like approximate method, Diagonal Method, Grid Method etc.

Other innovative methods of perspective presentation.

One point and two points perspectives of interiors.

Introduction to shortcut methods in perspective drawing.

Freehand perspective drawing.

Presentation Techniques

Introduction to represent different textures and finishes in plan and elevation.

Graphical representation of furniture, automobiles, human figures, etc. in plans and elevations and 3 dimensions

Preparation of presentation drawings of small buildings. Through planes, elevation, site plan. Etc. using various rendering techniques and media incorporating sciagraphy creating three-dimensional effects.

AR 205: WORKSHOP PRACTICES - II

TEACHING HOURS

L/TU	ST	TOTAL
0	2	2

EXAMINATION MARKS

A	WR	W	TOTAL
50	0	50	100

OBJECTIVE

To equip the students with necessary skills needed to represent design ideas in a three-dimensional format using a wide variety of materials and techniques and at different scales.

METHODOLOGY

Studio Exercises.

CONTENTS

Sequence of various stages and involved operations i.e. preparation of base, layout cutting, joining, fixing and finishing of various components.

Executing models for parts of buildings like stairs, curtain glazing, pergola, space frame and landscaping. One big exercise should be conducted where students make a model for their ongoing design studio project.

Construction of detailed building models.

Final finishing with color, texture, landscaping and human figures etc.

AR 206: THEORY OF STRUCTURES - II

TEACHING HOURS

L/TU	ST	TOTAL
3	0	3

EXAMINATION MARKS

A	WR	W	TOTAL
75	75	0	150

OBJECTIVE

To understand the analysis of indeterminate structures and their use.

METHODOLOGY

Lectures and computation exercises.

CONTENTS

TERM I

Determinacy and Indeterminacy

Determinate and Indeterminate structures.

Energy Principles

Introduction, forms of Elastic Strain Energy, Strain energy in members, Energy relation in structural theory, Virtual work, Betti's and Maxwell's laws of reciprocal deflection, Application of Virtual work, Castigliano's theorems.

Three-moment theorem

Analysis of fixed and continuous beams

Slope Deflection method

Introduction, Analysis of fixed and continuous beams, yielding of supports.

Moment Distribution

Introduction, analysis of indeterminate beams and simple frames, Sway frames

Approximate methods of Analysis

Substitute frame method

Overview of construction

Cement, aggregate, Water, reinforcement, materials.

TERM 2

Design philosophies

Strength and serviceability requirements, design methods, working stress, ultimate strength and limit state.

Analysis and Design

Analysis and design of sections for flexure by working stress and limit state method- singly and doubly reinforced sections, T and L sections, introduction and used of design aids (SP: 16 to 456)

Shear bond

Introduction. Shear stress, Diagonal tension, shear reinforcement Development Length, Anchorage Bond, Flexural bond.

Detailing of Reinforcement

Introduction, Requirement or good detailing, Cover to reinforcement, spacing or reinforcement, reinforcement requirements, Reinforcement splicing.

Slabs

Introduction. Design of One-Way slab. Two way slab.

AR 207: BUILDING SERVICES - I

TEACHING HOURS

L/TU	ST	TOTAL
1	0	1

EXAMINATION MARKS

IA	WR	W	TOTAL
50	50	0	100

OBJECTIVE

Introduction to elementary building services of water supply, sanitation and roads.

METHODOLOGY

Exercises in layout of simple drainage systems for small buildings. Planning of bathrooms and lavatory blocks in domestic and multi-storied buildings. Exercises can also be clubbed with design studio project.

CONTENTS

Water supply

Sources of water supply.

Impurities of water and systems of water supply.

Various kinds of water meters.

Water storage tanks, their capacity and location.

Calculation of water consumption.

Domestic hot and cold water supply systems.

Size of pipes and their joining details.

Connections of different sanitary fittings like ferrule, stopcocks, bibcocks etc.

Sanitation

Basic principles of sanitation and disposal of waste matter from buildings.

Dry and wet carriage systems.

Sanitary fittings- washbasins, WC's, bathtubs, sink, urinals, bidets, flushing cistern, traps etc.

Various types of joints, manholes and septic tanks.

Proper location and ventilation of intercepting chambers and inspection chambers.

Drainage systems- separate, combined and partially combined systems.

Single stack system.

One pipe and two pipe systems.

Testing of house drains.

Gradients used in laying drains and sewers.

Self-cleaning and non-scouring velocities for drain pipes.

Size of drainpipes and materials used.

Roads

Description and suitability of roads and comparative cost analysis. WBM (water bound macadam) road, tar, bitumen, asphalt and RCC roads.

Soil stabilized, brick and stone paving.

Drainage- sub drains, culverts, ditches, gutters, drop inlets and catch basins.

AR 208: VIRTUAL ARCHITECTURE - I

TEACHING HOURS

L/TU	ST	TOTAL
2	-	2

EXAMINATION MARKS

IA	WR	W	TOTAL
50	0	50	100

OBJECTIVE

Introduce techniques of photography, digital imaging and computer visualization and their role in architectural presentation.

METHODOLOGY

Lectures and skill development workshops and exercises.

CONTENTS

Photographic studies

Photography, cameras, basic skills, composition and the relation of aesthetics with architecture, synergy between the two fields, interrelation viz. use of landscapes and photography in interrelation with architectural designs and aesthetic principles.

Basic skills of camera operation both video and still; emphasis on image design and creative techniques; topics include exposure, lenses, composition, filters, and films. Photographing miniatures and models and their presentation.

Digital imaging

This will also involve cutting edge digital technology like scanning, printing, digital manipulation of images, presentation techniques on appropriate software for use by students.

Presentation skills for preview and postproduction of models.

Computer Visualization in Architecture

Application of current computer technologies in architecture and interior design; emphasis on the fundamentals of integrating multi-dimensional modelling, computer-aided design, and visualization methods into the design process.

Digital Design and Representation Tools

With a general framework of addressing the relationship between design and representation as a whole, this module explores the role of the computer in articulating design ideas, developing conceptual approaches, and interactively representing design proposals.

This course provides an investigation of computer-aided visualization techniques through the use of commercially available software for photo-realistic rendering, lighting simulation, animation, scanning, raster graphics, and virtual reality.

AR 209: COMPUTER APPLICATIONS - II

TEACHING HOURS		
L/TU	ST	TOTAL
1	1	2

EXAMINATION MARKS			
IA	WR	W	TOTAL
50	25	25	100

OBJECTIVE

Introduction and the use of software available for architectural applications.

METHODOLOGY

Integration of practical exercises along with the design studio project.

CONTENTS

TERM 1

Introduction

Introduction of various software available for Architectural application, like Auto CAD, Architectural desktop, Revit, Micro station etc. Stress should be given on Auto CAD.

Basic commands for 2-D AutoCAD

Learning basic 2D commands their function and application.

Working on layers and colors.

Understanding of Text, and dimension styles etc, supported with suitable exercise. Understanding complex commands like Pline, spline, x-refs, Attributes, Model space & Paper space etc.

At least one working plan, elevation and section should be completed.

TERM 2

Basic commands for 3D

Introduction of basic 3D commands.

Different types of modeling in Auto CAD.

Exercise on wire mesh modeling.

AR 210: DISSERTATION - INDIAN ARCHITECTURE

TEACHING HOURS			EXAMINATION MARKS			
L/TU	ST	TOTAL	IA	WR	W	TOTAL
2	0	2	50	0	50	100

OBJECTIVES

- To study historic and contemporary Indian architecture and its influence on the society and culture and its implications.
- To provide an opportunity for students to do architectural research along with design to supplement their theoretical knowledge.

METHODOLOGY

After the orientation classes and lectures, the student must submit to the concerned teacher the synopsis of a research project for approval. Each student is expected to complete and submit a report (40-50 pages) at the end of the research. Classes are to be used by the students for site visits, interviews and library work.

SCOPE OF STUDY

The study may be focused on a particular area/ period, or a specific building of historic / contemporary importance.

AR 211: ARTS AND GRAPHICS - II

TEACHING HOURS			EXAMINATION MARKS			
L/TU	ST	TOTAL	IA	WR	W	TOTAL
1	3	4	50	50	0	100

OBJECTIVES

To strengthen the students approach towards the aesthetic sense of architecture and to introduce Architecture as a functional art.

METHODOLOGY

Brief lectures, studio exercises, nature studies and Visits to art galleries and museums.

CONTENTS

TERM 1

Understanding design

Exercises based on the concept of design, creating a motif and using it for regular organized patterns in different geometric shapes and its decorative patterns.

Designs for mural, book covers, and 3-D paper sculpture.

Exercises based on the tonal treatment in color of 2-D and 3-D objects.

Still life

Still life and a sense of perspective. To give a knowledge of the relationship between the two objects with color, size and texture along with a sense of foreground and background.

Sketching

Rapid sketches based on day-to-day life like humans and animal figures, plants, fabric and furniture. To develop a sense of observation and recapitulation.

AR 301: ARCHITECTURAL DESIGN - III

TERM 2

Skill development

Exercises based on calligraphy and typography.

Brief introduction to different paintings and media like watercolor, poster color, pastels, pen and ink, pencil color etc.

Rendering of interior and exterior of buildings in color and monochrome.

Introduction to famous Indian artists and their art works and styles.

TEACHING HOURS

L/TU	ST	TOTAL
2	6	8

EXAMINATION MARKS

IA	WR	W	TOTAL
300	150	150	600

OBJECTIVES

- Exploring and designing structural spanning systems for different requirements.
- To develop sensitivity to building by laws. To understand varied structural building systems
- To develop understanding about how to design in an urban setting.

METHODOLOGY:

- Case studies to be clubbed with library research and live surveys
- Site restrictions should be imposed in framing design problems.
- Detailed models to be generated with key submissions to communicate details of parking, landscaping and elevation features. Perspectives and sketches to be included in all key submissions for the development of communication skills.

CONTENTS

TERM 1

Four structural design projects (4 week duration each).

- Each project would focus on exploring structural spanning systems for large covered areas (temporary or permanent) and their integration with form. Design exercises could be sports area, exhibition hall, temporary canopy etc. The design should be formulated to increase awareness and application about advanced structural systems and latest building material.
- Arcuated- corbelled, radiating arch, vault and dome, squinch and pendentives.
- Vector structures- trusses and space frames, slabs, one way and two-way coffer.
- Form structures- folded slabs, shells, hyperbola and parabola.

- Tensile- tents, cables and pneumatic vis-à-vis materials and plan shapes.
Emphasis of the problems would be on the design parameters and graphical presentation rather than detailed structural analysis.

TERM 2

One complex design problem (16 week duration).

The project would involve the study and design of a multi-storied building like office building, shopping mall, hotel, college and hostel, commercial complex, small hospital etc. The focus would be on understanding how to design for an urban setting. Other design issues are:

- Detailing of circulation areas like lifts, staircases etc. to develop sensitivity to horizontal as well as vertical circulation requirements in a multi story building.
- Integration of design with structural and construction details. For this, the project should be integrated with the structures and building construction classes. One set of detailed working drawings must be generated at the end of the design process.

AR 302: BUILDING CONSTRUCTION -III

TEACHING HOURS		
L/TU	ST	TOTAL
1	4	5

EXAMINATION MARKS			
IA	WR	W	TOTAL
150	75	75	300

OBJECTIVE

Introduction to a wide range of modern building construction systems incorporating the use of metals like steel and aluminium and composite materials.

METHODOLOGY

- Lectures and Studio assignments for understanding construction details.
- Site visits and library studies to supplement the studio work regarding materials and construction methods.

CONTENTS

TERM 1

Construction

- Doors: Different types of doors in steel, Aluminium and Glass. Sliding, Sliding and folding, revolving doors. Fire proof and Sound proof doors. Types of Rolling Shutters.
- Windows: Different types of windows in Steel, Aluminium and Glass. Sliding windows in Steel and Aluminium.
- Staircases: Special staircases in steel. Fire Escape Stair Cases.

Materials

- Composite materials: R.C.C. and R.B.W. Use of Bamboo for Reinforcement.
- Water proofing materials and systems for basement.
- Sections of doors and windows (I.S. 1038 etc)

TERM 2

Construction

- Roofs and Trusses: Steel Trusses.

- Detail of terracing for flat roofs.
- Water proofing and rain water disposal.

Materials

- Metals used in buildings: Properties constituents and uses of cast iron, Wrought iron, Steel, Stainless Steel, Bronze, Aluminium and Copper.
- Hot rolled sections, cold forming of sheets into sections.
- Materials for Terracing: Mud- phaska and Brick Tiles and other new systems for terracing.
- Common sections in Brass and Aluminium.
- Pipes in Mild Steel, Stainless steel, cast iron, brass and copper.

AR 303: HISTORY OF ARCHITECTURE - II

TEACHING HOURS

L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS

IA	WR	W	TOTAL
75	75	0	150

OBJECTIVES

To study the architecture of the medieval and modern world with a focus on India. The architectural styles and buildings would be discussed in context of their period, geographical/climatic conditions, economic and political conditions, social and religious customs, construction and technology, building material and structure.

METHODOLOGY

Lectures and site visits to acquaint students with historic sites and buildings of Delhi.

CONTENTS

TERM 1

Architecture of Medieval & Modern Western World

- Islamic architecture: Islam and its philosophy, its implementation in various building types such as mosque, tomb, fort and their elements like domes, minarets, arch etc.
- Renaissance, Mannerism (Monumentality and spatial effects of forms, use of orders), Post Renaissance: Baroque & Neo-classicism in parts of Europe.
- Modern architecture: Various modern movements in different parts of the Western world and their role in defining Modern architecture such as Post Impressionism, Expressionism, Art Nouveau, Surrealism, Abstract Expressionism, Cubism etc.

TERM 2

Architecture of Medieval & Modern India

- Sultanate Rulers: Slave, Khilji, Tughlak and Lodi Dynasties and their architecture in and around Delhi.

- Provincial styles: Styles developing in regional provinces such as Punjab, Bengal, Gujarat, Jaunpur, Bijapur, Bidar and the Deccan.
- Rajasthani architecture: Study of building types like *havelis*, step wells, gates, *baradaris* and their architectural characteristics. Fortified cities of Jaisalmer, Jaipur etc. Forts and Palaces in Mandu, Chittorgarh, Orcha, Jodhpur etc.
- Mughal Architecture: Babar, Humayun, Akbar, Jehangir, Shahjahan, and Aurangzeb. Architecture during the rule of later Mughals and development of Regional styles in Awadh, Bengal, Malwa, Jaunpur etc.
- Colonial Architecture: British Architecture and its impact on Indian Architecture in the colonial days.
- New Delhi: Planning criteria, architectural features, Stylistic influences, Rajpath, India gate, Viceroy's Palace (Rashtrapati Bhavan) etc.

AR 304: PRINCIPLES OF HUMAN SETTLEMENTS

TEACHING HOURS

L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS

IA	WR	W	TOTAL
50	50	0	100

OBJECTIVES

To study the patterns of human settlements and their relevance to architecture.

METHODOLOGY

Lectures and library studies.

CONTENTS

Man and Environment

Biological and behavioral responses to human settlements.
Design for living, natural and built- environment.

History of human settlements

Origin and growth of human settlement.
Role of River Banks in growth of human settlement.
Historical survey of the city as an expression of the vitality of a civilization.
Western world: River valley settlements, Greek, Roman, Medieval, Renaissance and modern.

Ancient texts and treatises on settlement and area planning in India.
Human settlements during ancient medieval and modern periods
India, Europe and other parts of the world.
Characteristics of human settlements built by Hindu and Islamic Rulers in India.

Study of ancient Indian settlements like Mohenjodaro, Taxila, Nalanda.

Study of ancient Indian cave settlements of Ajanta, Ellora, Elephanta.

Comparative study of Indus Valley and town planning in ancient and medieval India.

AR 305: ESTIMATION AND COSTING

TEACHING HOURS		
L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS			
IA	WR	W	TOTAL
75	75	0	150

OBJECTIVES

To equip students with the necessary technical knowledge for calculating estimates and detailed costing for small to medium scale projects.

METHODOLOGY

Small-scale projects to be undertaken to understand costing principles and terms. Final costing exercise to be carried out where students can undertake the costing of their studio design project.

CONTENTS

TERM 1 Systems

Systems of taking quantities and estimating for all trades involved in construction of medium complexity project.

Specification

Writing of Specification for Quantities.
Items of work and Materials.

Classification of areas

Plinth area, Covered area, Floor area, Carpet area and Projection area.

Types of Estimates

Preliminary, Detailed.

Methods of taking out quantities for building works.

Preparation of Bill of Quantities (BOQ).
Mode of measurements of quantities.

Market rates of labor and building materials.

Labor turnout and norms for consumption of basic materials.

TERM 2

Schedule of rates

CPWD

PWD

Cost Index.

Analysis of rates for common items of work like Cement concrete, Brick work, Painting etc.

Methods for preparation and submission of preliminary estimates and detailed estimates.

Tender

Tender notices and tender documents.

Types of tendering in practice.

Process of tendering.

Preparation of tender notes/ documents and comparative statements

Award of Tenders

AR 306: THEORY OF STRUCTURES - III

TEACHING HOURS

L/TU	ST	TOTAL
4	0	4

EXAMINATION MARKS

A	WR	W	TOTAL
75	75	0	150

OBJECTIVE

To understand the design elements of Reinforced Cement Concrete, Steel structures along with soil mechanics and foundation engineering

METHODOLOGY

Lectures and exercises in independent design of structural elements.

CONTENTS:

TERM 1

Design of Column

- Detail of axially and eccentrically loaded short and long columns by working stress and the limit state methods.
- Design for direct and uni-axial bending, use of design aids

Elements of Soil Mechanics

- Properties of Soil, Safe bearing capacity, active and passive earth pressures

Foundation Engineering and types of foundation

- Design of footing; strip footing for walls, isolated column footing, combined rectangular and trapezoidal footing
- Raft foundation
- Deep foundation
- Pile & well foundation.

Complete Design of continuous beams & Portal Frames

- Requirement of joints in RC.C. Construction
- Construction joints
- Expansion joints.

TERM 2

Theory & Design of Cantilever Retaining walls.

Design of stairs

- Effective span of stairs
- Distribution of Loading on stairs
- Simple case of design of stairs.

Steel Structures

- Design of Riveted & welded connections (Simple cases only).
- Tension & Compression members.
- Beam & Plate, Girder
- Introduction to grillage foundation.
- Trusses

AR 307: BUILDING SERVICES - II

TEACHING HOURS		
L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS			
A	WR	W	TOTAL
75	75	0	150

OBJECTIVES

To teach the schematic layout of simple electrical, illumination, lift and fire fighting system for domestic and office buildings.

METHODOLOGY

Lectures and studio exercises. Exercises can be clubbed with design studio project.

CONTENTS

TERM 1

Electrical Services

- Laws of electrical circuit- Ohm's and Kirchoff's laws and basic principles.
- Circuits- series and parallel.
- Common domestic installations- water heater, radiator etc.
- Wires- specifications and carrying capacity and calculation of electrical loads.
- Types of switches, sockets and fixtures.
- Distribution boards, circuit breakers, fuses, electrical meters and their layout.
- Design considerations for electrical installations.
- Protection against overload, short circuit, earth fault, lightning conductors and other safety measures for buildings.
- Wiring systems- methods of wiring, joint and loop in.
- Types of electrical wiring- batten, capping & casing, concealed conduits etc.
- Wiring material- types, sizes and specifications, main switch, MCB, DB meter.

Fire fighting

Causes and spread of fire. Combustibility of materials and safety norms.

Fire detection and fire fighting equipment- smoke detectors, monitoring devices, alarm systems. Etc. Design of Fire escapes for high-rise buildings.

TERM 2

Illumination

- Light and its propagation, reflection, radiation, transmission and absorption.
- Definitions and units of flux, solid angles, luminous intensity, brightness.
- Laws of illumination, types of illumination schemes – direct, semi direct, indirect and diffused lighting and their design considerations.
- Light flux method for calculation of number of lamps for illumination.
- Incandescent, sodium vapor, mercury vapor, fluorescent and neon lamps etc.
- Types of Luminaries for interior and exterior lighting.
- Residential, commercial, industry, flood and street lighting.
- Tests before commissioning of electrical services.

Lifts

- Types of lifts, their control and operation.
- Definition of average lift carrying capacity, rated load, rated speed, RTT etc.
- Details of lift section, machine room, equipment, lift well and lift pit.
- Design standards for lifts lobby, lift cars size etc from building codes.
- Escalators and conveyors.

AR 308: VIRTUAL ARCHITECTURE - II

TEACHING HOURS			EXAMINATION MARKS			
L/TU	ST	TOTAL	IA	WR	W	TOTAL
2	-	2	50	0	50	100

OBJECTIVE

Intro to technical and aesthetic concepts of interface design.

METHODOLOGY

This module consists of lectures and self-motivated projects leading from basic 3D modeling and animation to the existing world of virtual environments.

CONTENTS

Interface Design

Introduction to technical and aesthetic concepts of interface design, including interface design for the Web, graphics, video, and sound. Introduction to basic interactive multi-media programs, intermediate asset preparation, and delivery systems (Internet, CD, kiosk, etc.).

Digital Fabrication

Introduction to the fact that Digital technology is transforming not only the way buildings are conceived and designed, it is transforming the way buildings are constructed.

This course also explores the crossover between computer-aided designs. Through a series of hands-on labs and small design projects students learn various software applications and computer-driven hardware tools as a means of introducing basic concepts of construction.

Virtual Worlds, 3D Modelling and Animation

This module aims at developing competency and confidence in rapidly developing technology. The focus is on mastering technical challenges on aesthetics and creativity.

AR 309: COMPUTER APPLICATIONS - III

TEACHING HOURS			EXAMINATION MARKS			
L/TU	ST	TOTAL	IA	WR	W	TOTAL
1	2	3	75	50	25	150

OBJECTIVE

Advanced learning of software available for architectural applications.

METHODOLOGY

Integration of practical exercises along with the design studio project.

CONTENTS

TERM 1

AutoCAD 3D

Understanding Co-ordinate systems.
Introduction of solid modeling.
Learning solid modeling commands, editing solid modeling.
Working on different planes.
At least one exercise should be completed in 3D modeling.

TERM 2

Revit

Introduction of Revit.
Advantages of Revit over Auto CAD.
Learning various 2D & 3D Commands supported with suitable exercise.

Basic working commands for Adobe Photoshop, Adobe Pagemaker and Corel Draw as applications helpful in Architectural presentations.

AR 310: DISSERTATION- INDIAN ARCHITECTS

TEACHING HOURS		
L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS			
IA	WR	W	TOTAL
50	0	50	100

OBJECTIVES

To understand the face of contemporary Indian architecture through a study of Indian Architects, their projects, their design philosophies and their role in shaping contemporary Indian architecture.

METHODOLOGY

After the orientation classes and lectures, the student must submit to the concerned teacher the synopsis of a research project for approval. Each student is expected to complete and submit a report (20-25 pages) at the end of the research. Classes are to be used by the students for site visits, interviews and library work.

SCOPE OF STUDY

Areas of study would be the in-depth study of any contemporary Indian architect and his / her projects to understand his / her design philosophy and analyze his / her contribution to Indian architecture.

AR 401: ARCHITECTURAL DESIGN - IV

TEACHING HOURS		
L/TU	ST	TOTAL
2	6	8

EXAMINATION MARKS			
IA	WR	W	TOTAL
200	100	100	400

OBJECTIVES

- Integration of all aspects about a building design and its workings- including service details, assessment of environmental impact, innovative structural systems and materials etc.
- Evolving sensitivity to design of spaces at the urban scale – creation of nodes and links, visual landmarks, activity and interaction zones, relationship between commercial, recreational and residential areas.

METHODOLOGY

- Site studies to be carried out on a larger scale to analyze implications of the entire context within which the project is to be executed.
- Large scale models to be used for assessing site conditions and restrictions.
- Design process to incorporate panel discussion and seminar presentations.
- Presentations to be made using 3-D visualization.

CONTENTS

TERM 1

Group Housing (14 week duration).

One project would address the solution to a large-scale multi story project like group housing, commercial complex etc. Design proposals should study and address issues like movement of people and traffic, services, waste disposal management through detailed case studies. Sensitivity to use of materials, lighting, landscape and services must be a part of the solution.

The project could also focus on the design for economically weaker section- slum up-gradation projects, site and services schemes etc. In such projects the focus would be on devising economically viable alternative building materials, structural systems and service options.

TERM 2

Urban Design (16 week duration).

- The problem would be introduced before the end of the first term and case study/ site visit would be undertaken during the term break. The project would be a medium sized urban design intervention.
- The design solution would address issues like demography, market value, land use patterns etc. Other design issues are the detailing of open and built areas after studying human and vehicular traffic movement patterns. The project should be substantiated by detailed site surveys and reading about urban design principles. Study models must accompany every stage.

AR 402: BUILDING CONSTRUCTION -IV

TEACHING HOURS

L/TU	ST	TOTAL
1	5	6

EXAMINATION MARKS

IA	WR	W	TOTAL
200	100	100	400

OBJECTIVE

Introduction to construction details of specialized building elements like skylights, soundproof paneling, pre-cast and pre-stressed concrete elements etc.

METHODOLOGY

- Lectures and Studio assignments for understanding construction details.
- Site visits and library studies to supplement the studio work regarding materials and construction methods.

CONTENTS

TERM 1

Construction

Doors and Windows: Soundproof doors, Bay windows, Skylights.
Foundations: Pile foundation- details of pile, pile caps and types of piles.

Materials

Study of various patent materials of construction available under different trade names with their specifications, properties and uses like Vincertex, Marblex, Fixopan, Anchor Boards, Novapan etc.

TERM 2

Construction

Partitions: Construction and details of glazed, lightweight and soundproof partitions and soft paneling.
Pre-cast and Pre-stressed and post tensioning of concrete members.
Modular construction.

AR 403: ELECTIVE - I

TEACHING HOURS		
L/TU	ST	TOTAL
1	0	1

EXAMINATION MARKS			
IA	WR	W	TOTAL
50	0	50	100

OBJECTIVE

Intensive study of one of the following subjects so that students may have a base for doing specialization in specific field of architecture.

METHODOLOGY

The course shall consist of lectures/ tutorials/practical and self-study. The student will select a topic within his chosen subject with the consent of the concerned teacher and submit a detailed report/presentation. The report shall be submitted in 3 copies.

ELECTIVES

- Rural Habitat
- Vastu Shastra
- Vernacular Architecture
- Language- Persian, Arabic or French (with the Department of Foreign Languages, Jamia Millia Islamia).
- History of Indian Architecture (with the Department of History, Jamia Millia Islamia).

Viva-voce regarding the study and report shall be conducted by one external and one internal examiner.

AR 404: TOWN PLANNING

TEACHING HOURS		
L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS			
IA	WR	W	TOTAL
50	50	0	100

OBJECTIVE

Introduction to settlement and town planning.

METHODOLOGY

Lectures and seminar presentations.

CONTENTS

Pioneers of modern town planning

Patrick Geddes
Kevin Lynch
Clarence Perry
Frank Lloyd Wright
Ebenezer Howard
Le Corbusier
Soria Y Mata

City plan patterns

Linear, Radial and Grid Iron layout patterns.
Planning theories of the twentieth century.
Industrial revolution and modern city.
Garden City, Satellite town.
Democratic city.

Case studies of some recent planned cities like New Delhi, Canberra, Brazillia, Chandigarh.

Current theories on physical planning.
Socio-economic dynamics of urbanization.

Methodology of conducting town planning, surveys and analysis of data collected, use of G.I.S.

Preparation of Master plans.
Zoning and development controls.

Traffic Characteristics

Composition, speed, volume and direction of movement.
Urban road systems and geometry.
Capacity of roads and intersections.

AR 405: LANDSCAPE

TEACHING HOURS

L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS

IA	WR	W	TOTAL
50	0	50	100

OBJECTIVE

- Introduction to the role of landscape elements in architectural design.
- Impacts of landscape elements on environment.

METHODOLOGY

Landscape design work shall be conducted as part of Architectural Design Studio.

CONTENTS

Basic elements of Landscape

- Land
- Water
- Vegetation

Study and detailing of hard and soft landscape

Services related to landscape:

- Plumbing
- Electrical
- Sewage management
- Water supply

Plant Material

A study of Indian vegetation, its characteristics and design aspects

- Trees
- Shrubs
- Ground cover
- Indoor plants

Grading and Slopes
Landscape Design Concepts of

- Europe
- Japan
- India
- China
- Renaissance

AR 406: THEORY OF STRUCTURES - IV

TEACHING HOURS		
L/TU	ST	TOTAL
3	0	3

EXAMINATION MARKS			
IA	WR	W	TOTAL
50	0	50	100

OBJECTIVE

To understand the modern trends and challenges in building structural systems.

METHODOLOGY

Lectures by the experts in the field will be arranged to make the students to understand advance structure techniques available for construction of complex structures.

CONTENTS

Earthquake resistant design

Elements of Earthquake Engineering, zoning, base shear, Lateral forces, Ductile detailing
Introduction to new codes.

Introduction to Computer Aided Structural Design

Demo of practical problems using STAAD

Theory of Domes, Shells & Folded Plates.

(Following systems and techniques are to be understood conceptually. Calculations / Design for these techniques and systems are not expected.)

Synthesis of force systems to create Structural system.
Vector Active, Surface Active and Bulk Active systems.
Theory of Folded Plates, Domes, Shell, Vault.
Space Frame, Flat Slabs, Hollow Floor.
Portal Frame, Cables and Suspension Structures.
Structure System for Seismic Zone
Inflatable Structure

AR 407: BUILDING SERVICES - III

TEACHING HOURS

L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS

A	WR	W	TOTAL
50	50	0	100

OBJECTIVES

- To understand the schematic layout of simple air conditioning system for domestic and office buildings.
- To understand the methods and materials available for planning of soundproof areas in buildings.
- Understanding of intelligent buildings and devices used in them.

METHODOLOGY

Lectures and schematic layouts exercises. Exercises can be clubbed with design studio project.

CONTENTS

TERM 1

Air Conditioning

Principles of air conditioning.
Psychometric chart, comfort zone.
Refrigeration cycle and air cycle.
Methods of cooling and heating
Evaporative cooling systems of air conditioning.
Unit air conditioners and central air conditioning plants.
Standards and prescribed locations for various parts.
Descriptive details of plants and duct layout.
Air distribution system- fans, filters, ductwork, outlets, dampers.
Natural and artificial ventilation.
Cooling load for AC.

TERM 2

Acoustics

Principles of transmission and passage of sound.
Factors influencing hearing conditions.

Noise reverberations, resonance, reflection and absorption of sound, reverberation time

Acoustical defects in rooms and their solutions.

Echo, dead points, sound foci, Feedback etc.

Structure born and air born sounds.

Types of absorbents and reflectors, Co-efficients of efficiency.

Reverberation time, and time delay for rooms like classrooms, lecture rooms, multi purpose halls, conference rooms and auditoriums.

Noise pollution within and outside buildings and its remedies.

Intelligent Buildings

Sensing and auto operation devices for electrical, air conditioning, plumbing and Waste disposal services.

Water harvesting.

Use of non-conventional sources of energy for energy efficient buildings.

AR 408: HUMANITIES

TEACHING HOURS

L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS

IA	WR	W	TOTAL
50	50	0	100

OBJECTIVE

To understand the society to which architect serves as well the psychological implications in designing buildings and town ships.

METHODOLOGY

Lectures.

CONTENTS

TERM 1

Elements of Psychology

Study of Intelligence, Sensitivity, Creativity, Logic & Reasoning.
Implications of psychological issues in design of buildings and town ships.
Psychology and use of color in architecture.

Social science

Man, Nature & Society
Concept of Social, Political, Religious and Cultural Structure and their impact.
Traditional pattern and trends of change. Concept of Social stratification.
Imbalance in Labor Pool, Rural -Urban Dynamics and resultant Migration.
Impact of industrialization on traditional society. Modernization, Urbanization.

TERM 2

Economics

Theory of Demand and Supply, Economies of Scale.
Micro Economy, Macro Economy

Mercantile Economy, Industrial Economy, Agrarian Economy
Cost Benefit Analysis. Feasibility, Viability
Financing and institutions associated with Housing and Infra Structure Development.
Agenda, Program, Plan, Project. Five-Year Plans in India.

Indian Governance.

Union Government
State Government
Local Government.
Elements of Democracy, Welfare State, Socialism, Capitalism,

AR 409: BUILDING BYE LAWS

ATEACHING HOURS

L/TU ST TOTAL

1 0 1

EXAMINATION MARKS

IA WR W TOTAL

25 25 0 50

OBJECTIVE

Introduction of the need and importance of building byelaws and their applications.

METHODOLOGY

Lectures. The Exercise on Building Bye-laws shall be part of architectural design.

CONTENTS

Bye- laws

Need and importance of Building Bye-laws.

Authority behind building Byelaws.

Various laws for Regulation of Building operations and Urban development.

Detailed discussion of Bye-laws related to plot size, set backs, site coverage, light and ventilation, sanitation etc.

Bye-laws related to site planning and housing layouts, Master plan, land use, density, width of roads, open areas, public utilities.

Submission drawings for municipal approvals for individual houses, commercial buildings and housing layouts.

Standards: Use of Codes

Difference between codes and byelaws

Bureau of Indian Standards

National Building Codes

IS 456

Other codes of BIS

Time Saver Standards, Neuferts etc.

Housing

Housing needs and different types of housing: individual and multi family dwellings, group/ community housing.

Urban and Rural Housing.

Low cost housing in urban and rural context.

Studies Exercises: Group Housing Projects- Low rise and high rise alternatives.

AR 410: SEMINAR - INDIAN HABITAT

ATEACHING HOURS

L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS

IA	WR	W	TOTAL
50	0	50	100

OBJECTIVES

To study the various aspects of Indian Habitat (vernacular construction materials and methods etc) and their application in contemporary Indian Architecture.

METHODOLOGY

After the orientation lectures, the student must submit to the concerned teacher the synopsis of at least two different research projects for approval out of which one would be selected depending on its merit for research. Each student is expected to complete and submit a report (40-45 pages) at the end of the research. Classes are to be used by the students for site visits, interviews and library work.

SCOPE OF STUDY

The study shall focus on detailed study of a specific residential area/ dwelling cluster/ cooperative housing/ corporate housing or a particular issue related to Indian historical/ traditional or contemporary habitat.

AR 411: INTERIOR DESIGN

ATEACHING HOURS

L/TU	ST	TOTAL
1	1	2

EXAMINATION MARKS

IA	WR	W	TOTAL
50	0	50	100

OBJECTIVE

- To define how interior space planning varies from architecture.
- Introduction to various methods of interior space planning and execution including detailed anthropometric studies, materials, finishes and lighting.

METHODOLOGY

Lectures, presentations. Final exercise is to be integrated with the design studio project.

CONTENTS

Anthropometrics for Interior Design.

Human Scale / Static / Posture /Dynamic spaces
Furniture Anthropometrics

Principles of Interior Design

Elements of Interior Design
Tools of Interior Design
Color, Illuminators, Furniture, Furnishings and Accessories.

History of Modern Furniture Design

Gerrit Riet Weld
Breur
Kaar Klint
Alvar Aalto
Mies Van Der Rohe
Le Corbusier
Eiro Saarinen
Charles Eames

Molded Furniture
Modular Furniture

Exercises

Toilet Design
Office Design
Kitchen Design
Restaurant
Show room

AR 412: MANAGEMENT

TEACHING HOURS

L/TU	ST	TOTAL
2	0	2

EXAMINATION MARKS

IA	WR	W	TOTAL
50	50	0	100

OBJECTIVE

To equip students with basic management techniques needed for office and project management.

METHODOLOGY

Lectures.

CONTENTS

Management and the environment

Evolution of management thought.
Managing in a global environment.
Social and ethical responsibility of management.

Managing work and organization

Decision-making and the planning functions including strategic planning.
The organization function, the controlling function.

Managing people

Human resource management- managing work groups.
Leadership: motivation: communication and negotiations.
Organization change and development.

Financial management

Functions of financial management.
Financial objectives, analysis and interpretation of financial information.
Sources of long term and short term finance.
Project appraisal and capital budgeting.

Office management and procedure

Organizing work, staffing, delegation and decentralization.
Filing and Indexing.
IT application in office management and procedure.
Enterprise Resources Planning (ERP).
Customer Relationship Management (CRM) .
Customer satisfaction, Quality and Excellence.

Entrepreneurship

The entrepreneurs' tasks and special challenges of entrepreneurship.
Design office management
Construction management.

Reference

Donnelly, Gibson and Ivancevich, *Fundamentals of Management*
Ed. Irwin.
Hellriegel and Slocum, *Management*, 7th ed. South Western College
Publishing.
Anderson, *Customer Relationship Management*, Tata McGraw
Hill.
Hampton, *Management*, Tata McGraw Hill.

AR 501: THESIS

ATEACHING HOURS		
L/TU	ST	TOTAL
5	15	20

EXAMINATION MARKS			
IA	WR	W	TOTAL
600	0	600	1200

OBJECTIVES

Thesis projects must reflect the culmination of the development of the student's architectural skills and design attitude. The project must be chosen so as to address and resolve, through design, all aspects of the design process.

METHODOLOGY

The student must submit to the department the synopsis of at least two different design/research projects for approval out of which one would be selected depending on its merit for scope of design intervention and its scale.

A guide to supervise the studies will be appointed by the head for each student. Regular progress in studio will be monitored and internal assessment will be carried in six stages during the exercise, each stage will have a presentation to the internal jury for thesis.

The stage submissions must be based and supported by detailed analytical studies that lay down the validity of the design criteria and detailed methodology. The following are the basic guidelines for the planning the thesis design project and its submissions:

1. Detailed site study of existing site conditions and context and evolving design directives and concept.
2. Case studies to be clubbed with library research and surveys.
3. Site restrictions should be followed as applicable for building byelaws of parking, FAR, fire, security and services.
4. Initial concept stage to experiment with shapes and forms to evolve a built volume through block model studies.
5. Incorporating landscape to understand interaction between built and open space.
6. Study and address issues like movement of people and traffic,

- services, waste disposal management etc.
7. Develop details for use of materials, lighting, landscape and services.
 8. Final proposal to include specialized aspects of service details, assessment of environmental impact, innovative structural systems and materials etc.

In special cases depending upon past achievements and aptitude, the institute may allow a research project to be undertaken in lieu of a design project.

SCOPE OF STUDY

The projects chosen could vary in scale from small individual buildings to large complexes to urban design intervention. The project should be such that it highlights the student's individual innovation in the architectural design process.

AR 502: PROFESSIONAL PRACTICE

ATEACHING HOURS

L/TU	ST	TOTAL
6	0	6

EXAMINATION MARKS

IA	WR	W	TOTAL
50	50	0	100

OBJECTIVE

To introduce aspects of professional conduct, duties and responsibilities and legal rights and procedures of the architectural profession.

METHODOLOGY

Lectures.

CONTENTS

Architectural Profession today

Registration under Architect Act 1972.

Main provision of Architects Act, AICTE Act.

Architects role in society and careers in architectural profession.

Architects in practice and his office organization.

Basic Account Keeping and preparation of Balance Sheet.

Scale of Professional fees, mode of payment, Professional conduct and ethics.

Indian Institute of Architects

Its role as a professional body for promotion and regulation of the Architectural profession and assisting its members, ARCASIA (Architects Regional Congress of Asia), Common wealth Architects Association, UIA (Union International des Architects).

Law related to the profession

Introduction of following Acts: Contracts, Arbitration, Environmental, Consumer Protection, Negotiable Instrument, Easement, Partnership, Income Tax, Service Tax, Professional Tax.

Tender and Contracts

Types of building contracts, their merits and demerits.

Preparation of tender documents, inviting and opening of tenders, comparative statements.
Architects recommendations.
Signing of the contract.
Architectural Competitions.

Valuation

Role of Architect as an Evaluator.
General principles and methods of evaluation of buildings.

Arbitration

Role of an Architect as an Arbitrator.

Introduction to agencies related to Architectural Profession

HUDCO, Development Authority, TCPO etc.
Housing financing Agencies: HDFC, Banks, LIC, HUDCO etc.

AR 503: ELECTIVE - II

ATEACHING HOURS

L/TU	ST	TOTAL
4	0	4

EXAMINATION MARKS

IA	WR	W	TOTAL
50	0	50	100

OBJECTIVE

Intensive study of one of the following subjects so that students may have a base for doing specialization in specific field of architecture.

METHODOLOGY

The course shall consist of lectures/ tutorials/practical and self-study. The student will select a topic within his chosen subject with the consent of the concerned teacher and submit a detailed report/presentation. The report shall be submitted in 3 copies. One copy shall be filed with the library for future reference.

ELECTIVES

- Building Services for Intelligent Buildings.
- Earthquake Resistant Architecture.
- Islamic Architecture (with Center for Islamic Studies, JMI).
- Conservation of Historic buildings.

Viva-voce regarding the study and report shall be conducted by one external and one internal examiner.

MAR 101:

Architectural Philosophy

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To make a base of sound understanding of the fundamentals and theories in Architecture.
- To critically analyze the ongoing practices and formulate an understanding of the same.

METHODOLOGY:

- Lectures and presentations based on field observations, surveys, web search and library studies.

CONTENTS:

- Towards Analytical approach of Architecture: the concept and theory of Period, Place, Purpose, People and Philosophy.
- History, Theory, Criticism, Post Mortem and Anti Mortem
- Time, Function and Alterity in Architecture
- Complexity and Contradiction in Architecture
- Building Philosophy – Towards Architecture theory of Conceptualize, Communicate and concretize.
- Architectural Theory and Practice in International and Indian context
- Architectural Development in International and Indian context: 21st century changes with the advent of Foreign Direct Investment in Architecture.
- Ethics of Architecture – Objectivism

READINGS:

- Architectural Philosophy: Repetition, Function, Alterity by Andrew E. Benjamin
- Architectural Reflections: Studies in Philosophy and Practice of Architecture By Colin St. John Wilson, Roger
- Modern Architectural Theory Harry Mallgrave

MAR 102:

Contemporary Architecture

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To identify the theories, movements and buildings that have led to 'new' forms in architecture
- To recognize the social and political pressures behind contemporary architecture

METHODOLOGY:

- Lectures and presentations based on field observations, surveys, web search and library studies.

CONTENTS:

- Issues critical for present times: globalization, technology, cognitive sciences, the environment, and cultural politics.
- Formal or theoretical resonances of the same in a host of architectural movements: the techno fantasist movements of the 1960s, "post-modern" semiosis, phenomenology, Third World "social modernism", vernacularism, post-modernism, cybernetics, and so on.
- Societal dynamics on the socio- economic and politico paradigms :post-structuralism, and psychoanalysis as well as current debates in globalization, urban geography, mass customization, and post-criticality, among others.
- Transformation of Contemporary Architecture in the Indian scenario – 1920s-1950s, 1950-1980s, 1980-2000, 21st century.

Students will look at buildings, writing and movements as part of the evolving critiques of modernism from the 1950s onwards; in doing so, the students will come to examine the manner in which modernism was both critically unraveled and reinvented at different moments of its aftermath.

READINGS:

Frampton, K. (1980) *Modern Architecture: A Critical History*. London, Thames & Hudson
Jencks, C. (1985) *Modern Movements in Architecture*. Harmondsworth, Penguin
Sharp, D. (1991) *Twentieth Century Architecture*. London, Lund Humphries

MAR 103: Contemporary Technology

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To understand the contribution made by new materials and technology to contemporary buildings
- To understand the construction process
- Development of strategies for collaboration between disciplines

METHODOLOGY:

- The methodology of imparting information should be lectures and presentations citing examples and case studies.

CONTENTS:

- Statics of Architectural Structures: Structural Morphology, Basic structural elements and force systems.
- Building systems: Performance requirements, Identification and specification of elements
- Sustainable strategies Best practices, Resource Efficiency, upcoming issues and ratings
- Materials: Contemporary, structural and otherwise
- Systems integration
- Building Codes

MAR 104:**E I A & Natural Resources**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To introduce the students with the theory and practice of Environmental Impact Assessments for proposed projects
- To emphasize on the preservation of natural resources.
- To discover the relevance of natural resource management in design and planning of regional areas.

METHODOLOGY:

- Classroom teaching through lectures and presentation.
- Conducting exercises on EIA or introducing the preparation of a report for a project.

CONTENTS:

- **INTRODUCTION**
 - Understanding Ecosystems: General Structure and Function: Types of Biogeochemical cycles; Carbon cycle, Global water cycles, nitrogen cycle
 - Natural elements water, vegetation and land.
- **EIA**
 - from theory to the practical
 - What data is required, how this data should be collected and interpreted, and significance of the data
 - Effectiveness of the assessment methods
 - What issues should be addressed in the terms of reference (TOR)
 - Tools and thumb rules available to evaluate the environmental impact of projects
 - Better understanding of the EIA process – from screening, scoping, data collection to impact assessment as well as the role of public consultation
 - Better understanding of the environmental and social impacts of the industrial and developmental projects
 - Better ability to review EIA reports and identify its strengths and weaknesses
 - Increased ability to play active role in post-EIA monitoring.
- **NATURAL RESOURCES**
 - Introduction - Settlements in relation to regional landscape resources.
 - Microclimate: Definition and characteristics. The role of Natural Elements
 - Air pollution and Air pollution monitoring and quality criteria
 - Threat natural resources; urban environmental issues such as solid waste management, air quality, conservation of water resources and vegetation cover.
 - Natural resources specific to region types: for example: coastal, hills, deserts and plateau regions etc.

MAR 105:

Integrated Building Services

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

INTEGRATED BUILDING SERVICES:

OBJECTIVE:

- To understand the importance of building services in the design of the building.
- Provide students the basic concepts and thorough knowledge and operation of building services in modern, large high rise building complexes.

METHODOLOGY:

- Methodology of imparting information should be lectures and presentations citing examples and case studies.

CONTENTS:

- **HVAC Services:** Basics of Air-conditioning, air condition working, HVAC Comfort Principles, HVAC Components and Systems.
- **Electrical services:** Incoming supply and distribution in buildings, electric safety and risk assessment, concept of fault level, Over current protection.
- **Fire Services:** Basic fire extinguishing system viz water based, pedestal fire hydrant system, total flood gas protection systems, smoke management systems etc.
- **Lighting Services:** Photometry and colorimetry, lighting equipment and systems, lighting calculations, day lighting.
- **Building Acoustics:** Acoustic fundamentals, Acoustic design and planning, vibration.
- Basic principles involved in design of plumbing services, solar water heating and rain water harvesting.

MAR 106:**Research Methodology**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To enhance the students' generic research, communication skills and critical analytical ability

METHODOLOGY:

- Lectures, Project work and tutorials.

CONTENTS:**PART (A)****Unit I: Introduction, types of Research**

Foundation: Its Nature and Scope, plagiarism

Scientific Research: Steps of scientific methods and its scope in Architectural research

Qualitative Research Paradigm: Assumption, Nature and Scope, Action Research, Pure and Applied Researches in Architecture.

Unit II: Research Methods: Historical, Survey, Experimental, Case Study, Ethnographic, Visual Research

Unit III: Research Design: Meaning and Importance

- Sample and Sampling Design: Concepts of Population Sample, Representative Sample, Probability and Non Probability, Techniques of Sampling
- Tools and Techniques of Research: Characteristics of Good Tools, Questionnaire and Interview, Observation, Tests, Scale and Types

Unit IV: Preparation of Research Proposal:

Research Problems, Research Objectives, Research Questions, Hypothesis, Operational Variables, Review of Related Literature, Research Design, Limitations and Delimitations

Report Writing, Purpose, Format, Characteristics of Good Research report

PART (B): Branch Specific**Unit V: Descriptive Statistics:**

Data: Nature and types, Normal Probability Curve: Skewness and Kurtosis

Measures of Central tendencies, Measure of Variability, Measures of Correlation: Pearson's correlation and Spearman's Rho

Unit VI: Inferential Statistics (Parametric)

Significance of Statistics, Concept of Null Hypothesis, Level of Significance, T-Test

Unit VII: Inferential Statistics (Non Parametric)

Chi Square Test, Median R Test, Mann-Whitney Test.

Unit VIII: Analysis of Qualitative Data

Editing, Coding of data, Content Analysis

MAR 117

Dissertation I-(AP)

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	-	50	100	-	4

Objective:

- To develop an understanding of the indigenous & designed knowledge systems around us.
- To understand Architecture Education as a part of the Broader Education System in the Country.

Methodology:

- After initial lectures and detailed analysis, the students are supposed to choose a topic of research and perform studies under the guidance of the supervisor.

Contents:

A: Theory:

1. Knowledge Systems

Meaning & Definition, Need & Importance, Benefits & Limitations, Information & Knowledge, Generation & Flow, Economic, Societal & Cultural aspects.

2. Knowledge Components

Information Sources, Different Types of Knowledge Systems, Process of Knowledge Construction, Knowledge management Tools.

3. Contemporary Knowledge

Concepts of Great Educationists/Reformers who reformed the society and Education with their innovative and effective educational concepts
 Concepts of Great Architects cum Educationists to Architecture Education

B: Dissertation:

- The students are supposed to submit the **synopsis** for the intended topic of research relating to any form or aspect of knowledge systems existing in our societies along with the detailed work methodology
- The consecutive stages of work will be analysed with reference to the submitted work methodology only.
- The final Dissertation report is to be submitted at the end of the semester comprising the Study and conclusions/proposals/guidelines based on the research and guidance.

MAR 202

Intensive Humanities

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To study the social, economic and psychological factors responsible for shaping and functioning of the Human settlements and hence the built environment.
- To understand the discipline in global and national context.

METHODOLOGY:

- Lectures and presentations based on field observations, surveys, web search and library studies.

CONTENTS:

Psychology: Human being as living systems, human behaviour and the built environment,

- Definition and need & Schools of psychology, Current Perspectives & trends in Psychology,
- Biological bases of behaviour: sensory systems, nervous system, motivation & emotion, Stress and anxiety, Consciousness and its altered states, Personality and Individual Differences
- Cognition: Cognitive processes, Sensation and perception, theories of visual perception (gestalt),
- Learning and behaviour, Thinking and language; Intelligence, Sensitivity, Creativity, Logic & Reasoning,
- Psychology in Design & Environment (man-nature interaction, personal space concept, pollution reduction)

Sociology: Man, nature and society; social, religious, political, cultural structure and their impact.

- Origin and Growth of Cities, rural-Urban Dynamics and resultant migration, Impact of industrialization on traditional society, modernization, Urbanisation & Urbanism, rural-urban differences
- Classical and Contemporary theories of Sociology, European and Chicago school of thought
- Society as a total system of relationships between people, Social stratification, Diversity in Indian Society
- Traditional pattern and trends of change in community; Urban problems and issues,
- Technology, Globalization and changing socio-economic scenario, Sociology & Design

Economics: Theory of Demand & supply, Micro & Macro Economies, Economic systems , G.D.P, G.N.P, F.D.I, Migration, Division of Labour, Economies of Scale, Urban & Rural Economies, Cost Benefit Analysis, Feasibility, Viability

- Economic development of the country, dynamics of infrastructure development and the role of government agencies; financing and institutions associated with housing and infrastructure development
- Real Estate dynamics; Real Estate & Cost Index; Poverty line, real estate & nature of shelter of population
- Socio-economic structure of the country, global and local socio-economic processes and policies
- Implications of Globalisation on the Third World Economies, Global and National Organizations

MAR 203

Digital applications in Architecture

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	-	50	100	-	4

OBJECTIVE:

- To understand the digital technology and the way it is transforming our built environment.

METHODOLOGY:

Lectures and presentations based on field observations, surveys, web search and library studies.

CONTENTS:

Digital Applications

- Introduction, History and Scope of Digital Technologies in Architecture
- **Digital applications used in creating a built environment:** *Applications used from Conception to construction of a built environment at micro and macro level:*
 - **Presentation:** Raster & vector graphics, Colour models, file formats and their usage, presentation techniques in Architectural graphics and Animations.
 - **Visualization as a tool for design:** Visualization of complex forms, Digital Architecture, Parametric designing, Programming and scripting as tool for design.
 - **Designing, Drawing & detailing:** Applications used for design processes and considerations, Softwares used in AEC industry: CAD CAM & BIM applications.
 - **Digital Fabrication & Construction:** Applications and fabrication techniques.
 - **Management:** Applications used in conjunction with digital drawing information.
- **Digital applications used in Planning:** Remote sensing, Transport simulation applications etc
- **Digital technologies transforming our built environment:**
 - Building automation & Intelligent building concepts
 - Energy modelling applications
- **Recent trends:** Contemporary examples, role and need of Digital applications in transforming our society and built environment.

MAR 204:

Energy Simulation

CLASSES/ WEEK		MARKS				EXAM HOURS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>	
2	2	50	50	-	100	3

OBJECTIVE:

- To inform the students about the importance of energy efficiency and its conservation.
- To learn the basic techniques and processes involved in Energy Efficiency and Energy Conservation through various techniques. The study and application of various softwares involved in the process.

METHODOLOGY:

- The methodology of imparting information should be lectures and presentations citing examples and case studies.

CONTENTS:

- **Introduction**
 - LEED
 - Benefits and Advantages
 - Incentive Programs
 - Certification
 - Leed Version
 - Professional Accreditation
- **Green Building Concept**
 - Indian Green Building Council
 - Concepts of Green Building
 - Case Study of Green Buildings
 - Energy and Resource saving through Green Buildings
 - Role of TERI
- **Energy Conservation Building code ECBC**
 - Role of Bureau of Energy Efficiency BEE in controlling Energy Scenario in India
 - Application of ECBC in Indian Buildings
 - Analysis of saving of Energy by the application of ECBC
- **Application of Softwares**
 - Introduction of Important Softwares in Energy Modelling of Buildings
 - Application of Visual DOE in Modelling any one building

MAR 215: Studio-I

Architecture Education: Concepts & Practices

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	6	100	100	-	200	3	8

OBJECTIVE:

- To make the students understand the diversity and fast paced dynamics of Architecture profession to be incorporated and adapted in Architecture Education.
- To develop skill in the use of fundamental teaching procedures, techniques and methods of teaching.

METHODOLOGY:

- Lectures and presentations based on research, observations, surveys, mock classes and library studies.
- Assistance based learning to understand and experience practical teaching concepts and issues.

CONTENTS

(A) THEORY

- **Nature and Scope of Architecture Education:**

Nature of Architecture during the Ancient period, Medieval period, Colonial period, 19th Century, 20th century (pre-independence), 20th century : Post-independence 1947-1960, 1960-1970, 1970-80, 1980-1990, 1990-2000, 2000 onwards.

Interpretation of dynamics of Architecture observed during the studies of their period into the framing of teaching program for the Architecture Education.

- **Elements & Principles of Architecture Education:**

Identification of main disciplines which need to be covered into the teaching programs for Architecture. Elements of Architecture Education, systematic organization of main disciplines into logical groups to under: Associated description, Allied description, Core description. Principles of Architecture Education: Communication Skills, Technology application, Visualization.

- **Review of Architecture Education in India:**

Statistical studies about the present Architecture Education in India as well as outside India. Understanding of the formal level of Architecture Education in India as well as outside India. Different programs on Architecture Education being followed in India as well as outside India in Architecture as well as in assorted developments. Making the projection about the needs of the Architecture Education and students, Architects needed to run the country.

(B) PRACTICAL TRAINING

- Observing the Classroom/studio teaching in live classes of B.Arch. and assisting teachers in their academic responsibilities relating to B. Arch programme.

Masters of Architecture (Architectural Pedagogy)

- Preparation of **mock classes** on the **topics** observed in live classes of B.Arch.

Semester II

MAR 216:

Architectural Pedagogy

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- Understand Pedagogy and establish its relation with Architecture.
- Development of techniques for teaching of Core, Allied and Associated subjects to reach the final stages of the Architecture Education program.

METHODOLOGY:

- Classroom lectures and practical assignments.

CONTENTS:

1. Pedagogy of Architecture and Approaches of Teaching
 2. Lesson Planning and different Formats
 3. Principles of Architecture Curriculum
 4. Planning a teaching lesson in Core Subjects , Allied Subject and Associated Subjects
 5. Tools and Techniques of Evaluation
 6. Action Research based on in actual Classroom situations
 7. Pedagogical Analysis
- A. Pedagogy of Architecture
1. Lecture Method
 2. Lecture Demonstration Method
 3. Case Study Method
 4. Problem Solving Method
 5. Discovery Method
 6. Studio Method
 7. Project Method
 8. Survey Method
- B. Research in Architecture
1. Pure and Applied Research
 2. Action Research
- C. Lesson Planning and Simulated Teaching
- D. Syllabus and Curriculum, Types of Curriculum , Principles of Curriculum Construction
- E. Formal , Non Formal and Informal Education
- F. Planning Teaching Lessons in
- (a) Core Subjects(Architecture Design, Building Construction and Architectural Drawing)
 - (b) Associated Subjects (Humanities, Management, Psychology, History and Fine Arts)

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- (c) Allied Subjects (Building Services, Structure, etc.)
- G. Planning and Assessment Methods, Tools and Teaching Evaluation, Planning a test, Preparation of Blue Print, Criterion of a test item, Preparing the instruction, Preparing Schedule and Administering the test, and Final Evaluation
- H. Evaluation Techniques, Difference between Evaluation and Assessment, Summative, Formative and Diagnostic Assessment in Architecture
- I. Pedagogical Analysis: Meaning and Definition of Pedagogical Analysis, Need and importance, Pedagogical Analysis of a unit from B.Arch. Syllabus.

MAR 217: Dissertation-II (AP)

Architecture Pedagogy in National & International Context

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	-	50	100	-	4

OBJECTIVE:

- To create understanding of the diversities of Architecture Education in National and International context.

METHODOLOGY:

- Orientation and Research, along with discussions with the supervisor and site visits as required.

OUTPUT:

- After orientation classes and lectures, the student will submit a synopsis of one research project for approval. Each student is expected to complete and submit a report based on the research conducted.
- The research should relate to any aspect of Architectural Pedagogy in National and International context.
- The final Dissertation report is to be submitted at the end of the semester comprising the Study and conclusions/proposals/guidelines based on the research and guidance.

MAR 311: Instructional Methodology and Classroom Management

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	ST	IA	WR	VV	TOT		
4	0	50	50	-	100	3	4

OBJECTIVE:

- To introduce the students with the theory, concepts, and research in the field of institutional learning
- To understand the impact of learner and teacher characteristics and the interaction between the two for the effectiveness of classroom learning.
- To make the students learn the techniques and skill of conducting teaching in the formal classroom, and to equip them with various classroom management techniques.

METHODOLOGY:

- Develops methods/strategies that encourage self-directed thinking and learning in nurturing and supportive learning environments.
- Effective classroom management and communication techniques emphasized.

CONTENTS:

- **Introduction to Instructional Methodology:** Meaning, Definition, Need and importance of Instructional Methodology
- **Instruction and Learning:** Psychology of Instruction, Instructional Theories- Gagne, Instructional Models
- **Instructional Methods and techniques:** Lecture Method, Demonstration Method, Case Study method, Project Method, Programmed Instruction/Learning, Studio method, Instructional techniques- seminar, symposium, tutorial, conference etc.
- **Instructional Media:** Meaning, need and importance, Non-Projected media, Projected Media, Computer- Based Multimedia
- **Classroom Management:** Meaning, need and importance, Classroom Management Process, Approaches to Classroom Management, Organizing effective classroom, Barriers in classroom management, Conceptualizing learning difficulties, Learner characteristics (social, cognitive and affective)

MAR-312

Psychology of Learning and Development

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	ST	IA	WR	VV	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To equip the students with the psychological theories and techniques of learning, development and creativity for development of creative instincts and hence adding to teaching skills.

METHODOLOGY:

- The methodology of imparting information should be lectures, discussions and seminars.

CONTENTS:

- **Introduction to Educational Psychology**
 - Definition, Nature and Scope of Educational Psychology: The Learner, Learning Process, Learning Experience, Learning environment, Significance of Educational Psychology to the teacher.
- **Learning**
 - Meaning and Definition, Domains of Learning: Cognitive, Affective and Psychomotor
 - Learning Process and Its Aspects, Factors Affecting Learning
 - Learning Theories and Their Educational Implications: Behaviorist, Cognitivist and Humanist
- **Human Development**
 - Meaning, Types of Development, Principles and characteristics of growth and development
 - Dimensions of Development, Phases of development
- **Motivation**
 - Meaning and Definition, Intrinsic and Extrinsic Motivation, Approaches to Motivation
 - Theories of Motivation: Maslow’s hierarchy of needs, encouraging Motivation in Classroom
- **Intelligence**
 - Meaning and Definition, Development of Intelligence, Measurement and assessment of Intelligence
 - Theories of Intelligence and Their Educational Implications
 - Individual differences
- **Personality**
 - Meaning and Definition, Development of Personality, Classification or Types of Personality

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- Theories of Personality and Their Educational Implications: Alport's trait approach theory, Raymond B Cattell's Factor Analysis Theory and Psychoanalytic Theory of Sgund Freud

Semester III

MAR 313:

Thought Processes

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To develop the student's ability to find innovative solutions to problems through an understanding of thought processes.

METHODOLOGY:

- The methodology of imparting information should be lectures, discussions and seminars.

CONTENTS:

- **Human Memory**
 - Memory: Structure & Processes, Sensory memory, Short-term and Long-term memory
- **Thinking and language**
 - Types of thought Processes, theory of constraints, Thought process in design
- **Intelligence**
 - Measures of intelligence: patent creation, research & development
 - Igniting innovation, Organizational supports that enhances creativity & innovation.
- **Creativity**
 - Meaning nature and concept of creativity, Constitutes of creativity, Characteristics of creativity, Originality, flexibility, Creativity & Intelligence.
 - Theories of creativity, Traditional and modern views of creativity, Creativity techniques
 - Assessment of creativity, Encouraging and promoting creativity- Nickerson creativity technique, Creativity and architecture: trends and scope.
- **Innovation:**
 - Meaning, nature & concept of innovation, Characteristics of innovation, Models of innovation, Creativity and innovation [difference], Innovative practices [architecture]
 - Theories of innovation, Barriers/failures in innovation, Stages, Problem solving: factors, stages, methods, Factors that facilitate creativity and innovation
 - Factors that interfere with innovation and problem solving.
- **Logic & Reasoning,**
 - Deductive reasoning, Inductive reasoning, Abductive reasoning, adaptive reasoning

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- **Problem-solving:** Gestalt theory, Problem space theory, Individual differences

Semester III

MAR 314:

Educational Technology

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To understand Architecture Education in relation to technology and digitization and the way it has revolutionized Architectural thinking.

METHODOLOGY:

- Conceptual inputs, Case discussion, Individual exercise, Group exercise

CONTENTS:

- **Introduction to Educational Technology**
 - Educational Technology and its Components
 - Systems approach & Multimedia approach in Educational Technology
- **Communication and Classroom Interaction**
 - Concept, Process and Elements of Communication
 - Psychology of Communication and its application in Educational Technology
 - Models of Communication, Factors and Barriers
 - Classroom Interaction, Classroom Interaction Analysis -Flander Interaction category system.
- **Emerging trends in Educational Technology**
 - Personalized system of instruction (PSI) -Programmed Learning
 - CCTV, Computer Assisted Instruction (CAI)
 - Modern trends in multimedia – Virtual Reality & Virtual Environments/classroom
 - Educational Satellite, Interactive Video, Tele and Video conferencing
 - Web 2.0 in Education, E-learning, e-teaching, digital conferences
 - Course management soft wares
- **Digital Architectural Pedagogy**
 - Use of softwares in Core, Allied and Associated subjects in Architecture Education
 - Effective Integration of Digital Courses, Digital Tools
 - Digital Visualization and Thinking, Design and Drafting
 - Games based learning In Architecture.

MAR 315:

Education Management

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To understand the Management of Architecture Education and related government policies.

METHODOLOGY:

- The methodology of imparting information should be lectures, research and discussions.

CONTENTS:

- **Architecture education as a system**
 - Education as a System: an overview
 - National Policy on Higher Education, Policy development and implementation.
 - Educational legislation, reform policy and analysis
 - Role of UGC, AICTE, COA, IIA in Architecture Education
 - Informal education: methods and techniques,
 - Finance in educational system
- **Principles & Techniques of Mgmt for Educational administrator**
 - Stages in the management process in an educational organization: basic elements of management process (decision-making, problem solving, human relations, and communication).
 - Concepts and practices relating to planning: process, procedure, techniques, strategic planning, operational planning in educational organizations
 - Directing: leadership, delegation.
 - Decision: policies, strategies and decisions in an educational organization, process of decision making, behavioral dimension of decision making.
 - Problem solving: approaches and techniques for creative problem solving, implementation and evaluation of decisions.

MAR 316:

Practice Teaching

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	6	100	-	100	200	-	8

OBJECTIVE:

- To give sufficient practical exposure for conducting teaching methodology.
- To develop skill in the use of fundamental teaching procedures, techniques and methods of teaching different types of subjects

METHODOLOGY:

- After proper understanding of teaching fundamentals, the students will engage themselves in assisting class co-ordinators in their respective classes, which may include giving lectures and demonstrations, conducting exercises, evaluation and assessment.

CONTENTS:

- Need and importance of practice teaching.
- Stages in Practice teaching- primary stage, preparation of lesson, qualities of a good lesson, teaching in classroom, evaluation and assessment.

MAR 317: Dissertation III (AP)

Core, Allied and Associated subjects

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	-	50	100	-	4

OBJECTIVE:

- To create understanding of the details of Architecture Curriculum and analyse them in detail

METHODOLOGY:

- Orientation and Research, along with discussions with the supervisor and site visits as required.

OUTPUT:

- After orientation classes and lectures, the student will submit a synopsis of one research project for approval. Each student is expected to complete and submit a report based on the research conducted.
- The research should relate to any or some aspects in detail of ONE subject in the Architectural Curriculum,
- The final Dissertation report is to be submitted at the end of the semester comprising the Study and conclusions/proposals/guidelines based on the research and guidance.

MAR 412:

Thesis (AP)

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	14	200	-	200	400	-	16

OBJECTIVE:

- This is aimed to reflect the culmination of the development of skill, knowledge and systematic approach bound research and exploration as well as development of presentation skills and techniques

METHODOLOGY:

- Orientation and Research, along with discussions with the supervisor and site visits as required.

OUTPUT:

- The student must submit to the Dean/Co-ordinator synopsis of at least three different research projects explaining the topic, scope and methodology out of which one synopsis would be selected.
- The Co-ordinator will assign a supervisor to guide the study. The student will be required to conduct the studies under his guidance. Regular progress will be monitored and Internal Assessment will be carried out in four steps which will be decided by the Co-ordinator.
- The student will be required to conduct in depth research and submit the final outcome in the form of reports which will be judged by a jury as appointed by the Co-ordinator. Students are also required to do the presentation in Audio Visual format, apart from hard bound reports and drawings.

MAR 413:

Internship

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
0	8	100	-	100	200	-	8

OBJECTIVE:

- To give sufficient practical exposure for conducting teaching methodology.
- To build upon the skills in teaching procedures, techniques and methods of teaching.

METHODOLOGY:

- The students will engage themselves in full-fledged teaching experience and academic works.

OUTPUT:

- The subject aims to culminate all teaching procedures, techniques and experiences learned and practiced in array of subjects undertaken during the course.
- The students will be assessed according to the teaching preparations, teaching content, teaching style, innovative methods used and overall impact as a teacher. The students will have to maintain a log book to keep track of works done, and will be assessed on the basis of every class by their respective supervisor.

MAR 101:**Architectural Philosophy**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To make a base of sound understanding of the fundamentals and theories in Architecture.
- To critically analyze the ongoing practices and formulate an understanding of the same.

METHODOLOGY:

- Lectures and presentations based on field observations, surveys, web search and library studies.

CONTENTS:

- Towards Analytical approach of Architecture: the concept and theory of Period, Place, Purpose, People and Philosophy.
- History, Theory, Criticism, Post Mortem and Anti Mortem
- Time, Function and Alterity in Architecture
- Complexity and Contradiction in Architecture
- Building Philosophy – Towards Architecture theory of Conceptualize, Communicate and concretize.
- Architectural Theory and Practice in International and Indian context
- Architectural Development in International and Indian context: 21st century changes with the advent of Foreign Direct Investment in Architecture.
- Ethics of Architecture – Objectivism

READINGS:

- ***Architectural Philosophy: Repetition, Function, Alterity by Andrew E. Benjamin***
- ***Architectural Reflections: Studies in Philosophy and Practice of Architecture By Colin St. John Wilson, Roger***
- ***Modern Architectural Theory Harry Mallgrave***

MAR 102: Contemporary Architecture

CLASSES/ WEEK		MARKS				EXAM HOURS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT	
2	2	75	75	-	150	3

OBJECTIVE:

- To identify the theories, movements and buildings that have led to new forms.
- To recognize social, political pressures behind contemporary architecture.

METHODOLOGY:

- Lectures and presentations based on field observations, surveys, web search and library studies.

CONTENTS:

- Issues critical for present times: globalization, technology and cognitive sciences, the environment and cultural politics.
- Formal and theoretical resonance of the same in a host of movements: the techno fantasist movement of the 1960's, " post modern" semiosis, phenomenology, Third World "social modernism", vernacularism, post modernism, cybernetics and so on.
- Societal dynamics on the socio economic and politico paradigms: post structuralism and psychoanalysis as well as current debates in globalization, urban geography and mass customization, and post criticality among others.
- Transformation of contemporary architecture in Indian scenario- 1920- 1950s, 1950-1980s, 1980-2000, 21st century.

Students will be looking at buildings, writings and movements as part of evolving critiques of the modernism from 1950s onwards; in doing so students will come to examine the manner in which modernism was both critically unraveled and reinvented at different movements of its aftermath.

TEXT AND REFERENCES

Text:

- *Frampton K (1980) Modern Architecture: A Critical History , London Thames and Hudson*
- *Jenks C. (1985) Modern Movements in Architecture. Harmondsworth Penguin Sharp D. (1991) Twentieth Century Architecture. London Lund Humphries.*

MAR 103: Contemporary Technology

CLASSES/ WEEK		MARKS				EXAM HOURS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT	
2	2	50	50	-	100	3

OBJECTIVE:

- To understand the contribution made by new materials and technology to contemporary buildings
- To understand the construction process
- Development of strategies for collaboration between disciplines

METHODOLOGY:

- The methodology of imparting information should be lectures and presentations citing examples and case studies.

CONTENTS:

- Statics of Architectural Structures: Structural Morphology, Basic structural elements and force systems.
- Building systems: Performance requirements, Identification and specification of elements
- Sustainable strategies Best practices, Resource Efficiency, upcoming issues and ratings
- Materials: Contemporary, structural and otherwise
- Systems integration
- Building Codes

TEXT AND REFERENCES

Text:

- *Energy efficient Buildings by Wagner Walter*
- *Design for Environment by Mackenzie*
- *Energy Efficient Buildings in India by Milli Majumdar*
- *Earth Construction by Houben Hug*

References

- *Mehrotra R " Architecture in India: Since 1990", Pictor Publishing Pvt Ltd, 2011*
- *Smith K " Introducing Architectural Theory", Routledge, 2012*

MARC 105: Integrated Building Services

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	0	50	50	-	100	3	4

OBJECTIVE:

- To understand the importance of building services in the design of buildings.
- Provide students the basic concepts and thorough knowledge and operation of building services in modern, large high rise buildings complexes

METHODOLOGY:

- The methodology of imparting information should be lectures and presentations citing examples and case studies.

CONTENTS:

- **HVAC Services:** Basics of air conditioning, air condition working, HVAC Comfort principles, HVAC Components and systems.
- **Electrical Services:** In coming supply and distribution in buildings, Electric safety and risk assessment, Concept of fault level, Over current protection
- **Fire Services:** Basic fire extinguishing systems viz Water based, pedestal fire hydrant systems, total flood gas protection systems, smoke management systems etc.
- **Lighting Services:** Photometry and colorimetry, lighting equipment and systems, lighting calculations, day lighting.
- **Building Acoustics:** Acoustics fundamentals, Acoustics design and planning, vibration
- Basic principles involved in design of Plumbing services, Solar water Heating, Rainwater harvesting etc.

TEXT AND REFERENCES*Text:*

- *Fire Safety in Buildings* by V K Jain
- *Fire Protection and Prevention* by barendra Mohan Sen
- *Energy Efficient Buildings in India* by Milli Majumdar

References

- Mehrotra R “ *Architecture in India: Since 1990*”, Pictor Publishing Pvt Ltd, 2011

MAR 104: E I A & Natural Resources

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To introduce the students with the theory and practice of Environmental Impact Assessments for proposed projects
- To emphasize on the preservation of natural resources.
- To discover the relevance of natural resource management in design and planning of regional areas.

METHODOLOGY:

- Classroom teaching through lectures and presentation.
- Conducting exercises on EIA or introducing the preparation of a report for a project.

CONTENTS:

- **INTRODUCTION**
 - Understanding Ecosystems: General Structure and Function: Types of Biogeochemical cycles; Carbon cycle, Global water cycles, nitrogen cycle
 - Natural elements water, vegetation and land.
- **EIA**
 - from theory to the practical
 - What data is required, how this data should be collected and interpreted, and significance of the data
 - Effectiveness of the assessment methods
 - What issues should be addressed in the terms of reference (TOR)
 - Tools and thumb rules available to evaluate the environmental impact of projects
 - Better understanding of the EIA process – from screening, scoping, data collection to impact assessment as well as the role of public consultation
 - Better understanding of the environmental and social impacts of the industrial and developmental projects
 - Better ability to review EIA reports and identify its strengths and weaknesses
 - Increased ability to play active role in post-EIA monitoring.
- **NATURAL RESOURCES**
 - Introduction - Settlements in relation to regional landscape resources.
 - Microclimate: Definition and characteristics. The role of Natural Elements
 - Air pollution and Air pollution monitoring and quality criteria
 - Threat natural resources; urban environmental issues such as solid waste management, air quality, conservation of water resources and vegetation cover.
 - Natural resources specific to region types: for example: coastal, hills, deserts and plateau regions etc.

MAR 106:**Research Methodology**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To enhance the students' generic research, communication skills and critical analytical ability

METHODOLOGY:

- Lectures, Project work and tutorials.

CONTENTS:**PART (A)****Unit I: Introduction, types of Research**

Foundation: Its Nature and Scope, plagiarism

Scientific Research: Steps of scientific methods and its scope in Architectural research

Qualitative Research Paradigm: Assumption, Nature and Scope, Action Research, Pure and Applied Researches in Architecture.

Unit II: Research Methods: Historical, Survey, Experimental, Case Study, Ethnographic, Visual Research

Unit III: Research Design: Meaning and Importance

- Sample and Sampling Design: Concepts of Population Sample, Representative Sample, Probability and Non Probability, Techniques of Sampling
- Tools and Techniques of Research: Characteristics of Good Tools, Questionnaire and Interview, Observation, Tests, Scale and Types

Unit IV: Preparation of Research Proposal:

Research Problems, Research Objectives, Research Questions, Hypothesis, Operational Variables, Review of Related Literature, Research Design, Limitations and Delimitations

Report Writing, Purpose, Format, Characteristics of Good Research report

PART (B): Branch Specific**Unit V: Descriptive Statistics:**

Data: Nature and types, Normal Probability Curve: Skewness and Kurtosis

Measures of Central tendencies, Measure of Variability, Measures of Correlation: Pearson's correlation and Spearman's Rho

Unit VI: Inferential Statistics (Parametric)

Significance of Statistics, Concept of Null Hypothesis, Level of Significance, T-Test

Unit VII: Inferential Statistics (Non Parametric)

Chi Square Test, Median R Test, Mann-Whitney Test.

Unit VIII: Analysis of Qualitative Data

Editing, Coding of data, Content Analysis

MAR 127(BS): Dissertation-I (BS)

CLASSES/ WEEK		MARKS				EXAM HOURS
<i>L</i>	<i>ST/T</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>	
2	2	50	--	50	100	--

DISSERTATION-I

OBJECTIVE:

- To understand the basic principles of Building Services that would be pertinent to simple and advance design building services.

METHODOLOGY:

- The methodology of imparting information should be studio exercises and presentations based on the theory taught in the theory subjects.
- The basic understanding and application of major building services which will act as foundation for the advance form of building services which will come in subsequent semesters.

MAR 202

Intensive Humanities

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To study the social, economic and psychological factors responsible for shaping and functioning of the Human settlements and hence the built environment.
- To understand the discipline in global and national context.

METHODOLOGY:

- Lectures and presentations based on field observations, surveys, web search and library studies.

CONTENTS:

Psychology: Human being as living systems, human behaviour and the built environment,

- Definition and need & Schools of psychology, Current Perspectives & trends in Psychology,
- Biological bases of behaviour: sensory systems, nervous system, motivation & emotion, Stress and anxiety, Consciousness and its altered states, Personality and Individual Differences
- Cognition: Cognitive processes, Sensation and perception, theories of visual perception (gestalt),
- Learning and behaviour, Thinking and language; Intelligence, Sensitivity, Creativity, Logic & Reasoning,
- Psychology in Design & Environment (man-nature interaction, personal space concept, pollution redction)

Sociology: Man, nature and society; social, religious, political, cultural structure and their impact.

- Origin and Growth of Cities, rural-Urban Dynamics and resultant migration, Impact of industrialization on traditional society, modernization, Urbanisation & Urbanism, rural-urban differences
- Classical and Contemporary theories of Sociology, European and Chicago school of thought
- Society as a total system of relationships between people, Social stratification, Diversity in Indian Society
- Traditional pattern and trends of change in community; Urban problems and issues,
- Technology, Globalization and changing socio-economic scenario, Sociology & Design

Economics: Theory of Demand & supply, Micro & Macro Economies, Economic systems , G.D.P, G.N.P, F.D.I, Migration, Division of Labour, Economies of Scale, Urban & Rural Economies, Cost Benefit Analysis, Feasibility, Viability

- Economic development of the country, dynamics of infrastructure development and the role of government agencies; financing and institutions associated with housing and infrastructure development
- Real Estate dynamics; Real Estate & Cost Index; Poverty line, real estate & nature of shelter of population
- Socio-economic structure of the country, global and local socio-economic processes and policies
- Implications of Globalisation on the Third World Economies, Global and National Organizations

MAR 203

Digital applications in Architecture

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	ST	IA	WR	VV	TOT		
2	2	50	-	50	100	-	4

OBJECTIVE:

- To understand the digital technology and the way it is transforming our built environment.

METHODOLOGY:

Lectures and presentations based on field observations, surveys, web search and library studies.

CONTENTS:**Digital Applications**

- Introduction, History and Scope of Digital Technologies in Architecture
- Digital applications used in creating a built environment:** *Applications used from Conception to construction of a built environment at micro and macro level:*
 - Presentation:** Raster & vector graphics, Colour models, file formats and their usage, presentation techniques in Architectural graphics and Animations.
 - Visualization as a tool for design:** Visualization of complex forms, Digital Architecture, Parametric designing, Programming and scripting as tool for design.
 - Designing, Drawing & detailing:** Applications used for design processes and considerations, Softwares used in AEC industry: CAD CAM & BIM applications.
 - Digital Fabrication & Construction:** Applications and fabrication techniques.
 - Management:** Applications used in conjunction with digital drawing information.
- Digital applications used in Planning:** Remote sensing, Transport simulation applications etc
- Digital technologies transforming our built environment:**
 - Building automation & Intelligent building concepts
 - Energy modelling applications
- Recent trends:** Contemporary examples, role and need of Digital applications in transforming our society and built environment.

MAR 204: Energy Simulation

CLASSES/ WEEK		MARKS				EXAM HOURS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>	
2	2	50	50	-	100	3

OBJECTIVE:

- To inform the students about the importance of energy efficiency and its conservation.
- To learn the basic techniques and processes involved in Energy Efficiency and Energy Conservation through various techniques. The study and application of various softwares involved in the process.

METHODOLOGY:

- The methodology of imparting information should be lectures and presentations citing examples and case studies.

CONTENTS:

- **Introduction**
 - LEED
 - Benefits and Advantages
 - Incentive Programs
 - Certification
 - Leed Version
 - Professional Accreditation
- **Green Building Concept**
 - Indian Green Building Council
 - Concepts of Green Building
 - Case Study of Green Buildings
 - Energy and Resource saving through Green Buildings
 - Role of TERI
- **Energy Conservation Building code ECBC**
 - Role of Bureau of Energy Efficiency BEE in controlling Energy Scenario in India
 - Application of ECBC in Indian Buildings
 - Analysis of saving of Energy by the application of ECBC
- **Application of Softwares**
 - Introduction of Important Softwares in Energy Modelling of Buildings
 - Application of Visual DOE in Modelling any one building

MAR 225: HVAC Services

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
4	2	75	75	-	150	3	6

OBJECTIVE:

- To understand the basic and advance principles of Building Services that would be pertinent to simple and advance design building services.

METHODOLOGY:

- The methodology of imparting information should be lectures and presentations citing examples and case studies.

CONTENTS:

- **HVAC Services**
 - Basics of Air Conditioning
 - Air Condition Working
 - HVAC Comfort Principle
 - HVAC Components involved in Thermal Comfort and Indoor Air Quality
 - ASHRAE Standards and Guidelines
 - HVAC Components
 - HVAC Systems
 - Refrigeration and Air Conditioning System Performance
 - Factors Affecting Performance and Efficiency of Refrigeration Plants
 - Managing Mechanical HVAC Systems
 - Air Conditioning Energy
 - Case Study of Any One Important Building

MAR 226: Studio-I

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	4	75	-	75	150	-	6

OBJECTIVE:

- To understand the basic and advance principles of Building Services that would be pertinent to simple and advance design building services.

METHODOLOGY:

- The methodology of imparting information should be live case studies, field visits and study of building codes

CONTENTS:

- **Studio based on HVAC Services**

The students will be required to do Studio exercises based on the theory taught in HVAC Services. The live case studies, field visits and sound knowledge and application of building codes with reference to HVAC services. At the end of the semester the students must understand the design aspect of HVAC services.

MAR 227(BS): Dissertation-II (BS)

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	-	50	100	-	4

DISSERTATION-II**OBJECTIVE:**

- To understand the basic principles of Building Services that would be pertinent to simple and advance design building services.

METHODOLOGY:

- The methodology of imparting information should be studio exercises and presentations based on the theory taught in the theory subjects.
- The basic understanding and application of major building services which will act as foundation for the advance form of building services which will come in subsequent semesters.

MAR 321: Electrical Services

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

ELECTRICAL SERVICES**LEARNING APPROACH:**

- Lectures and Seminars
- Workshop/Case Studies
- Tutorials
- In class assessments

OBJECTIVES:

- To provide students with thorough knowledge and critical appreciation of electrical installation design and operation in modern, large high rise buildings and complexes.

METHODOLOGY

- The emphasis will be on design methodology for safe and economic system performance, and the troubleshooting of operational problems. A critical review of current practices with a view to developing a total systems design approach, with integration and co-ordination aspects will be emphasized. The subject will place emphasis on efficient supply, distribution and utilizations of electrical energy in buildings.

CONTENTS

- **HV supply and distribution in buildings:** HV switchgear, distribution, control, protection schemes, HV and LV co-ordinate protection.
- **Review of design & operating objectives and criteria:** electricity supply ordinance, rules, codes and regulations affecting supply and utilization of electricity.
- **Electric safety and risk assessments:** nature and mechanisms of electric shock, assessing electric shock risk, isolation, earthing and bonding principles and practices.
- **Earthing for lightning protection, functional purposes and safety:** integrated scheme for high rise buildings. Design of earth electrode systems. Integration with building structure.
- **Fault calculations for LV systems:** IEC standard methods. Data for calculations.

- **Over current protection** for large plant, cabling systems, motor drives, etc. Sizing electrical conductors. Earth fault protection. Selection of equipment.
 - **Standby generation.** Dynamic analysis of engine/generator. Load profiles, regenerative power. Generator selection, protection. Reliability analysis. Requirements for fire services systems. Co-generation schemes, economics.
 - **Uninterruptible power supplies:** UPS dynamics, load profiles, battery sizing, protection, failure modes, MTBF. Generator/UPS/Load transient analysis. Earthing UPS systems.
 - **Motor drives:** Fan, pump, chiller, etc. System characteristics, load and supply variations, integrated control and protection schemes. Inverter drives. Starting dynamics, fault, transient and harmonic analysis. System energy analysis.
-

- **INDICATIVE READING LIST AND REFERENCES:**

- BS/IEC/VDE standards, publications and codes
- EMSD & FSD code of practice
- Engineering Council -Power System Protection Vols 1 &2
- ERA Technology -Research Reports Extracts (compilations)
- GEC -Protective Relays Application Guide
- Handbook on IEE Wiring Regulations -Trevor Marks (current edition)
- IEEE Transactions on PAS and IA (selected papers)
- IEE Regulations (current edition)
- Tagg -Design of Earthing Systems

MAR 322: Fire Services

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

FIRE SERVICES**LEARNING APPROACH:**

- Lectures and Seminars
- Workshop/Case Studies
- Tutorials will be conducted with aids of film shows, demonstrations, discussions on published papers and problem solving based on examination type questions.

OBJECTIVES:

- To equip the students with an in-depth and up-to-date knowledge of fire engineering systems associated with the building services industry, based on a rational and critical analysis of the systems.

METHODOLOGY

- The emphasis will be on design methodology for safe and economic system performance, and the troubleshooting of operational problems. A critical review of current practices with a view to developing a total systems design approach, with integration and co-ordination aspects will be emphasized.

CONTENTS

- **Basic engineering science of water-based fire engineering systems:** Dynamics of jets and sprays for water; Fire extinction theories of water; Properties of high, medium and low expansion foams; Fire extinction theories of foam.
- **Water-based fire engineering systems:** A critical analysis of various codes for the application, design, installation, operation, and maintenance of fire hydrant/hosereel systems, i.e. Indian Fire Services Department Codes.
- **Pedestal fire hydrant systems;** Sprinkler systems (Loss Prevention Council LPC/National Fire Protection Association NFPA Rules); Thermal responses of sprinkler heads; Water spray/deluge systems (NFPA Code); Drencher systems.

- **Total flooding gas protection systems:** A critical analysis of the codes for the application, design, installation, Halon substitutes systems, CO2 systems and dry powder systems; Computer programmes for system design.
 - **Basic engineering science of gas systems;** Dynamics of jets and sprays for gases; Fire extinction theories of gaseous extinguishing agents and dry powders.
 - **Smoke management systems:** Legal and insurance requirements of smoke extraction, and staircase pressurization, critical review of the principles, equations, design guides and codes of practice etc.; Computer simulation.
 - **Fire safety controls in HVAC systems:** Fire detection systems, fire communication systems and false alarm; System control, operation and maintenance of fire engineering systems; System reliability.
-

- **INDICATIVE READING LIST AND REFERENCES:**

- Chow W.K., On the Sprinkler Tank Size and Fast Response Sprinkler Head, International Journal on Engineering Performance-Based Fire Codes, Vol. 2, No. 4, p. 124-126 (2000).
- Chow W.K., Fong N.K. and Ho C.C., Analysis of Unwanted Fire Alarm: Case Study, ASCE Journal of Architectural Engineering, Vol. 5, No. 2, p. 62-65 (1999).
- Chow W.K., Smoke Control for Retail Shops with Cabin Design, ASHRAE Transactions, Vol. 110, Part 2, p.417-423 (2004)
- Fire Protection Handbook, 19Ed., National Fire Protection Association, Quincy, MA, USA (2003)

MAR 323: Lighting Services

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

LIGHTING SERVICES**LEARNING APPROACH:**

- Lectures and Seminars
- Workshop/Case Studies
- Tutorials
- In class assessments

OBJECTIVE:

- To provide the students with up-to-date knowledge of lighting technologies and practice. Photometrics of lamps and luminaries as well as characteristics of lamp and ballast systems are examined. To provide students with up-to-date knowledge of lighting technologies and practice. Photometrics of lamps and luminaries as well as characteristics of lamp and ballast systems are examined. Lighting objectives of various types of buildings and outdoor spaces are identified and various design techniques and calculations are examined. The balance between performance, comfort and energy consumption are also examined. Importance of lighting in relation to health, safety, and well-being, economics and energy conservation, and human productivity and creativity are discussed.

METHODOLOGY:

- In addition to lectures and guided reading, students are required to do an evaluation of a lighting scheme or a case study or a literature review and present their work in seminars and/or reports.

CONTENTS:

- **Photometry and colorimetry:** Photometric quantities, standards and measurements. Colorimetric quantities and systems. Production and processing of photometric data.
- **Lighting equipment and systems:** Incandescent lamps. Discharge lamps. Fluorescent lamps. Luminaries and control gear. Conventional and electronic ballasts. Lamp and ballast as a system. Lighting control systems. New light sources and emerging lighting systems.

- **Lighting calculations:** Direct luminance due to point, line and area sources. Inter-reflections. Lumen method. Calculation of utilization factors. Point-by-point and flux transfer methods.
 - **Daylighting:** Daylighting benefits. Daylight availability. Sky models. Design techniques and calculations. Daylight-linked control systems.
 - **Human and environmental factors:** Vision and human factors. Visual performance and its assessment. Lighting and comfort, glare. Non-visual effects of light. Lighting quality.
 - **Lighting design:** Design objectives and criteria. Choices of lighting system, lamp and luminaries. Integration of electric light and daylight. Energy conservation. Maintenance of lighting systems. Cost analysis. Lighting economics. Lighting energy code.
 - **Computer aided lighting design:** Electronic transfer of photometric data. Overview of features, applications and limitations of lighting design packages. Future trends.
-

- **INDICATIVE READING LIST AND REFERENCES:**

- CIBSE Code for Lighting (2002)
- Coaton, J.R. and Marsden, A.M. *Lamps and Lighting*. 4Ed. Arnold (1997)
- IESNA Lighting Handbook (2000)
- ISO 8995: 2002 Lighting of indoor work places.
- Selected CIE Publications. Selected papers in the following journals: Lighting Research and Technology, Journal of the Illuminating Engineering Society, Built Environment, Energy and Buildings.
- Simons, R.H. and Bean, A.R. *Lighting Engineering – Applied Calculations*. Architectural Press (2001)

MAR 324: Architectural Building Acoustics

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

ARCHITECTURAL BUILDING ACOUSTICS**LEARNING APPROACH:**

- Lectures and Seminars
- Workshop/Case Studies
- Tutorials
- In class assessments

OBJECTIVE:

- To extend knowledge of students on acoustics, noise and vibration control to acoustical design of special rooms and the practices of noise and vibration control, and to enable graduates to become specialists of their design office.
- To train students in greater breadth and depth to achieve a satisfactory acoustical environment.
- The subject will start with a discussion on indoor noise and vibration sources and their effects on human beings.
- Acoustic design needs of various indoor environments will be identified. Noise and vibration control methods will be discussed and examined.
- Instrumentation, measurement techniques and acoustic application software will be examined and discussed. The use of equipment will be demonstrated.

METHODOLOGY:

- Seminars will be used for the introduction of concepts and fundamentals of the subjects. Tutorials will be conducted to supplement the lectures for the application and better understanding of complex engineering theories. Students are required to read and discuss course materials and relevant publications at seminars and to prepare alternative solutions to problem.

CONTENTS:

- **Acoustic fundamentals:** Fundamental properties of sound and waves, sound sources, sound field in enclosures, sound propagation and transmission inside buildings, external impact, room acoustics, sound generation and transmission in air ducts. Effects of noise on human beings.
 - **Acoustic design and planning:** Acoustic design requirements for auditorium, lecture theatres, plant rooms etc. Requirements for speech and music: loudness, directional and special impression, reverberation, echo, clarify and etc., silencers, active noise control. Prediction methods for building acoustics and flow generated noise.
 - **Environmental impact and local legislation:** Noise control ordinance, product noise control ordinance, environmental administration, environmental impact assessment, practical noise control strategy.
 - **Vibration:** Fundamentals of vibration, vibration sources and their control, acoustically driven vibration, vibration transmission, flow-induced vibration, statistical energy method and modal analysis.
 - **Problem investigations:** Instrumentation, noise and vibration measurement and data analysis techniques, signal processing, problem identification and assessment, software packages.
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- **INDICATIVE READING LIST AND REFERENCES:**

- Acoustic Design of Concert Halls and Theatres. V. L. Jordon (1980).
- Acoustic Noise Measurement. J. R. Hassall (1979).
- Active Control of Sound. P. A. Nelson and S. J. Eillott (1993).
- An Environmental Assessment for Existing Office Buildings. BRE (1993).
- An Environmental Assessment for New Office Design. BRE (1993).
- Applied Acoustics Journal.
- BS and ISO standards.
- Community Noise Rating. T. J. Schultz (1982).
- Concert Halls and Theatres: How they sound. L. L. Beranek (1996).
- Effects of Noise on Man. K. D. Kryter (1985).

MAR 325: Intelligent Buildings

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

INTELLIGENT BUILDINGS**LEARNING APPROACH:**

- Lectures and Seminars
- Workshop/Case Studies
- Tutorials
- In class assessments, technical assignments

OBJECTIVE:

- To provide the students with enhanced knowledge of advanced intelligent building technologies, system configuration, system operation and control.

The emphasis will be on use of system integration, application of technologies and the operation performances. A critical review of current practices with a view to developing a total intelligent building system, with integration and co-ordination aspects will be emphasized.

METHODOLOGY:

- In addition to lectures and guided reading, students are required to do an evaluation of an advance intelligent building technology scheme or a case study or a literature review and present their work in seminars and/or reports.

CONTENTS:

- **Intelligent Buildings:** concepts, definitions of intelligent buildings, intelligent architecture and structure, evolution of intelligent buildings, IB assessment criteria.
- **Building Management System (BMS):** binary data, digital controller, input and output units, sensors and actuators; architecture and configuration of BMS, BMS outstation and central station, programming environment and platform, monitoring interface and development platform, building energy management functions.
- **Local Area Network (LAN) and BMS Communication Standards:** Local Area Network (LAN), protocol standards and OSI model, medium-access schemes, different BMS network configurations, gateway and interoperability, BACnet, integration at management level.

- **Applications of Internet Technologies in BMS:** Internet and Internet protocols, TCP/IP, Internet LAN vs WAN, use of Internet technologies at different levels, BACnet/IP, Convergence networks and total integration.
 - **Advanced Direct Digital Control:** closed control loops, control loop stability, PID control and tuning of PID; auto-tuning, self-tuning, adaptive control.
 - **HVAC System Control and Optimization:** control of CAV and VAV systems, outdoor ventilation control and optimization, optimal control of air-side systems; chiller performance and optimal control of central chilling systems.
 - **Other Building Automation Subsystems:** building security systems; access control, cards access control and biometric access control; lighting control systems; fire detection systems; lift control systems.
-

- **INDICATIVE READING LIST AND REFERENCES:**

- B Atkin (1988) Intelligent Building, John Wiley & Sons.G J Levermore.
- Building Energy Management Systems, E&FN Spon.Leszek Reiss (1987) IESNA Lighting Handbook (2000)
- Introduction To Local Area Networks with Microcomputer Experiments, Prentice Hall Inc.S.W. Wang (2003) Selected CIE Publications. Selected papers in the following journals: Lighting Research and Technology, Journal of the Illuminating Engineering Society, Built Environment, Energy and Buildings.
- 1992Intelligent Building and Building Automation, The Hong Kong Polytechnic University

MAR 326: Studio-II

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	-	50	100	-	4

STUDIO-II**LEARNING APPROACH:**

- Workshop/Case Studies
- Tutorials
- In class assessments
- Understanding and designing of the building services

OBJECTIVE:

- To provide the students with enhanced knowledge of advanced building services. Understanding and designing of building services with the help of consultants. Live examples may be taken so that the students are able to learn of the latest in building services design.

METHODOLOGY:

- The expert lectures from the leading building services consultants and their continuous guidance through the semester.

CONTENTS:

- **Electrical Services.**
- **Fire Services.**
- **Lighting Services**
- **Building Acoustics.**

MAR 327: Dissertation-III

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	50	-	50	-	3	4

DISSERTATION-III

OBJECTIVE:

- To understand the basic and advance principles of Building Services that would be pertinent to simple and advance design building services.

METHODOLOGY:

- The methodology of imparting information should be studio exercises and presentations based on the theory taught in the theory subjects.

MAR 327: Dissertation-III

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	50	-	50	-	3	4

DISSERTATION-III

OBJECTIVE:

- To understand the basic and advance principles of Building Services that would be pertinent to simple and advance design building services.

METHODOLOGY:

- The methodology of imparting information should be studio exercises and presentations based on the theory taught in the theory subjects.

MAR 422: Thesis (BS)

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	14	200	-	200	400	-	16

THESIS (BS)**OBJECTIVE:**

- To understand the basic and advance principles of Building Services that would be pertinent to simple and advance design building services. The students must be able to design the building services at this level. They may take any one of the services and design for any one of the contemporary building.

METHODOLOGY:

- The students must submit three synopses for approval. One of these will be approved. The progress will be monitored regularly in various stages.

MAR 423: Dissertation-IV (BS)

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
1	7	100	-	100	200	-	8

DISSERTATION-IV(BS)

OBJECTIVE:

- To understand the basic and advance principles of Building Services that would be pertinent to simple and advance design building services.

METHODOLOGY:

- The methodology of imparting information should be studio exercises and presentations based on the theory taught in the theory subjects.

MAR 424: Plumbing and Solar Water Heating

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	-	4

PLUMBING AND SOLAR WATER HEATING SERVICES**LEARNING APPROACH:**

- Lectures and Seminars
- Workshop/Case Studies
- Tutorials
- In class assessments

OBJECTIVES:

- To provide students with thorough knowledge and critical appreciation of plumbing installation design and operation in modern, large high-rise buildings and complexes and about solar energy technologies.

METHODOLOGY

- The emphasis will be on design methodology for safe and economic system performance, and the troubleshooting of operational problems. A critical review of current practices with a view to developing a total systems design approach, with integration and co-ordination aspects will be emphasized. The subject will place emphasis on efficient supply, distribution and utilizations of plumbing and learning the usages of solar services.

CONTENTS

- **Water Supply and Drainage:** Water Supply, drainage and sanitation as per National Building Code (Part 9). Water supply and drainage of a building. Leakages and seepages.
- **Green Building Parameters for Plumbing Design:** Green building parameters. Methods of harvesting rainwater. Conserving water for making sustainable and resilient conditions. GRIHA and TERI standards.

- **Quantity of Sanitary Sewage:** Types. Infiltration, Quantity estimation for future and effect of population growth on per capita sewage production. Variation in quantity of sewage (hourly, seasonal, monthly).
- **Quantity of Storm Water Sewage:** Storm water quantity on basis of amount & intensity of rainfall, catchment area. Usage of rainwater. Estimation for maximum runoff and area time graph.
- **Design of Sewers:** Sanitary sewers. Factor of Safety. Storm water sewage. Self-cleaning velocity. Calculation of sewer sizes (Crimp & Burge's Formula, Hazen William Formula). Velocity of flow, Limiting Velocity. Planning & design of sewage system.
- **Treatment of Waste Water and Disposal:** Ways to treat water. Different degrees of treatment (Preliminary, Primary, Secondary, Tertiary, Advanced). Disposal of Sewage after treatment, dilution and irrigation. Sewage sickness and prevention.
- **Solar Energy:** Components, elements and working mechanism for electricity generation by solar panels. Advantages and disadvantages over conventional electricity generation. Passive solar techniques. Government policies and subsidies. Calculation for Solar Roofs, electricity generation and solar cities. Wind energy production, utility and constraints.

INDICATIVE READING LIST AND REFERENCES:

- National Building Code
- GRIHA Guidelines

MAR 151: Concepts: Assembly of the City- Morphological and Social Components

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To introduce the notion of city and urban built environment.
- To be able to comprehend the assembly of a city into various strata of Morphological and Social components.

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Notion of City:**
 - The Definition of 'Urban'
 - The Attributes of Urban
 - What causes Rural-Urban migration?
 - Hierarchy of the cities
 - Sizes and Scales w.r.t. Area and Population.
 - Cognition of the City:
 - Urban Spatial Experience
 - Urban Culture; unique cultural characteristics of various cities.
- **Urban Morphology:**
 - The Physical Structure of the city.
 - Shape of the City: Linear vs Laminar
 - Urban patterns: Grid-iron, Radial, Circular and Organic
- **Urban Design:**
 - Components of the city: City Centre, Commercial Centres, Open Spaces, Landmarks
 - Urban Design Elements: Axis, nodes, Streetscapes, Street furniture, Architectural Vocabulary, Building Control, Architectural Control
 - Urban Design Schemes
- **Urban Sociology:**
 - Social Structure of the Cities

- Horizontal and vertical stratification in urban scenario
- Social Cohesion: Congregational Spaces; Public Squares, Streets, transport interfaces.
- Socio-Spatial schemes, both; planned and informal.

MAR 152:**Theory: Indigenous Urbanism**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To inform the student about the form and function of the urban settlements other than modern planned towns and cities.
- To appreciate the spontaneity and dynamics in the form and function of the informal settlements.
- To generate understanding about the factors shaping indigenous settlements and traditional wisdom of urbanization.

METHODOLOGY:

- Lectures and Presentations.
- Description of Cities by ancient and medieval travellers to India
- Case Studies (primary & secondary) by students to further the understanding.

CONTENTS:

- **Ancient Cities of India:**
 - Cities of Indus-Valley Civilization.
 - Study of the morphology of the ancient cities.
 - Traditional Planning Schemes of Ancient cities of India.
- **Medieval cities of India:**
 - Traditional Planning Schemes of indo-Islamic Cities.
 - Traditional Planning Schemes of Temple Cities of India.
- **Informal Settlements:**
 - Study of Informal Habitation in the cities; Slums, Squatters, Unauthorized Colonies, Ghettoization.
- **Urban Villages:**
 - Study of Urban Villages in Indian cities with focus on Delhi.
 - Socio-Economic dynamics of Urban Villages vis a vis Urban Sprawl.
- **Study of the Process of Gentrification in Informal Settlements:**

- The Factors leading to the Gentrification.
- The Socio-Economic relationship of gentrification.
- Effects of gentrification.
- Case Studies:
 - Hauz Khas Village, Okhla, Shaheen bagh- Abul Fazal, Shahpur Jat, Bharat Nagar, Khizrabad, Nizamuddin etc;

- **Mixed Land use as Traditional urban Scheme:**
 - Nature and Organization of Mixed Land use in Indian Cities.
 - Spatial organization of mixed land use at building level and city level.

- **Traditional Knowledge Systems of Human Settlements**
 - Introduction to Traditional knowledge systems.
 - Traditional Knowledge systems in Human Settlements.
 - Architecture of a Place-Derivative of indigenous knowledge.
 - Sacred Dimensions: Architecture and urban patterns shaped by metaphysical beliefs, the scientific interpretation of the same.
 - Vernacular material and construction technology; Harvest mapping.
 - Study of Traditional knowledge citing Natural resource management and Disaster management.
 - Architecture for climate.
 - Architecture for water harvesting; *baoli*, cisterns, tanks, ponds, channels, *bunds* etc.
 - Architecture for mitigating floods, earthquake, storms and other disasters.

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To inform students the process and techniques of Planning in India.
- To train students about the basic application of GIS and other information management tools.
- To introduce about the Planning Acts, Master Planning.
- To introduce in brief the fundamentals and principles of Planning discipline.

METHODOLOGY:

- Lectures and Presentations.
- Case Studies (primary & secondary) by students to further the understanding.

CONTENTS:

- **Introduction:** Planning Terminologies and definitions.
- **Planning Process:**
 - Data Collection, Primary and Secondary Sources of data.
 - Surveys, Sampling, Questionnaire Design.
 - **Data Analysis:**
 - Collating data and presenting in the Physical and Socio-economic layers
 - **Census:**
 - Definitions, Process of conducting Census, Scope of Census, Information content in Census, Use of Information in Census in Planning.
 - **Demography:**
 - Definitions, Demographic data, Use of Demographic data in Planning, Study of changes and shifts in socio-economic statistics, migration and population projections etc.
- **GIS:**
 - Introduction of Geographical Information System.
 - Role and Scope of GIS in urban planning and management.
 - The process of generating a base map and further evolving multilayered thematic maps.
 - The process of collating and attaching the metadata with the maps.
- **Town and Country Planning:**
 - Town and Country planning Acts in India.
 - Comprehensive Plan, Master Plan, Zonal Plans, Local Area plans, Development Schemes.

- **Economic Planning Theories**
- **Planning Principles:**
 - **Urban Planning:**
 - General plans of land development;
 - Zoning and subdivision controls specifying the permissible land uses,
 - Densities, and requirements for streets, utility services, and other improvements;
 - Plans for traffic flow and public transportation;
 - Strategies for economic revitalization of depressed urban and rural areas;
 - Strategies for supportive action to help disadvantaged social groups;
 - Guidelines for environmental protection and conservation of scarce resources.
 - Role and Jurisdiction of Planning and Development Authorities
 - **Housing Planning:**
 - Housing Scenario in India, Housing deficit.
 - National Housing policies.
 - Housing Types and Housing Sectors development.
 - Role of Government and Non-Government agencies in Housing Sector.
 - Housing Finance.
 - Role of Hudco in Housing sector
 - Role of State Housing Boards
 - Role of National Housing bank and other financial institutions.
 - Procurement for Housing loan.
 - Role of private sector in housing stock generation.
 - Socio-Economic impacts of planned housing.
 - Designation of Slums, Squatters and Unauthorized colonies.
 - HHS Slum Act, Rent Control Act and Transfer of Development Rights.
 - Development of Low Income Housing.
 - Resettlement Schemes and Policy
 - Design of dwelling unit, cluster and provisions for infrastructure
 - Micro-Credit, financial feasibility, Cost-sharing, land pooling
- **Case Studies:**
 - Comparative Studies between Urban and Housing Situations in Historic, Informal and Modern planned areas through the application of GIS.

MAR 154:**Urban Regeneration: Policy and Practice**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To inform students about the approaches of Urban Regeneration.
- To inform the students about various policies, plans and schemes under the umbrella of urban regeneration.
- To Study the roles of various Govt. and Non-Govt. agencies in urban regeneration.

METHODOLOGY:

- Lectures and Presentations.
- Case Studies (primary & secondary) by students to further the understanding.

CONTENTS:

- **Introduction:**
 - Definitions and Terminologies
 - Revival, Restoration, Renewal, Restoration, Recycling, Reuse, Rehabilitation, Resettlement, Redevelopment
 - Scope and Notion of Regeneration
 - Regeneration of Potential of Urban Centers.
 - Requirements of Regeneration
 - Present urban crisis, carrying capacity of Urban Centers, Disparity in the Allocation of Resources
 - Values of Urban Regeneration
 - Up gradation of Physical Environment, Safe and Comfortable, Inclusive Social and community living, Economically feasible, Universal Designs, Ecologically Sustainable
- **Plans and Schemes:**
 - Provisions of Ministry of Urban Development, Ministry of Housing, Ministry of Environment, Ministry of Culture.
 - Jawahar Lal Urban Renewal Mission (JNNURM)
 - Mandate, Structure and organization, Role and Scope, Financial model, Appraisal
 - City Development Plans (CDP's)

- Mandate, Structure and organization, Role and Scope, Financial model, Appraisal
- Master Plans
 - Provisions in Master plan for Redevelopment, Resettlement, Regeneration Projects.
 - Provisions for mixed land-use in MPD2021
- **Policy and Strategy:**
 - Policy and Strategy for Regularization of Un-authorized colonies.
 - Policy and Strategy for the Abadi-Area, Lal-dora and Urban Villages.
 - Policy and Strategies for the redevelopment, revitalization, resettlement and recycling of housing.
 - Policy towards historic, traditional and informal housings.
- **Integration of Urban Regeneration with other initiatives:**
 - Integrated Heritage Conservation. (to be studied in detail in second semester)
 - Integrated Tourism Development. (to be studied in detail in third semester)
 - Major events; CWG2010.
 - Post Disaster rehabilitation.

MAR 155:**Urban Management: Local Urban Governance**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To inform students about the organization, structure, roles and responsibilities of various agencies in local urban governance.
- To inform student about the process of Statutory Approval for a development project.

METHODOLOGY:

- Lectures and Presentations.
- Case Studies (primary & secondary) by students to further the understanding.

CONTENTS:

- **The Constitution of India**
 - Preamble of the Constitution of India
 - Structure of the Indian Constitution
- **The Three Lists**
 - Constituents of the 3 Lists. Roles and Responsibilities of the Centre and State
 - Mandates of Urban Development and Urban Governance as given in the Constitution of India.
- **Agenda 21**
- **Five Year Plans**
- **De centralization**
 - The 72nd, 73rd & 74th Amendment Acts
 - Strengthening of urban local governance
 - Central Planning Commission
 - State Planning Board
 - District Planning Committee
 - Metropolitan Planning Committees
 - State Finance Commissions
- **Urban Local Bodies**

- Municipal Corporations, Municipalities, Development Authorities, Urban Improvement Trusts (Rajasthan)
- Constitution and Role & Responsibilities of Urban Local Bodies

- **Urban Local Institutions**
 - Case of Delhi, NCRPB, NDMC, MCD, DDA, DJB, DUAC, Delhi Metro, Heritage Conservation Committee etc;
 - Allocations of roles and responsibilities: Multiplicity and Conflicts.

- **Statutory Approval and Sanctioning Process**
 - The Process of getting Statutory Approval of a Development or Regeneration Project from various agencies in Delhi.

- **Case Study of Urban Local Institutions (One City per student)**
 - Study of the Constitution, Organization, Roles and Responsibilities of Urban Local Bodies in various cities of the country.

MAR 156:

Studio-I (Perception and Appreciation; Urban Precinct)

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	6	100	-	100	200	-	8

OBJECTIVE:

- The course intends to impart a thorough understanding of the complex urban situations like morphological, socio-economic, political and cultural.
- The practical understanding of the students is enhanced by taking up studio exercises (real/hypothetical) in real situation and then apply the learning of the theoretical subjects.

METHODOLOGY:

- Lectures, Site Surveys, Field Visits (Educational Tours).
- Discussion Forums & Brainstorming Session.
- Case Studies (primary & secondary) by students to further the understanding.
- Presentation by students.

CONTENTS:

- **Perception & Appreciation**
 - Students select one city (e.g. respective hometown) and generate basic information about morphology and demography.
 - Prepare a comparative Matrix, discussing upon the peculiarities and diversities in the cities selected.
 - Study the satellite image or map and identify the urban components; old town, fort, palace and other landmarks, fortification, maidan, gardens and other open spaces, streets, bazaars, water edge.
 - Study the homogeneity and heterogeneity in the Urban sprawl.
 - Identifying the markers for delineation of the heterogeneous urbanism like traditional settlement and modern planned settlements.
 - To decipher the course of expansion of the city.
- **Study of Urban Precinct**
The Study will be based on selecting a real precinct to the scale of neighborhood level in urban situation and conducting a comprehensive studio exercise on the same.
 - Identifying a precinct (neighborhood level) in an urban situation (after brainstorming session) for detailed study and studio project.
 - Setting up of Aim and Objective of Study
 - **Preliminary Stage:**

- Studying the selected area in its entire context of the city; location, origin & evolution and peculiarities.
- Generation of a base map on suitable scale.
- Studying the morphology: Figure map, Urban Pattern, Density, Streetscapes.
- Studying the demographics; Occupation, Migration, Socio-Economical aspects, ownerships.
- **Intermediate Stage:**
 - Studying the Physical and Social infrastructure.
 - Identification of Heritage and other cultural resources.
 - Studying the Local Governance mechanism.
 - Collating the information as layers on the Base map.
- **Pre-Final Stage:**
 - Identification of issues pertaining to the urban situation.
- **Final Stage:**
 - Formulation of Proposals- Planning, Design and Management.

MAR 157:**Dissertation I (Research Methodology)**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	-	50	100	-	4

OBJECTIVE:

- To introduce the methodology of carrying out researches.
- To carry out a Dissertation on a topic comprising of an aspect or space in urban context.

METHODOLOGY:

- Lectures and Presentations on Research Methodology.
- Case Studies (primary & secondary) by students to further the understanding.
- Discussions with individual student during the course of dissertation.
- Students are required to submit a synopsis identifying the knowledge gap and formulating a case for dissertation.

CONTENTS:

- **Hierarchy of Information**
 - Data-Information-Knowledge-Wisdom
- **Research Methodology**
 - Inquiry, identification of Knowledge gap
 - Theorem of Research
 - Concepts of objectivity
 - Inductive Reasoning
 - Deductive Reasoning
 - Analogy and Causality
 - Interpolation and Extrapolation
- **Philosophy of Dialectics**
 - Dialectic
 - Views of Plato, Aristotle, Hegel
 - Diamat by Karl Marx
- **Sequential Research**
 - Case-Hypothesis-Inquiry & Analysis-Thesis-Synthesis-Anti thesis
- **Citation and Cross-referencing**
 - Chicago Manual
 - Annotated Bibliography

- *Students will be simultaneously working on the respective Dissertation Topic. Final Submission will be in the form of three hard copies and one soft copy of their dissertation for evaluation at the semester end.*

MAR 251:**Concepts: Transformations of Cities**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To study the city as a dynamic unit.
- To understand the factors causing transformations
- To understand the patterns of transformation

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **City as Dynamic entity:**
 - Cities in the dynamic state; changing continuously
 - Cities within cities:
 - City Centres, Old town
 - Central business district, District Centers
 - Downtown
 - Squares, Chawks, gardens
 - Markets, malls, bazaars
 - Slums, Squatters, Informal developments
- **Factors Causing Transformations:**
 - Population growth
 - Migration
 - Upgradation of infrastructure
 - Political and Management issues
- **Processes of Transformations**
 - Expansion: Change in Landuse, Encroachments
 - Re-densification: Change in Regulations

MAR 252: Theory: Finance Planning and Implementation of Urban Regeneration Projects

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To inform about the Sources of Funding, Financial models and methods of Financial Feasibility of projects.
- To inform about the process of Project planning and implementation.
- To learn about the Project Management Techniques.

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Sources of Funding:**
 - Government allocation and distribution in Annual Budget
 - Planning Commission sanctions
 - Budget Allocation of JNNURM, SEZ projects, Export Promotion Zones
 - Sources of Non-Govt. funding; UNDP, ADB, NGO's, Private Sector
- **Financial Model:**
 - Public Private Partnerships
 - Design-Build-Own-Operate-Transfer
 - Cost-Sharing
- **Economic and Financial Feasibility Analysis**
 - Demand-Supply relationship
 - Cost-Benefit Analysis
 - Cost-Recovery methods
 - Break-Even point
 - Risk and uncertainty analysis
- **Project Planning:**
 - Project Formulation by economic and urban development policies
 - Process for Legal, Environmental and Institutional approvals for Project
 - Appraisal of Project Plan: Technical, Financial, Environmental, Social Appraisals.
 - Methods of Appraisal: 3-UNIDO, World Bank, ADB etc
- **Project Management:**
 - Work practices and Labour Laws

- Cybernetics Project Management Techniques
 - Work Packages, Phasing, Scheduling, CPM, PERT
 - Gantt Charts, Quality Control

MAR 253:

Parameters: Jurisprudence

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To inform students about various laws and acts in place related with the Urban Development.
- To understand the application and jurisdiction of these laws and acts.

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Definitions:**
 - Acts, Statutes, Laws, Ordinances
 - Jurisdiction of Centre and State Laws
- **Environment Laws:**
 - Wildlife conservation laws
 - Environmental Legislation
 - Coastal Zone Regulations
 - Air, Water (Prevention & Control of Pollution) Act
- **Urban development Laws**
 - Town and Country Planning Acts
 - DDA Act
 - Municipal Act
 - Planning Regulations
 - Land Acquisition Acts
 - Building Bye Laws
 - Rent Control Act
 - Slum Act
- **Urban Conservation Laws**
 - UNESCO World Heritage Legislation
 - National Antiquities Laws
 - Monument Act and Treasure Trove Act

- Archaeological and Antiquities Act
- UNESCO Charters

MAR 254: Urban Regeneration: Integrated Territorial Urban Conservation

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To introduce the role of urban conservation in urban regeneration.
- To learn the methodology of preparation of the Integrated Conservation Plans.

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Introduction:**
 - Urban heritage; Tangible and Intangible Aspects.
 - Identification, Inventorying and Mapping of Urban Heritage Resources
- **Value and Significance:**
 - Establishing the Value and Significance of Urban Heritage Resources including Natural components
 - Identity of a City and Urban Cultural Resources.
- **Urban Regeneration and Urban Conservation:**
 - Role of Urban Conservation in Urban Regeneration:
 - Holistic and Comprehensive Urban Conservation
 - Socio-Economic development
 - Community Participation
 - Up-gradation of Infrastructure
 - Tourism Infrastructure development
 - Ecological Sustainability
 - Inclusive-Universal
 - Establishing Identity
 - Urban Recycling and brown field projects
 - Adaptive reuse
 - Up-gradation of existing built resources
 - Seismic Retrofitting
 - Barrier Free Accessibility

- Fire Safety measures
 - Energy efficiency Retrofitting
 - Infill development
- **Integrated Urban Conservation:**
 - Background
 - Urban Conservation before 1975- York, Chester, Bath
 - Conservation Planning 1975-1990, Bologna, Ferrara. Integrating with the planning sector
 - Post 1992-The Rio Conference
 - Methodology for Interdisciplinary integration in Urban Conservation
 - Assessing the historic settlement with its cultural and natural setting.
 - Studying continuity and transformations
 - Establishing the values and significance
 - Identifying the Issues
 - Integrating with the existing systems of administration
 - Integrating with the Planning; regional plans, master plans, zonal plans, local area plans, infrastructure plans, transport plans, tourism plans etc.
 - Preparation of integrated conservation plans and management plans

MAR 255: Urban Management: Integrated Urban Eco-System Management

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To inform students about the aspects of ecology and environment in the Urban Context.
- To learn the integration of Ecological components in the urban regeneration plans.
- To learn the process of Environment Impact Assessment.

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Introduction:**
 - Definitions: Ecology, Ecosystem, Biosphere etc.
 - Urban habitation, Co-Habitation
 - Concepts of Sustainability: Ecological balance, Natural Resources Depletion, Reduce, Reuse and Recycle
 - Study of Microclimate in Urban Areas.
 - LEED, GRIHA ratings system for Energy Efficiency.
- **Urban Hydrology:**
 - Water Resources, both; natural and artificial in urban context
 - Rivers, tanks, Lakes, Ponds, baoli, well etc;
 - Depletion and Pollution of water resources.
 - Case of Flooding in Urban scenario
 - Water management:
 - Catchment & Draining, Recharge and Holding Capacity.
 - Rain Water harvesting
- **Urban Forestry & Bio-Diversity:**
 - Forest Cover in Urban Situations; Ridge in Delhi, Mangroves in Mumbai, Green Belt in Chandigarh etc;
 - Zoos and Bio-Diversity parks; Delhi Zoo, Deer park.
 - Role of Forests in maintaining the Urban Ecology and Environment.
 - Depletion of urban forest cover and effects on cities; Case Studies.
- **Urban Open-Spaces:**

- Study of system of Urban Open Spaces in a City.
 - Ecological Significance of open spaces.
- **Land stock Management**
 - Distribution and allocation of land for Ecological regions
 - Criteria for location of Industrial Facilities, Sewerage Treatment plant, Waste Disposal Units.
- **Waste Management**
 - Collection, Segregation, Disposal, treatment, Recycle
- **Climatic Change**
 - Green House Gas Emission.
 - Carbon Footprint of a City
- **Hazard Vulnerability**
 - Cities and Risk of Disasters due to Ecological Imbalance
- **Environment Impact Assessment**

MAR 256:**Studio-II (Integration of Urban Infrastructure)**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	6	100	-	100	200	-	8

OBJECTIVE:

- To enhance the capabilities of working on practical regeneration projects.
- To learn the process of integration of socio-economical, infrastructure, heritage and ecology within the regeneration plans.

METHODOLOGY:

- Lectures, Site Surveys, Field Visits (Educational Tours).
- Discussion Forums & Brainstorming Session.
- Case Studies (primary & secondary) by students to further the understanding.
- Presentation by students.

CONTENTS:

- Selection of Real or Hypothetical project (in real situation) greater than neighbourhood scale with complex issues.
- Preparation of urban regeneration plan integrating the following:
 - Socio-Economic development plan
 - Heritage development plan
 - Environment improvement plan
 - Infrastructure up-gradation plan

MAR 257:**Dissertation II**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
0	4	50	-	50	100	-	4

OBJECTIVE:

- To further the ability to conduct researches from previous semester.
- To enhance the process of reasoning and analysis as taught in the previous semester for enriched research results.

METHODOLOGY:

- Lectures and Presentations on Research Methodology.
- Case Studies (primary & secondary) by students to further the understanding.
- Discussions with individual student during the course of dissertation.

CONTENTS:

- Students are required to submit a synopsis identifying the knowledge gap and formulating a case for dissertation.
- The identified research area should be specific with complex methodological requirements to carry out research
- *Final Submission will be in the form of three hard copies and one soft copy of their dissertation for evaluation at the semester end.*

MAR 351:**Concepts: Expanse of City; Regional Inter-relationships**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To introduce the notion of region as an extension of urban center.
- To be able to comprehend the assembly of the region.
- To understand the inter-dependency of entities with in a region.

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Notion of Region:**
 - Regions as extension of Urban Sprawl. Case Studies NCR etc.
 - Assembly of Region
 - Urban Centers: Metropolitan Region, Satellite Towns, Counter-Magnates
 - Urban Fringes: Rural-Urban Interface,
 - Rural Extensions: Villages, Agrarian regions
 - Industrial Belts
 - Special Economic Zones (SEZ)
- **Delineation of the Region**
 - Delineation of the regions on the basis of Social, economic and Cultural aspects.
- **Regional Intra-Dependency**
 - Socio-Economic Dependency: Floating Population for education, occupation, trade.
 - Supply of Commodities: Agrarian and Industrial
 - Service Sector
 - Ecological relationships
 - Factors causing Migrations.

MAR 352:**Theory: Social Inclusion and Harmonious Communities**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	25	25	-	50	3	2

OBJECTIVE:

- To introduce the concepts of sociology and the functioning of urban social framework.
- To understand the concepts for inclusive and harmonious community living.

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Introduction:**
 - Definition: Sociology
 - Views of Classical and Contemporary sociologists
- **Concepts:**
 - Individual and Collective, Social Structure, Interaction and socializing.
 - Material Culture, Authority, Social Control conformity and deviance
 - Difference and inequality.
- **Urban Social institutions:**
 - Family, neighborhoods, resident welfare associations, voluntary associations.
- **Urban Social spaces:**
 - House, neighborhoods, mohallas, gardens, parks, streets, malls, markets etc.
 - Social Interaction in public spaces.
- **Disorder and Conflict:**
 - Density and Scale: Disorder, overcrowding, deprivation
 - Community Identity, crisis response, leadership, state negotiation
 - Riots, crimes
 - Ghettoes and Slums
 - Urban Stress and Gender Issues
 - Sick building Syndrome, Epidemics

- **Urban Social Inclusion and harmonious communities**
 - Social and Economic access to urban assets.
 - Barrier Free built environment
 - Non-Discriminatory culture
 - Safe and Secure
 - Effective Social and Physical environment
 - Physical and Mental health
 - Law enforcement

MAR 353:**Parameters: Regional Planning; Processes and Principles**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To introduce the concept of regions as planning entity.
- To understand the regional interdependency for sustainable functioning of Region.
- To learn the processes of Regional Planning

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Introduction:**
 - Concepts of Regions as Functional territories.
 - Regions Types
 - Planning region, Resource Region, Cultural region, Urban region, Backward regions, District Planning regions.
- **Regional planning**
 - Region as a comprehensive planning entity.
 - Data Collection: Census and Surveys
 - Demographic Analysis: Socio-Economic status, Migration patterns, population projections.
 - People-Land-Wealth-resource Survey
 - Study of Regional Settlement Patterns
 - Regional Development plan
 - Approaches: Decongestion of Urban Centers, Reverse Migration, Extension of urbanization.

MAR 354: Urban Regeneration: Integrated Tourism Planning and Development

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- To Study the Policies for the development of the Tourism Sector and understand Integrated Planning and Development Process.
- To learn about the process of urban regeneration driven by tourism development.

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Dimensions of Tourism**
 - Heritage Tourism
 - Ecotourism
 - Adventure Tourism
 - Medical/ Education/ Business Tourism
- **Policies & Strategies**
 - National Tourism Policy, State Tourism Policies
 - Global Scenario vis a vis Domestic Scenario
 - Special Tourism Zones and Circuits: North Eastern States, Andaman and Nicobar islands etc Golden Triangle, Pilgrim Circuits;
 - Tourism Dependent Regions
 - Special Tourism Packages, Thrust Strategy
- **Integrated Planning & Development**
 - Urban Regeneration through Tourism Development; Economical Regeneration: Case Studies
 - Mitigation Strategies for the threats due to tourist's inflow.
 - Perspective and Development Matrix
 - Tourism Resources
 - Identifying the Resources and Tourism Potential
 - Carrying Capacity of Tourists Sites
 - Requirements of Tourist Amenities

- Creation of Tourism Circuits and Regions for the Controlled and Sustainable Development of the Region
- Integration of Tourism plan
 - Integrating the Tourism Plan with regional plans, master plans, zonal plans, local area plans, infrastructure plans, transport plans, heritage development etc.
- **Tourism Management**
 - Management Framework (Hierarchy and Role)
 - Ministries, Dept., Agencies in Tourism Management
 - Infrastructure Management in Tourism Sector
 - Human Resource Management in Tourism Sector
 - Visitor Management/ Information Management

MAR 355 Urban Management: Urban Management: Resource Management, Real Estate Management & Disaster Management

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVE:

- The course is divided into three sections informing students about the concepts and techniques and Resource management, Real estate management and Disaster Management.

METHODOLOGY:

- Lectures and Presentations
- Case Studies by the students

CONTENTS:

- **Resource Management:**
 - **Introduction**
 - Definitions of Resources
 - Characteristics of Resources
 - **Classification of Resources**
 - Natural Resources
 - Artificial Resources
 - Human Resources
 - **Value of Resources**
 - Availability: Discussing with examples Abundance, Scarcity, Depletion, Contamination, Crisis
 - Utility: Discussing the use of resources in producing other resources with examples
 - Fiscal value, Industrial Value
 - **Management of Resources**
 - Need for the Management of Resources
 - Basic Techniques of Resource Management
 - Resource Allocation
 - Resource Mobilization
 - Resource Leveling: Minimum Moment Method
 - Resource Optimization
 - Resource Conservation: Reduce, Reuse, Recycle

- **Real Estate Management:**
 - Real Estate Market:
 - Demand-Supply
 - Values and rental structure
 - Economic Cycle
 - Investment and risk assessment techniques:
 - Market Surveys and research
 - Rating system in Real Estate market
 - Agencies in Real-Estate development
 - Enhancing the value of Real estate through urban Regeneration: Case Studies

- **Disaster Management:**
 - Case of Disasters: Natural & Man Made
 - Earthquakes, Flood, Tsunami, Fire, Riots, Arson etc.
 - Vulnerability Assessment of Risks in Urban Areas.
 - Pro- Active Approach of Risk Preparedness
 - Organization and Role of Various Agencies and Bodies in Disaster Mitigation.

MAR 356:**Studio-III (Integration of Regional Context)**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	6	100	-	100	200	-	8

OBJECTIVE:

- To enhance the capabilities of working on practical regeneration projects.
- To learn the process of integration of socio-economical, infrastructure, heritage and ecology within the regeneration plans.

METHODOLOGY:

- Lectures, Site Surveys, Field Visits (Educational Tours).
- Discussion Forums & Brainstorming Session.
- Case Studies (primary & secondary) by students to further the understanding.
- Presentation by students.

CONTENTS:

- Selection of Real or Hypothetical project (in real situation) of regional scale.
- Preparation of the comprehensive regeneration plan for the Region.

MAR 357:**Dissertation-III**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
0	4	50	-	50	100	-	4

OBJECTIVE:

- To further the ability to conduct researches from previous semester.
- To enhance the process of reasoning and analysis as taught in the previous semester for enriched research results.

METHODOLOGY:

- Lectures and Presentations on Research Methodology.
- Case Studies (primary & secondary) by students to further the understanding.
- Discussions with individual student during the course of dissertation.

CONTENTS:

- Students are required to submit a synopsis identifying the knowledge gap and formulating a case for dissertation.
- The identified research area should be pertaining to the regional context in continuation of the thrust area of the semester.
- *Final Submission will be in the form of three hard copies and one soft copy of their dissertation for evaluation at the semester end.*

MAR 451:**Research Paper (Futuristic Urbanism)**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	-	50	100	-	4

OBJECTIVE:

- To further the ability to conduct researches from previous semester.
- To enhance the process of reasoning and analysis as taught in the previous semester for enriched research results.

METHODOLOGY:

- Lectures and Presentations.
- Case Studies (primary & secondary) by students to further the understanding.
- Discussions with individual student during the course of dissertation.

CONTENTS:

Students are required to submit a synopsis identifying a topic focusing on Future of Urbanism. The research paper will conduct enquiry into the possible forms of urbanism like vertical cities, underwater cities, ecological cities, vertical gardens and agriculture etc;

MAR 452:**Thesis**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	14	200	-	200	400	-	16

OBJECTIVE:

- To culminate the entire understanding of previous semesters through the Thesis.

METHODOLOGY:

- Lectures and Presentations.
- Discussion Forums & Brainstorming Session.
- Case Studies (primary & secondary) by students to further the understanding.
- Presentation by students.

CONTENTS:

Students should identify a thesis area pertaining to the Theory, Design, Planning or Management aspects of Urban Regeneration. The scale and complexities of the thesis vary in each case.

The Output has to be presentation(s) before jury in the form of primary and secondary data, maps, illustrations, drawings reflecting the proposals of the thesis.

The submissions have to be the set of sheets and three copies of thesis reports along with the soft copies of the submission.

All the secondary information used should be duly given citations and the copyright norms should be respected.

MAR 453:

Seminar (Urban Management)

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	6	100	-	100	200	-	8

OBJECTIVE:

- To study the management aspects related to the Thesis topic and formulate a management framework or proposals.

METHODOLOGY:

- Lectures and Presentations.
- Case Studies (primary & secondary) by students to further the understanding.
- Discussions with individual student during the course of dissertation.

CONTENTS:

Students are required to select a management aspect associated with the Thesis Project. The output should be in the form of management framework or proposals that augments the Thesis Project.

EK- 101:**Ekistics and Ekistics Matrix**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	0	25	25	-	50	3	2

OBJECTIVES: To study the emergence and scope of ekistics and its need in shaping the Human Settlements.

METHODOLOGY: Lectures supported by Library Studies and Presentations.

CONTENTS:

Ekistics as a discipline dealing with Human settlements in totality

Origin and development of Ekistics as lead discipline for Human Settlement

C.A Doxiadis:

C.A. Doxiadis as the pioneer of Ekistics

Influences from Central Place Theory and its Biological Analogy

Early works of Doxiadis.

Elements of Ekistics

Doxiadis Definition of Ecumenopolis

Land Use- Doxiadis 12- Zone proposal

Ekistics Matrix:

Anthropocosmos Model

Ekistics Units and Ekistics Grid

Synthesis

Ekistics Synthesis of Structure and Form

EK- 102:**Study of Society**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

The objective of the course is to create an understanding of the reproduction of contemporary culture in the post-colonial city resulting from interdisciplinary participation drawn from Sociology anthropology to Culture Studies.

Meaning and Concept: Understanding Cities

- Classical Sociological Approaches
- City as a human network – Social Structures and urban form.
- Contemporary Culture – Community and Solitude: Social Relations in City:- The Metropolitan Experience.
- Cities in Quarters

City Spaces:

- Concept of place and Space-Social Construction of space.
- Space as contested domain
- Spaces of Modernity vs spaces of Social Justice post-modernity and the city
- Space to Place

Cities of differences: Inequality, Marginalization and Fear

- The politics of urban difference: Consensus to conflict
- Social Justice and the 'urban question'
- Gender in the city
- New divided city?
- Global trends and local diversity
- Discoveries and implication of the post-metropolis, globalization and transnational Urbanism.

EK- 103:**Demographics and Land Data Analysis**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVES: To study the demographic profile and spatial information of settlements and to study the various aspects of Land Economics

METHODOLOGY: Lectures and Field Study

CONTENTS:

Spatial Information: City Overview, Zonal details, Road Network, traffic volumes, approaches for spatial planning. Graphic Data and Non Graphic Data

Surveys - Analysis and research, Primary and Secondary Data. Census, Analysis of Census data

Demographic Profile of Settlements: Studies based on Age, History, Household Types, Diversity, Employment, Population, Income, Land Use and Location

LAND ECONOMICS

Economic concepts of Land; Objectives and scope of Land Economics – its relevance to spatial planning; Land as a Resource/Commodity and its role in urban development; Economic principles of land use; Demand forecasting for land use; factors affecting land supply and demand; Land valuation – technique, land pricing, subsidies, auction;

Land Information System: Land Records, Transparency in land transaction, methods of publicizing land prices and land price monitoring; Land Policy and Land Markets, Development of Land and Real Property; valuation of real property – principles and practices; private ownership and social control of land; Land price behavior in Metropolitan cities in India;

Factors influencing Locational decisions – like residential, commercial, institutional etc., in the light of location theories. Techniques of Cost Benefit Analysis; Urban Land Management and Land Reforms.

EK- 104:**Environment & Management of Natural Resource**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVES: To study the important natural resources available to the mankind and their effective management for a sustainable development. To understand the methods for environmental impact assessment and mitigation measures. The course will provide practical opportunities for students to participate in reviewing and critiquing actual environmental impact statements, as well as to use various assessment methods

METHODOLOGY: Lectures and presentations

CONTENTS:

Natural resources, Classification of natural resources, Resource Appraisal, resource problems and sustainable development. Ecological footprints and carbon credits.

Renewable and Non Renewable Resources.

Forest Resources: Types, uses and management, world Forest Cover, Forest Resources of India, Afforestation, deforestation and Sustainable Forest management.

Water Resources: Worldwide Scenario, Indian water Resources, Hydrological cycle, Surface water, Ground water, Flood, drought. Managing water resources. Current water related issues of India.

Energy Resources: World Energy demand, Sources of Energy- Solar, Geothermal, Hydel, Tidal, Hydrogen, Biomass and Nuclear Energy

Land Resources: Land as a Resource, Soils, Types of Indian soils, land Degradation, Soil Degradation, Soil Degradation- Causes, Indian scenario, Soil Conservation

EK- 105:**Evolution & Development of Human Settlements**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	-	25	25	-	50	3	2

OBJECTIVES: To study the Evolution and Growth of Human Settlements with a critical appreciation to draw inferences for application.

METHODOLOGY: Lectures and Library Studies

CONTENTS:

Origin and Growth of Human settlements, River Banks as a carrier to growth of Human settlements

River valley Settlements: Greek, Roman, Medieval, Renaissance and modern

Classification of Settlements: Informal and Formal, Open and Walled, Feudal and Democratic, Organic and Inorganic, Irregular and Geometrical, Magical and Mystical, Medieval and Classic

India:

Human Settlements during Ancient, Medieval and modern Periods

Characteristics of Human Settlements built under ancient & medieval period

Study of Ancient Settlements like Mohenjodaro, Taxila and Nalanda, Hampi, Madurai etc.

EK- 201:**Policies & Legislations**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVES: To study the various aspects of Land and environment related laws and Legislative framework in India

METHODOLOGY: Lectures and Field Study

Unit I: Sources of Law, meaning of the term of law, legislation, ordinance, bill, act, regulations and bye-laws; significance of law and its relationship to urban development; Land Acquisition Act, 1894 (with amendment in 1984) – basic concept, procedure for compulsory acquisition of property and determination of compensation; Urban Land Ceiling and Regulation Act, 1976 – objectives, contents and planning implications; Laws relating to Regulation of Building Operation; 73 and 74 Constitution Amendment Acts, 1992.

Unit II: Environmental Protection Act, 1986; The Air (prevention and control of pollution) Act, 1981; Water (prevention and control) Act, 1974 (with amendment); The Forest (conservation) Act, 1980; Wild Life Protection Act, 1972; Biological Diversity Act, 2002

Unit III: Five Year Plans in India – an appraisal

Unit IV: Town & Country Planning Act, DDA Act.

EK- 202:**Land Information Resource System**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

CONTENTS:

Unit I. Introduction. Basic concept of Geological factors in development of landforms. Spatial dimension of landforms. Time scales of landform development. Scope of the study of landforms as a unit of systematic analysis and importance of the study of landforms for Human Settlements .

India as a Mega Diversity nation: Trans- Himalayan Region, Indian desert, Semi-arid regions, Western Ghats, Deccan peninsula, Gangetic Plains, North eastern region and Coastal regions

Unit II. Map Reading and Interpretation of Survey Sheets: conventional symbols, locating points, map projections and classification of maps; scales, section drawing. Aerial photo grammetry: Definition, photo scale, and classification of Aerial photographs, Air photo interpretation key elements, and photo grammetric terminology.

Unit III. Factors controlling landform development; endogenetic and exogenetic forces; concepts of geomorphic cycles; geomorphic agents, definition of weathering, types of weathering physical and chemical, definition of erosion and denudation, cycle of erosion. Evolution of different types of landforms. Glacial, Fluvial, Coastal, Desert. Limestone (Karst) characteristic landforms and formation; swallow holes, resurgence, dry valleys, limestone pavements, bedding planes, joints, clints, grykes, caverns, stalactites, stalagmites and pillars. Landuse in different landforms (farming, forestry, water supply and tourism).

Unit IV. Temperature and pressure belts of the world; heat budget of the earth; atmospheric circulation; planetary and local winds; monsoons and jet streams; air masses and fronts; temperate and tropical cyclones; types and distribution of precipitation; Koppen's and Thornthwaite's classification of world climate; hydrological cycle; climatic change. Importance of interpretation of weather and climate in Settlement Planning.

Unit V. Recognition of landforms resulting from river, ice and marine erosion and Interpretation in terms of urban/rural Landuse patterns.

Suggested Reading

1. A text book of Geology by P.K.Mukharjee
2. Text book of Geomorphology by Thombury
3. Elements of Photo grammeteries by K.K. Rampal

EK- 203:**Transportation Planning**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	TOT		
2	2	50	50	-	100	3	4

OBJECTIVES: To study role of Traffic and Transportation in shaping the human settlements.

METHODOLOGY: Lectures and presentations

CONTENTS:

Transport system and components, modes of transport, mixed traffic and their role in transportation system, road pattern.

Traffic surveys: formulating objectives, identifying outputs, designing survey formats of traffic surveys; classified traffic volume survey, origin and destination survey, speed and delay survey, road network inventory survey. Methodology for analysis and presentation of field survey data and identification of issues.

Appreciation of importance of parking in Transport System planning, parking characteristics, parking indices, parking surveys, parking space inventory, parking norms and standards, design standard for on-street and off-street parking facilities.

Functional hierarchy of road network system. Capacity of highway, definitions and factors affecting, concept of Level of Service (LOS), road network standards by India Road Congress (IRC).

Traffic circulation, traffic management principles, advantages and disadvantages of various traffic management techniques, corridor management

Public transport system in cities, fares and subsidies, World-wide standards and system selection

Cross sectional elements of highways, road geometry and related planning standards, types of intersections, space standards of urban roads, typical cross section of urban roads.

Travel demand forecasting: stage in transport planning process, transport demand models, trip generation, trip distribution, trip assignment, modal split, formulation of transportation plan on the basis of land use, socio-economic growth.

Special emphasis on transport issues in Indian cities, successful cases of appropriate transport planning and infrastructure design from India and other countries.

Methods of traffic calming in residential areas, planning standards for pedestrian priority zones, planning standards for cycle tracks

EK- 204:**Dynamics of Development**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	-	25	25	-	50	3	2

OBJECTIVES: To study the forces of Society, Politics and Economics forming the basis of a prismatic theory leading to the dynamic growth of settlements.

METHODOLOGY: Lectures and Field Study

CONTENTS:

Theory of Demand and supply, Micro and Macro Economies, Industrial and Agrarian Economies, Economies of Scale, Migration, Shift in Labour Pool, Real Estate and Cost Index, G.D.P., G.N.P., F.D.I. , Political Agendas, Policies, Planning and projects

Land Economics

Land as a Resource and Commodity, Land Records, Land Acquisition Act 1897 with recent Amendments, Urban Land Ceiling Acts, Land use and Land Values, Land and real Estate Market, Building Operation & Regulation Act, Five Year plans in India- an appraisal

EK- 205:**Survey & Research Methodology**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	-	25	25	-	50	3	2

OBJECTIVES: To study various techniques of sampling and survey research.

METHODOLOGY: Lectures

CONTENTS:

Module 1: Definitions and Basics of Research Methods

Definition and needs of Research, Scientific research and methods, System approach of research, Levels of research: micro and macro. Major steps in the conduct scientific research, induction, deduction and verification. Selection and formulation of research problems, Reviewing of literature.

Module 2: Research Design and implementation

Approaches in research, developing a method for research; Questionnaire Design, Types of data, Sampling and survey techniques; developing aims, objectives, scope, limitations; and literature research – using library, accessing the Internet

Module 3: Designing Research and Test of Hypothesis

Designing a research, Pre test and pilot study, Synopsis, and components of synopsis, Hypothesis; meaning, importance and different concept, formulation and testing of hypothesis, Tests of Hypothesis, z-test, t-test, F-test, Chi-square test. Lorenz Curve; Correlation and Regression Analysis - meaning, types, importance, methods of measurement.

Module 4: Process of Theorization and Research Compilation

Definition of Concept, Theory and facts, Process of theorization, Research Compilation and report: contents and style, factors in the organization of a research report, writing of foot notes, quoting styles, references, cross referencing and bibliography.

EK- 301:**Urban Rejuvenation**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVES: Urban rejuvenation is critical to the recycling and revival of certain city areas, the objective of the course is to equip the students to deal with developments in existing cities.

METHODOLOGY: Lectures and Field Study

Historic overview of urban renewal

Development strategies for regeneration of inner city areas, recycling, renewal, etc.

Case studies of urban renewal, adaptive reuse and Brown Field projects in India and abroad

Infrastructure up gradation, economic regeneration, financing and management of urban renewal schemes

CONSERVATION

Introduction to conservation, heritage, concepts of historic zones and world heritage sites

Principles of conservation and successful practices in conservation in India and abroad

Importance of Charters, Archaeological Acts, Conservation Acts and Legislation

Concepts and approaches to urban conservation in India, UK and Europe

Heritage tourism and conservation

Institutional framework for urban conservation in India

EK- 302:**Regional Planning**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	-	25	25	-	50	3	2

OBJECTIVES:**METHODOLOGY:** Lectures and Field Study

Origin and Evolution of planning, contemporary developments in planning, Context of Regional planning, classification of Regions and Delineation Techniques, Threshold analysis

Structure Plans, Master Plans, Zonal development plans, UDPFI guidelines. Land Use, Physical structure and relationship between parts of the city.

Urban and Regional Planning principles and considerations: Urban structure; Urban typology, density and sustainability - spatial types and morphologies related to intensity of use, consumption of resources and production and maintenance of viable communities

Regional planning processes: Identification of plan objectives; collection, classification and analysis of data

Selected case studies in regional development in the Indian context.

EK- 303:

Planning Tools: (Remote Sensing & GIS)

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	ST	IA	WR	VV	TOT		
2	2	50	50	-	100	3	4

OBJECTIVES: To gain a basic understanding of the concepts underlying the operation of Geographic Information systems, the analysis of digital images, and the acquisition and use of remotely sensed imagery. Students will also learn how to apply these concepts to real-world data by using GIS, image analysis. Finally, students will explore how these software tools can be applied to spatial anthropological data.

METHODOLOGY: Lab and Field Study

CONTENTS:**Unit-I: Fundamentals of Remote Sensing**

Concept of satellite remote sensing; Types of satellites: Sun-synchronous and geostationary satellites; Platforms and sensors; Stages of remote sensing; Electromagnetic radiation (EMR); Electromagnetic spectrum; Interaction with atmosphere; Interaction with the earth surface; Remote sensing sensors and their characteristics; Spectral signature; Types of resolutions; Satellite data types and their uses: IRS satellites series, LANDSAT series, IKONOS, Quick bird and WV; Remote sensing data acquisition.

Unit-II: Fundamentals of GIS

Basic concepts of Geographic Information System; Concept of geo-informatics; Components of GIS; GIS data formats; Types of data structure: spatial and non-spatial; Vector and raster data structure; Data models: tabular, hierarchical, network, relational, object oriented; Errors and accuracies in GIS; Operations in GIS.

Unit-III: Spatial Data Input and analysis

Methods of data capture and input; Geo-referencing; Projection and datum; Coordinate transformation and resampling; Digitization of maps and satellite images; Generation spatial data base; Attribute generation; Linking spatial and non-spatial data; Generation of thematic maps.

Unit-IV: Manipulation, Analysis and Output

Data manipulation techniques; Spatial data analysis: overlay operations and proximity analysis; Data interpolation: point and line data; Network analysis and suitability analysis; Creation of data base: contours, spot heights; 3 D modeling: digital elevation models (DEM), slope and aspect; Query in GIS; Data output and presentation.

EK- 304:**Networks & Communications**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	2	50	50	-	100	3	4

OBJECTIVES: To understand the importance of Networks and communications and their role in shaping human settlements and vice versa.

MEHODOLOGY: Lectures

CONTENTS:

Water Supply Water requirement for various activities/building types, factors affecting water demand, per capita water requirement and its relationship with population size of settlement, variation in water consumption, seasonal and hourly variation, peak factor, concept of water demand management - Water treatment, various types of water treatment, water storage, pumping, types of water distribution system including, head loss, water flow in pipe network, 'loop' and 'branch' type distribution system - Fire fighting system and its impact on design of water distribution system.

Storm Water Drainage Rainfall pattern, measurement of precipitation, intensity, duration, frequency relationship, rainfall intensity, time of concentration, rainfall formula, runoff, hydrograph, unit hydrograph, rational formula, method for estimation of runoff, rainfall map, surface water, watershed, flood frequencies, flood protection - hydraulic gradient, concept of gravity flow, full flow self-cleaning velocity, souring velocity - concept of watershed management & rain water harvesting, impact of rainwater harvesting on water logging/drainage - rain water harvesting techniques.

Power Supply & Distribution Network for large cities, distance sources, power losses in transmission, power shortages, load optimization and load balancing, three phase supply, need for 3 phase and 2 phase power supply at different voltages, role of substations, isolation of circuits through substation, street lighting, emergency power, metering and cost recovery, safety requirements in respect of power supply and distribution networks.

Transmission Systems Satellite, Internet, Wireless, Fiber Optics, Microwave Television and Video-conferencing, Telecommunications development in India, technology and regulations, Evolution and History.

EK- 305:**Housing**

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
<i>L</i>	<i>ST</i>	<i>IA</i>	<i>WR</i>	<i>VV</i>	<i>TOT</i>		
2	0	25	25	-	50	3	2

OBJECTIVES: To understand society at its micro-level and its pattern of interaction within settlements.

METHODOLOGY: Lectures and Field Study

CONTENTS:

Housing comprises of the most important basic unit of SHELL several units in its collective hierarchical structure forms the social fabric in a settlement. It has high interdependence on social and physical infrastructure (at micro-level). Integration of Social infrastructures like basic education, health, etc.

Clustering patterns in traditional communities, pattern of community living, concept of neighborhood living, Radburn and other concepts – modern clustering concepts, density, high density living.

Stratification of settlements, Imbalances in settlements, Changes occurring in the pattern of settlements, Conflicts within settlements, communities based on ethnic groups - life style of different socio-economic groups, resulting in housing demand - environmental factors affecting housing layout, site analysis techniques, criteria for location of plots, various concepts of layout planning, techniques of promoting social interaction - development control for plotted and group housing – organization of open spaces and landscaping.

Detailed study of networks like power, water supply, drainage, sewerage, optimization techniques in layout, - site and services schemes.

Role of housing policy, supply of land, need for special attention for the urban poor, housing requirements of economically weaker sections - housing strategy, need for wide variation in housing stock and a good mix of ownership as well as rental housing in response to mobility – role of housing standards & significance in housing design.