

FFCBCS Course structure and Syllabus of B.Arch.
Applicable for Batch 2022-27
Structure of B.Arch. FFCBCS Program

Basket/ Area	Minimum Credits to be taken	Credit per course	Courses
Language & Literature (LL) Core: None Elective: Choose any 1 LL course	3	3	1
Discipline Core (DC)	218	-	49
Discipline Elective (DE) Core: None Elective: Choose any 8 DE courses	21	3	7
Skill Enhancement Courses (SEC) Core: None Elective: Choose any 3 SEC courses	4	2	2
Ability Enhancement Courses (AEC) Core: Entrepreneurship & start-ups, Environmental Science Elective: Indian Constitution, Aptitude & Soft Skills	2	2	1
Humanities & Liberal Arts (HL) Core: None Elective: Choose any 1 HL Courses	3	3	1
Free Electives (FE) Core: None Elective: Choose any 4 FE Courses	9	3	3
Total Credits	260		

DIT University B.Arch. FFCBCS Program Structure

Basket/ Area	Credits	Weightage (%)
Language & Literature (LL)	3	1.1
Discipline Core (DC)	218	84
Discipline Elective (DE)	21	8
Skill Enhancement Courses (SEC)	4	1.5
Ability Enhancement Courses (AEC)	2	0.8
Humanities & Liberal Arts (HL)	3	1.1
Free Electives (FE)	9	3.5
Total	260	100

FFCBCS Course structure and Syllabus of B.Arch.
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Course Baskets (other than DC/DE) for B.Arch. Program

Course Code	FFCBCS Baskets (Other than DC/DE)					
	Language & Literature (Min 3 credits to be taken)	Contact Hours				Credits
	Name of Courses	L	T	P	S	C
LAF181	Professional Communication	2	0	2	-	3
LAF182	Indian English Literature	3	0	0	-	3
LAF183	English Language Teaching	3	0	0	-	3
LAF184	Corporate Communication & Soft Skills	2	0	2	-	3

Course Code	Skill Enhancement (Minimum 4 Credits to be taken)					
	Name of Courses	Contact Hours				Credits
		L	T	P	S	C
ARF246	Technical Training 1	0	0	4	-	2
ARF244	Technical Training 2	0	0	4	-	2
ARF245	Value Added Training 1	0	0	4	-	2
ARF343	Value Added Training 2	0	0	4	-	2
DC	MOOCS Courses (as advised by the departments)	2	0	0	-	2

Course Code	Ability Enhancement (Minimum 2 Credits to be taken)					
	Name of Courses	Contact Hours				Credits
		L	T	P	S	C
CHF201	Environmental Science	2	0	0	-	2
LAF285	Indian Constitution	2	0	0	-	2
MEF483	Entrepreneurship & Start-ups	0	0	4	-	2
UCF201	Aptitude & Soft Skills	2	0	0	-	2

Course Code	Humanities & Liberal Arts (Minimum 3 Credits to be taken)					
	Name of Courses	Contact Hours				Credits
		L	T	P	S	C
LAF281	Introduction to Psychology	3	0	0	-	3
LAF381	Positive Psychology & Living	3	0	0	-	3
LAF481	Application of Psychology	3	0	0	-	3
LAF282	Human Values	3	0	0	-	3
LAF283	Literature, Language & Society	3	0	0	-	3
LAF284	Principles of Management	3	0	0	-	3
LAF482	Intellectual Property Rights	3	0	0	-	3
LAF382	Engineering Economics	3	0	0	-	3

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Course Code	Free Electives (Minimum 9 Credits to be taken)					
	Name of Courses	Contact Hours				Credits
		L	T	P	S	
ECF481	Analogue Electronics (ECE)	2	0	2	-	3
ECF482	Cellular Communication Networks (ECE)	2	0	2	-	3
ECF381	Microcontroller (ECE)	2	0	2	-	3
ECF382	Bio Medical Instrumentation (ECE)	2	0	2	-	3
ECF483	Digital Image Processing (ECE)	2	0	2	-	3
CSF381	Software Project Management	3	0	0	-	3
CSF345	Introduction to Data Science	3	0	0	-	3
CSF482	Introduction to Cyber Security	3	0	0	-	3
MEF381	Composite Materials	3	0	0	-	3
MEF481	Total Quality Management	3	0	0	-	3
MEF482	Renewable Energy Sources	3	0	0	-	3
PEF381	Carbon Capture & Sequestration	3	0	0	-	3
PEF491	Polymer Technology	3	0	0	-	3
PEF492	Health, Safety & Environment in Industry	3	0	0	-	3
CEF281	Properties of Materials	3	0	0	-	3
CEF382	Disaster Preparedness, Planning & Management	3	0	0	-	3
CEF481	Environmental Management & Sustainability	3	0	0	-	3
CEF482	Natural Dynamics	3	0	0	-	3
CEF483	GIS	3	0	0	-	3
CEF484	Resource Dynamics & Economic Implications	3	0	0	-	3

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Course Baskets: B. Arch FFCBCS DC & DE Baskets

Discipline Core (218 Credits)							
	Name of Courses	Pre-requisite Courses	L	T	P	S	C
ARF101	Architectural Design-I	None	0	0	0	8	8
ARF102	Building Construction & Materials-I	None	0	0	2	2	4
ARF103	Structural Design & Systems-I	None	1	1	0	-	2
ARF104	Architectural Graphics Skills-I	None	2	0	0	2	4
ARF105	History of Architecture-I	None	2	0	0	-	2
ARF106	Basic Design & Visual Art	None	0	0	0	3	3
ARF107	Computer Application-I	None	0	0	3	-	3
ARF108	Architectural Design-II	ARF101	0	0	0	8	8
ARF109	Building Construction & Materials-II		0	0	2	2	4
ARF111	Structural Design & Systems-II		1	1	0	-	2
ARF112	Architectural Graphics Skills-II		2	0	0	2	4
ARF113	History of Architecture-II		2	0	0	-	2
ARF114	Surveying & Levelling	None	0	0	2	-	2
ARF115	Computer Application-II	None	0	0	3	-	3
ARF201	Architectural Design-III	ARF108	0	0	0	9	9
ARF202	Building Construction & Materials-III		0	0	2	2	4
ARF203	Structural Design & Systems-III		1	1	0	-	2
ARF205	History of Architecture-III	None	2	0	0	-	2
ARF206	Climatology	None	1	0	2	-	3
ARF207	Architectural Design-IV	ARF201	0	0	0	9	9
ARF208	Building Construction & Materials-IV		0	0	3	2	5
ARF209	Structural Design & Systems-IV	None	1	1	0	-	2
ARF212	Contemporary Architecture	None	2	0	0	-	2
ARF213	Building Bye Laws & Code of Practice	None	2	0	0	-	2
ARF301	Architectural Design-V	ARF207	0	0	0	10	10
ARF302	Building Construction & Materials-V	None	0	0	4	1	5
ARF303	Structural Design & Systems-V	None	1	1	0	-	2
ARF304	Building Services-I (WS)	None	2	0	0	-	2
ARF305	Landscape Design	None	-	0	2	2	4
ARF306	Architectural Design-VI	ARF301	0	0	0	10	10
ARF307	Building Construction & Materials-VI	None	0	0	4	1	5
ARF308	Structural Design & Systems-VI	None	1	1	0	-	2
ARF309	Specification and Estimation	None	3	0	0	-	3
ARF311	Town Planning	None	2	0	0	-	2
ARF312	Building Services-II(EMS)	None	2	0	0	-	2
ARF313	Principles and Practices of Sustainable Building Design		1	0	2	-	2

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Discipline Core							
	Name of Courses	Pre-requisite Courses	L	T	P	S	C
ARF401	Architectural Design-VII	ARF306	0	0	0	12	12
ARF402	Building Construction & Materials-VII	None	0	0	2	1	3
ARF404	Theory of Urban Design	None	2	0	0	-	2
ARF405	Working Drawing	None	0	0	0	5	5
ARF406	Architectural Design-VIII	ARF401	0	0	0	12	12
ARF407	Advance Construction & New Building Materials	None	0	0	2	1	3
ARF408	Professional Practice-I	None	2	0	0	-	2
ARF409	Research Methods	None	2	0	0	-	2
ARF413	Dissertation	None	0	0	0	2	2
ARF412	Seminar	None	0	0	0	3	3
ARF501	Practical Training	None	-	-	-	-	15
ARF502	Architectural Thesis	ARF501	0	0	0	15	15
ARF503	Professional Practice-II		2	0	0	-	2

Discipline Electives (Minimum 21 Credits to be taken)							
	Name of Courses	Pre-requisite Courses	L	T	P	S	C
ARF241	Theory of Design	None	3	0	0	-	3
ARF242	Interior Design	None	0	0	0	3	3
ARF243	Furniture Design	None	0	0	0	3	3
ARF244	Architectural Photography	None	0	0	0	3	3
ARF245	Traffic Awareness	None	3	0	0	-	3
ARF341	Architectural Documentation	None	0	0	0	3	3
ARF342	Architectural Journalism	None	3	0	0	-	3
ARF344	Barrier Free Built Environment	None	3	0	0	-	3
ARF345	Hill Architecture	None	3	0	0	-	3
ARF441	Earthquake Resistant Architecture	None	3	0	0	-	3
ARF442	Mega Structures	None	3	0	0	-	3
ARF443	City Planning Concepts	None	0	0	0	3	3
ARF444	Architectural Acoustics	None	3	0	0	-	3
ARF445	Construction & Resource Management	None	3	0	0	-	3
ARF446	Building Economics	None	3	0	0	-	3
ARF541	Architectural Conservation	None	0	0	0	3	3
ARF542	Sustainable Cities & Communities	None	3	0	0	-	3
ARF543	Visual Communication	None	3	0	0	-	3
ARF544	Adaptive Reuse of Built Form	None	3	0	0	-	3

Abbreviations:

1	L	Lecture
2	T	Tutorial
3	P	Practical
4	S	Studio

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DIT UNIVERSITY, DEHRADUN

FFCBCS SYLLABUS: Bachelor of Architecture

Subject Code	ARF1 01	Subject Title	ARCHITECTURAL DESIGN-I						
LTPS	0,0,0,8	Credit	8	Subject Category	DC	Year	I	Semester	I

Course Objective:

- The course should enable the student to comprehend design principles, methods, visual judgment and the creative process. Studio focuses on the development of fundamental skills: manual (making), visual (seeing) and intellectual (abstracting)
- Get acquainted with workshop tools and incorporate their use in the creative process.

Unit 1: Introduction to Architecture & Design Principles

- Introduction to architecture. Scope and types of services rendered by an Architect.
- Introduction to Primary Elements and Basic Design Principles.
- Component of Design-Geometrical forms, Transformations, collisions, Articulation.
- Application of elements of design to achieve design principles and in Creative work.

Unit 2: Application of Design Principles

- Difference & relation between form & Space
- Proportion & Scale- Visual Scale & Human Scale
- Approach to Design as a continuous process through Aesthetics, function, psychological impact (on space & design) and Technology (construction)
- Basic components of a building and their Functions.
- Openings, Enclosures & Quality of Space, Organization of Form & Space
- Types of Organization of forms with emphasis on spatial relationship,
- Form of circulation space, path space relationship.

Unit 3: Basic Human Activities

- Study of basic human Needs, Various requirements, standard measurements of Human activities and allocation of Spaces.
- Students are expected to do any small exercise as a group work.

Unit 4: Approach and Process of Design

- Principles of Design with reference to function, various activities and related spaces.
- Case Study & analysis of single Units like living spaces, sleeping and cooking spaces etc.
- Art, Architecture & Architectural Design, Preliminary geometric interpretation from nature & surroundings

Unit 5: Architectural Research-I

Introduction. Meaning of research. Significance and importance of research. Basic definitions & terminologies.

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Learning Outcome

At the end of the course, the student will be able to:

- Will be able to make composition using Design Principles and elements.
- Have a comprehensive knowledge about the sketching and the usage of colour media.
- Able to communicate observation & memory through free hand drawing.
- Will be able to design the spaces as per anthropometrics studies.

Text Book [TB]:

1. Form, Space and Order, Francis D. K. Ching.
2. Architectural Graphic standards editor, Boaz Joseph

Reference Books [RB]:

1. Planning – the Architect's handbook, E and E.O.
2. Time Saver standards for building types, Editor Joseph D.C. and John Callender.
3. Neufert's Architect's data.

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Subject Code	ARF1 02	Subject Title	BUILDING CONSTRUCTION & MATERIALS - I						
LTPS	0,0,2, 2	Credit	4	Subject Category	DC	Year	I	Semester	I

Course Objective:

- To make the pupil aware of the history related to construction and construction materials.
- The pupil will be taught the history and evolution of construction methods and construction materials related to bricks and brick bonds.

Unit 1: Materials Past and Present

- Building material and construction method.
- Types of mortars and their classifications based on different components involved in them.
- Types of mortar joints and their advantages and disadvantages.
- Construction materials:
 1. Blocking material.
 2. Binding material.
 3. Layering material.

Unit 2: Materials

- Classification, availability, characteristics and uses of materials discussed in Unit - I
- For example- Cement, fine aggregates, coarse aggregates, mortars, concrete, plastering etc

Unit 3: “Masonry and Arches in Bricks and Stone”

- Brick Bonds
- Types of brick bonds: English bond, Flemish bond, Header bond, Stretcher bond in different thickness of brick walls.
- Stone masonry -Rubble work: Random Rubble, built-to-course and coursed masonry, miscellaneous, Classification, characteristics and properties of stones, quarrying of stone, artificial stone

Unit 4: Vertical Section & Types of Buildings

- Vertical section of building explaining all the building terminologies with standard dimensions specification and details.
- Basic difference between a framed structure and a load bearing structure. Their advantages and disadvantages.

Learning Outcome

At the end of the course, the student will be able to:

- Analysis of the evolution of construction methods and construction materials related to bricks and brick bonds.
- Related to types of buildings that will initiate the pupil's thought process to think in the direction of classifying typologies and structures of any particular building visually.
- Understand the basic building elements, their function and behaviour under various conditions with specific reference to “Load Bearing Construction”.

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Text Book [TB]:

1. Form, Space and Order, Francis D.K.Ching.

Reference Books [RB]:

1. Architectural Graphic standards editor, Boaz Joseph
2. Planning – the Architect's handbook, E and E.O.
3. Time Saver standards for building types, Editor Joseph D.C. and John Callender.
4. Neufert's Architect's data.
5. A.J. Metric Handbook, editors, Jan Bilwa and Leslie Fair weather.

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Subject Code	ARF1 03	Subject Title	STRUCTURAL DESIGN & SYSTEM-I						
LTPS	1,1,0,0	Credit	2	Subject Category	DC	Year	I	Semester	I

Course Objective:

To help students develop an analytical and logical sequence in thinking about structural aspect of building along with the types of building structures and basics of structural components.

Unit 1: Types of Structures

- Classification based on - loading system, Materials, Technique/ Technology.

Unit 2: Properties & Behavior of Structural Materials

- Concept of homogenous & heterogeneous materials in response of direct & bending force.

Unit 3: Simple Stresses & Strain

- Introduction, types, elasticity, elastic theorem, limit, hook's law, modulus of elasticity, poisson's ratio, linear strain, shear stress.

Unit 4: Concept of Load

- Introduction, static load, dynamic load or impact load, fluctuating load, stresses created by these loads.

Learning Outcome

At the end of the course, the student will be able to:

- Understand the advantages & limitations of various building structural systems.
- Understand the behaviour of structural materials under loading conditions.
- Understand the various loading conditions for buildings

Text Book [TB]:

1. POPOV, E.P., Mechanics of solids, Prentice - Hall Inc, Englewood Cliffs, New Jersey - 1976
2. S. Ramamrutham and Narayanan R., Strength of Materials, Dhanpat Rai Publications, New Delhi, 2002

Reference Books [RB]:

1. Timoshenko, C.P., and Gere., Mechanics of materials, McGraw - Hill Book Company, New York, 1984
2. Khurmi R.S., A text book of Engineering Mechanics, S. Chand and Co, New Delhi, 1999

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Subject Code	ARF1 04	Subject Title	ARCHITECTURAL GRAPHICS SKILL – I (Manual)						
LTPS	2,0,0, 2	Credit	4	Subject Category	DC	Year	I	Semester	I

Course Objective:

- Students will learn how to make architectural drawings manually draw using traditional and current tools and techniques.
- They will understand the relationship between plan, elevation and sectional drawings of objects and simple architectural composition.

Unit 1: Drawing Tools and Accessories

- Introduction to the subject and drawing equipment. Setting of drawing equipment such as drawing board set-squares, Tee-square, French curve, stencils, different types of pencils and pens and their uses.

Unit 2: Lettering & Scale

- Free hand and Architectural lettering, size and notation of drawing
- Types and uses of scales, Scales used by an architect, reducing and enlarging scales
- Measured drawing of small objects, such as building elements, pieces of furniture and small built forms.

Unit 3: Basic Technical Drawing

- Types of line, Drafting and quality of lines with pencil and ink pen
- Symbolic representation of building elements and material, other features as per I.S.I and standard practice.
- Division of lines and angles.
- Drawing polygons, Inscribing and circumscribing circles in polygons. Internal & External tangents, Metric Drawing.

Unit 4: Orthographic Projections

- Definition, Planes of Projections.
- Projection of regular rectilinear and circular solids (prisms, pyramids, cones, cylinders, spheres etc.) in different positions,
- Surface Development of solids, interpenetration of solids.

Learning Outcome

At the end of the course, the student will be able to:

- Have a comprehensive knowledge about the sketching and the usage of colour media.
- Handle the instruments T square, set square manually to draw plan, elevation and section of an object.
- Understand the relationship between elevation, plan and section of the objects
- Will be able to draw to a suitable scale.

Text Book [TB]:

1. Architectural Graphics, C. Leslie Martin
2. Perspective for the Architect: Themes and Hudson
3. Interior Design, Ahmed Kasu
4. Architectural Graphics, Ching Frank
5. Engineering Drawing, N.D. Bhatt.

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Reference Books [RB]:

1. A.J. Metric Handbook, editors, Jan Bilwa and Leslie Fair weather
2. Architectural Graphic standards editor, Boaz Joseph
3. Time Saver standards for building types, Editor Joseph D.C. and John Callender.
4. Rendering with pen and ink
5. Practical Plane and Solid Geometry, H.Joseph and Morris
6. Engineering Drawing and Design by David A. Madsen
7. Architectural Drawing Course by Zell, Mo
8. Ching, F.D.K., "Design Drawing", Van Nostrand Reinhold

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Subject Code	ARF1 05	Subject Title	HISTORY OF ARCHITECTURE– I						
LTPS	2,0,0,0	Credit	2	Subject Category	DC	Year	I	Semester	I

Course objective:

This course aims to introduce the strong relation of Culture, Society and Architectural Design over time. The course shall enable the student to understand the manner in which buildings may be “read” relative to a specific culture. The student shall also decipher that Architectural design is a process in which the needs of society are erected in a built form which subsequently defines the goals of the society itself.

Unit 1: Introduction to Sociology & Its Effect on Architecture

- Definition, scope and use of sociology.
- Importance of the subject for Architects and Town Planners
- Man, his Social and Physical environment, Social groups & social structure, utility and relation with Architecture.
- Sociological studies of communities with their habits and built environment

Unit 2: Pre – History & Built Spaces

- Paleolithic Age
- Mesolithic Age
- Neolithic Age

Unit 3: Early Civilizations & Architecture – Parallel India and the World

- Indus Valley Civilization
- Egyptian Civilization
- Mesopotamian Civilization
- The Aryans in India

Unit 4: Buddhist and Jain Architecture

- Asoka, and the beginnings of Buddhist School; Rock-cut architecture; Viharas or Monasteries; South India; Buildings in Brick; Lats, eddicts, stupas, viharas and chaityas (synopsizing the Stone Age to Neolithic settlements, world civilizations, and the Aryan civilization). Jain Architecture with specific reference to the temple cities of Palitana and Cemar

Learning Outcome

At the end of the course, the student will be able to:

- Have a comprehensive knowledge about the design of our environment, with the exception of some current trends, which has largely been essential in defining our culture and sub-cultures, while providing a long-term replication of cultural ideals in built form.
- Apply the technique to observe social structure and behaviour within their own environment.
- Will be able to discuss the differences between their own and other cultural sub-sects of the world.

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Text Book [TB]:

1. Pier Liugi Nervi, General Editor – History of World Architecture – Series, HARRY N.Abrams, Inc. Pub, New York, 1972.
2. S.Lloyd and H.W.Muller, History of World Architecture Series, Faber and Faber Ltd., London, 1986.

Reference Books [RB]:

1. Spiro Kostof – History of Architecture – Setting and Rituals, Oxford University Press, London, 1985.
2. Gosta, E.Sandsform, Man the Builder, McGraw Hill Book Company, New York, 1980

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Subject Code	ARF1 06	Subject Title	BASIC DESIGN & VISUAL ART						
LTPS	0,0,0, 3	Credit	3	Subject Category	DC	Year	I	Semester	I

Course Objective:

The course should enable the student to appreciate the art and its philosophies. They will be familiarized with principles and theories of arts and architectural composition and development of art and graphic skills.

Unit 1: Introduction to Theory of Architecture & Art & its Philosophy

- Introduction to Graphic Composition, Principles of design, Elements of Design, Introduction to Architectural Composition, Application of elements and Principles of Design through 2-D and 3-D compositions, Unity, Elements of Unity, Texture, Color, Tone Direction Proportion, Form and shape, solids and voids
- Colour theory
- Relevance of art in life, Appreciation of art: Painting, Sculpture and Architecture

Unit 2: Art and Graphics Skills

- Free hand sketching and drawing, drawing curves and other shapes, Comprehension of scale, still life drawing- from observation & memory, Nature.
- Free hand sketching – Drawing People, Furniture and various rendering skills and techniques like textures, materials, finishes using various equipment like transfer, airbrush and architectural drafting.

Unit 3: Collage, Mural, Sculptures (3D)

- Collage with paper and various waste materials with theme and presentation, Mural with different materials on live scale, Sculpture with different materials like P.O.P, Clay etc.
- Photography & Small movie making.

Unit 4: Model Making & Carpentry Workshop

- Understanding the qualities of different materials, Different types of joints on model making
- Use of different types of materials – paper, thermacol, clay, wood, P.O.P. etc, with different combinations
- Use of Colors in model making

Unit 5: Arts and Graphics Skills

- Free hand drawing –drawing people, furniture, fabric and transport from imitation, observation and recapitulation.
- Rendering techniques –for textures of materials and finishes; using equipment's like transfers, airbrush, rendering architectural drawings. Drawing from nature-shrubs, trees, grass, plants, flowers, rocks, water.
- Still life drawing from observation

Learning Outcome

At the end of the course, the student will be able to:

- Will be able to make composition using Design Principles and elements.
- Have a comprehensive knowledge about the sketching and the usage of color media.
- Able to communicate observation & memory through free hand drawing.
- Will be able to make the collages, Murals and Sculptures.

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Text Book [TB]:

1. Architectural Graphics, Ching Frank
2. Engineering Drawing, N.D. Bhatt.
3. Space, form and Order, D.K. Ching
4. Rendering with pen and ink.

Reference Books [RB]:

1. Architectural Graphic standards editor, Boaz Joseph
2. Planning – the Architect's handbook, E and E.O.
3. Time Saver standards for building types, Editor Joseph D.C. and John Callender.

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Subject Code	ARF1 07	Subject Title	COMPUTER APPLICATION-I						
LTPS	0,0,3,0	Credit	3	Subject Category	DC	Year	I	Semester	I

Course Objective:

This course aims to introduce various software to the students helping them in compilation of then text reports etc, further, to enable them to understand the role of various data storing devices such as scanners Digitizers etc. and their applications.

Unit 1: Learning M.S.Office

- Basic command to operate the component say M.S. Office such as M. S. Word, Knowledge about D.T.P Techniques in M.S. Word, Use of various Command to make charts, graphs, tables, to help students compile their reports in M.S. Word, exporting & Importing such work done is other software and using of clip Art and making elementary shapes in M.S. Word.

Unit 2: Learning M.S.Office

- Learning the other components of M.S. office like M.S. Excel, M.S. Power Points, etc, Making work sheets in M.S. Excel.

Unit 3: Use of Photo editing Softwares

- Learning photo-editing software such as Adobe, Photoshop, Photo editor, Page Maker etc.

Unit 4: Model Making & Carpentry Workshop

- Understanding the qualities of different materials, Different types of joints on model making
- Use of different types of materials – paper, thermacol, clay, wood, P.O.P. etc, with different combinations
- Use of Colors in model making

Unit 5: Introduction to Use of Printing Equipment and Hardware

- Familiarizing the use of scanners, printers, plotters their hardware and other related systems

Learning Outcome

At the end of the course, the student will be able to:

- Have a comprehensive knowledge about the basic software.
- Will be able to make the presentation, graphs, charts etc.
- Will be able to edit the drawings and data using software like Photoshop, Photo editor etc.
- Know how to scan and take prints using printers, plotters etc.

Text Book [TB]:

1. Computer Organization, 5th edition, Zvonko Vranesic, Safwat Zaky
2. Computer Organization, ISRD Group, Tata Mc-Graw-Hills companies.

Reference Books [RB]:

1. Manuals of AUTOCAD – AUTODESK Inc.
2. Computer and common sense, Hunt and Shelly

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Subject Code	ARF1 08	Subject Title	ARCHITECTURAL DESIGN-II						
LTPS	0,0,0, 8	Credit	8	Subject Category	DC	Year	I	Semester	II

Course Objective:

To make the students aware about how materials, processes of construction, and the structure are integral to design. The students will also understand the importance of site orientation, attribute and inter-relationship of activities, circulation and the way buildings respond to it.

Unit 1: Introduction to Different aspects of Simple Structures

- Primary knowledge of Load bearing and frame structures required for design process.

Unit 2: Anthropometrics Studies, and Measure Drawings

- Study of basic human Needs, Various requirements, standard measurements of Human activities and allocation of Spaces.
- Students are expected to do any small exercise as a group work.
- Measured drawing of building Unit or Units representing the structural & spatial components. Ex. Small room, stair case, canopy, courtyard, fountain etc.
- Students are expected to do any small exercise as a group work.

Unit 3: Site Attributes and Response to Climate

- Site Orientation Response of site to the physical feature (natural in & man made).

Unit 4: Circulation

- Inter-relation with the activities and circulation in context to site surrounding and inside the site.

Unit 5: Architectural Research-II

Research in architecture. Research problems in architecture. Study of articles and write-ups of eminent people of the profession

Learning Outcome

At the end of the course, the student will be able to:

- Will be able to Design based on the typology of load the structure is distributing.
- Design based on the interdependence of form, function and structure in the process of Architectural Design.
- Understand the context for design: site attributes and surroundings

Text Book [TB]:

1. Petrol filling stations: construction and operation, HMSO, 1990
2. Design Fundamental in Architecture, Walter Gropius
3. Pattern of Nature, Peter Streens
4. Elements of Architecture, Meiss Pierree Von
5. Architecture: Form, Space and Order, Francis D.K. Ching

Reference Books [RB]:

1. A.J. Metric Handbook, editors, Jan Bilwa and Leslie Fair weather
2. Architectural Graphic standards editor, Boaz Joseph
3. Structure in Architecture, Heller Robert and Salvadori Mario
4. Planning – the Architect's handbook, E and E.O.
5. Neufert's Architect's data
6. Time Saver standards for building types, editor Joseph D.C. and John Calader.

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF1 09	Subject Title	BUILDING CONSTRUCTION & MATERIALS - II						
LTPS	0,0,2, 2	Credit	4	Subject Category	DC	Year	I	Semester	II

Course Objective:

To acquaint the students with the principles, properties & behaviour of structural components of framed structure.

Unit 1: Timber

- Softwood and Hardwood - Secondary Timber - Physical properties and their uses/ applications in buildings (framing, shutters, Panelling, flooring, roof finishing and furniture) - Defects, Conversion, Seasoning, Decay and preservation of timber - Fire retardant treatment, anti-termite treatment.

Unit 2: Industrial Timber

- Plywood, block board, particle board, fiber boards. MDF boards, veneers, laminates etc, and other current products/development.

Unit 3: Tools and Techniques

- Elementary carpentry, Tools, Common joints

Unit 4: Doors and Windows

- Types of Doors-Ledged, Braced Batten Door, Panelled, Flush, Sliding doors, Sliding and folding doors, Mosquito Proof Shutters, Rotating Door, etc.
- Types of windows, ventilators and their details

Unit 5: Partitions & Panelling

- Wooden Partitions and panelling.

Learning Outcome

At the end of the course, the student will be able to:

- Each student shall be able to apply timber and timber products strategically & in a proper manner, judiciously in different elements of building.
- Understand the nature and properties of timber.
- Understand various joints in timber and apply.

Reference Books [RB]:

1. W. B Mckay, Building Construction
2. Building Construction Illustrated by Francis D. K. Ching
3. Fundamentals of Building Construction: Materials and Methods by Edward Allen & Joseph Iano

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Applicable for Batch 2022-27

Subject Code	ARF1 11	Subject Title	STRUCTURAL DESIGN & SYSTEMS-II						
LTPS	1,1,0,0	Credit	2	Subject Category	DC	Year	I	Semester	II

Course Objective:

To acquaint the students with the principles, properties & behaviour of structural components of framed structure.

Unit 1: Properties of Sections

- C.G., M.I., section modulus, radius of gyration, theorem of perpendicular & parallel axis, M.I. for composite sections

Unit 2: Shear Force & B.M.

- Introduction to different beams (cantilever, simple supported, fixed, continuous) concept, of shear force & bending moment, sagging & hogging moments, B.M. & shear force diagrams for determinate beams under simple loads, moment of resistance, point of contra flexure, interrelation between B.M. & S.F. diagram.

Unit 3: Theory of Columns

- Introduction, Euler's load, derivation of Euler's formulae, buckling, short & long columns, slenderness ratio, Rankin's formulae, effects of eccentric loading.

Unit 4: Stresses in Beams

- Introduction to beam, theory of simple bending, neutral axis, bending & shear stress in symmetrical sections, bending & shear stress distribution & its diagram.

Learning Outcome

At the end of the course, the student will be able to:

- Understand the basic theory of shear force and bending moments in structural members- horizontal and vertical.
- Understand the various aspects of vertical structural member.
- Understand the stress distribution in horizontal structural members.

Text Book [TB]:

1. Building Structures Illustrated by Francis D. K. Ching
2. Strength of Materials by J.P. Den Hartog
3. Engineering Mechanics for Structures by Louis L. Bucciarelli

Reference Books [RB]:

1. Timoshenko, C.P., and Gere., Mechanics of materials, McGraw - Hill Book Company, New York, 1984
2. Khurmi R.S., A text book of Engineering Mechanics, S. Chand and Co, New Delhi, 1999

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF1 12	Subject Title	ARCHITECTURAL GRAPHICS SKILLS – II (MANUAL)						
LTPS	2,0,0, 2	Credit	4	Subject Category	DC	Year	I	Semester	II

Course objective:

Make the student conversant with architectural drafting & train to draw the metric drawing. Will also enable student to understand the theory of perspective to draw an object / simple along with the developing and rendering the foreground and background of the perspective view in different medium.

Unit 1: Section of Solid

- Sections of regular rectilinear and circular solids (prisms, pyramids, cones, cylinders, spheres etc.): conditions of sectional plane and true shape of sections.

Unit 2: Views

- Isometric, axonometric and pictorial view

Unit 3: Perspective Drawing

- Purpose and use. Differences with metric projections.
- One point, two point, three point perspectives. Drafting of simplex or complex building.
- Introduction to shortcut methods in perspective drawing. Free hand perspective.

Unit 4: Shades, Shadows and Rendering

- Values in shades and shadows,
- Constructing plan shadows (point, line and plane),
- Constructing shadows in elevations (Point, line and Plane).
- Short- cut methods for constructing shadows Presentation techniques in different types of rendering techniques and materials.

Unit 5: Rendering

- Rendering in different media.
- Rendering of students own works (design project) interior and exterior perspectives.
- Enlargement and Rendering in Ink

Learning Outcome

At the end of the course, the student will be able to:

- Identify and understand the concept of drafting different types of perspective views.
- Will be able to draft and show the Sciography in their presentation drawings.
- Will be able to render the fore-ground and back ground of the perspective.

Text Book [TB]:

- Perspective for the Architect, Themes and Hudson
- Perspective and Sciography, Shankar Mulik
- Interior Design, Ahmed Kasu
- Architectural Graphics, Ching Frank
- Engineering Drawing, N.D. Bhatt.

Reference Books [RB]:

- Architectural Graphic standards editor, Boaz Joseph
- Rendering with pen and ink
- Practical Plane and Solid Geometry, H. Joseph and Morris.

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Applicable for Batch 2022-27

Subject Code	ARF1 13	Subject Title	History of Architecture- II						
LTPS	2,0,0,0	Credit	2	Subject Category	DC	Year	I	Semester	II

Course Objective:

The course should enable the students to gain awareness about the society and world around them. This awareness will in turn, make them appreciate the various elements of culture and society that have an effect on the architecture of a place, in terms of motive and style.

Unit 1: Hindu Architecture-Indo Aryan

- Evolution of the temple form in north India; the schools of Architecture: Rajputana, Gujarat, Khajuraho, Deccan and Orrisa styles

Unit 2: Hindu Architecture-Dravidian

- Genesis under the Pallavas; Pandyas, Vijayanagar Dynasty and Madura; Later Chalukyan, or Hoysala Style; evolution of the vimana and the contributions of the Nayaks to the temple cities

Unit 3: Introduction and understanding of Islam's philosophy and its interpretation in building type

- Sultanate Style- The Arabs, Afghans, Slave Dynasty, Khaljis, Tughlaqs, Lodhis and Sher Shah regimes and their architecture
- Provincial Style- Development of colloquial styles in various provinces of India like Punjab, Jaunpur, Gujarat, Bengal, Bijapur, Bihar and Deccan.

Unit 4: Mughal Architecture

- The architecture of the Timurids in India- Babur, Hamayun, Akbar, Jahangir and Shahjahan
- Later Mughal- the Oudh architecture in Lucknow and its surroundings briefly outlining the Lucknow city

Unit 5: Colonial

- The British architecture of the colonial days in Indian capital of Delhi and the residency at Lucknow, emphasizing on their planning criteria and architectural features; Gothic revival architecture of Bombay and classical architecture of Calcutta

Learning Outcome

At the end of the course, the student will be able to:

- Apply the tools and techniques to observe societal elements, architectural designs, social structures and behaviours within their own environment.
- Discuss the differences between theirs and other cultural sub-sects of the world.
- Understand the evolution of new architectural forms in India after invasion from outside world.

Text Book [TB]:

1. G.K. Hiraskar, Great Ages of World Architecture, Dhanpat Rai & Sons, 2015
2. Percy Brown, Indian Architecture (Buddhist & Hindu Period)

Reference Books [RB]:

1. Percy Brown, Indian Architecture (Buddhist & Hindu Period)
2. S.Lloyd and H.W.Muller, History of World Architecture Series, Faber and Faber Ltd., London, 1986

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Applicable for Batch 2022-27

Subject Code	ARF1 14	Subject Title	SURVEYING & LEVELLING						
LTPS	0,0,2,0	Credit	2	Subject Category	DC	Year	I	Semester	II

Course Objective:

The course should enable the student to understand the topographical factors and other physical constraints present in the site. The students deal with the real engineering problems in surveying and mapping operations.

Unit 1: Surveying

- Role of surveying in Architecture, Types of survey.
- Introduction to various techniques – Chain and Plain Table Survey, Travers Survey.
- Contouring – Contour Maps, characteristics, use and interpretation. Evolution of the temple form in north India; the schools of Architecture: Rajputana, Gujarat, Khajuraho, Deccan and Orrisa styles

Unit 2: Leveling

- General principles and application of Levelling in Surveying.

Unit 3: Drone Analysis

- Introduction to drone analysis. Its importance in today's world.

Learning Outcome

At the end of the course, the student will be able to:

- Handle the different tools and equipment used in surveying
- Understand the survey plans
- Apply the survey techniques to prepare contour maps

Text Book [TB]:

1. C. Venkatramaiah, Textbook of Surveying, Universities Press Ltd, 1996
2. S.K. Duggal, Surveying Volume 1, Tata McGraw Hill Publishing, 2006

Reference Books [RB]:

1. N.N. Basak, Surveying & Levelling, McGraw Hill Education Pvt. Ltd.
3. B.C. Punamia, Surveying, 16th Edition, Laxmi Publications, 2005

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Applicable for Batch 2022-27

Subject Code	ARF1 15	Subject Title	COMPUTER APPLICATION - II						
LTPS	0,0,4,0	Credit	4	Subject Category	DC	Year	I	Semester	II

Course Objective:

This course aims to enable the students to visualize and graphically reproduce simple and complex layouts to succeed in subsequent drafting and design courses.

Unit 1: Introduction to Autocad, Basic Drawing Tools and Drawing Precision

- Interface, navigating a Drawing, Lines, Circles, Rectangles, Polar Tracking, Erasing Objects, Creating a Simple Drawing, Object Snaps, Polar Tracking Options, Object Snap Tracking, Snap and Grid Settings etc

Unit 2: Drawing Organization, Making Changes, Getting Information and Object Types

- Templates, Units, Layers, Controlling Layer States Move and Copy, Rotate and Scale, Mirror, Grip Editing, Arcs, Poly lines, Polygons, Ellipses, Object Properties, Measuring Objects

Unit 3: Advance Editing, Blocks, Setting Up Layout

- Trim and Extend, Stretching Objects, Fillets and Chamfers, Offset and Array, Using Blocks, defining a Block, Reusing Blocks, Printing Concepts, working in Layouts, Copying Layouts, Creating Viewports.

Unit 4: Adding Text, Hatching, Dimensioning and Printing

- Modifying Text, Adding Leaders, Creating Tables, Creating Hatches, - Modifying Hatches, Linear Dimensions, Radial and Angular Dimensions, Editing Dimensions, Printing Layouts, Printing from Model Space.

Unit 5: Introduction to Autocad 3d- Creating, Editing And Printing

- Introduction

Learning Outcome

At the end of the course, the student will be able to:

- Create, annotate, edit and plot drawings using basic AutoCAD commands and features.
- Apply basic AutoCAD skills to intermediate AutoCAD course and other design and drafting courses.
- Apply the tool to prepare a building plan

Text Book [TB]:

1. Autocad 2009 and Autocad LT 2009, Mcfarland, Jon
2. Autocad 2009 and Autocad LT 2009, Finelstein, Ellen

Reference Books [RB]:

1. Fundamentals of CAD/CAM/CIM, Sharma.V
2. Autodesk Official Training Guide, Krygiel, Eddy

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF2 01	Subject Title	ARCHITECTURAL DESIGN-III						
LTPS	0,0,0, 9	Credit	9	Subject Category	DC	Year	II	Semester	III

Course Objective:

Learning from vernacular wisdom and precedents. The course would focus on the core philosophy to harmonise the building form and fabric with the site and climate thereby reducing ecological impacts and achieving energy efficiency.

Unit 1: Group Work -Vernacular Study

- Case study of typical small scale settlement in town or village, for understanding evolution of
- Design, use of material (Maximum one week), local climate, topography life style, culture, occupation, economy etc.
- Study of accepted worldwide themes- primitive, pre- industrial, modern and new vernacular

Unit 2: Site Study and Analysis & Site Planning

- Site and surroundings survey- location, local climatic conditions, topography, existing landscape, socio- cultural impact on design. Study of locally available material, technology and resources. Use surveying for site analysis. Introduction to site planning.

Unit 3: Built Form and Building Design Development

- Concept development, detailed study of functions, circulation and connectivity with overall planning. Study of relationship of built and open spaces, interlinking of various activities, volumetric analysis, Façade treatment- Interior and exterior. Overall design development till last stage.

Unit 4: Presentation

- Enhancement of presentation skills using multiple media. Creation of 3-D models based on the design.

Unit 5: Architectural Research-III

Research problems in architecture. Problem identification, Case Studies

Learning Outcome

At the end of the course, the student will be able to:

- At the end of the sequence each student will have created all the pieces they need for the design of a small single-zone building, usually some type of residential project.
- The form of the building will have evolved week by week from the issues covered in each module.
- At the end of the sequence each student will have developed their own set of design criteria against which their final building design can be evaluated.
- Students shall be able to work in any climate, in context of local topography.

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Applicable for Batch 2022-27

Text Book [TB]:

1. Jan Bilwa and Leslie Fair weather A.J. Metric Handbook
2. Department of Road and Transport, Residential roads and footpath, HMSO, 1992

Reference Books [RB]:

1. Boaz Joseph, Architectural Graphic standards, Wiley Publications
2. Joseph D.C. and John Callender, Time Saver standards for building types, Tata McGraw Hills

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Applicable for Batch 2022-27

Subject Code	ARF2 02	Subject Title	BUILDING CONSTRUCTION & MATERIALS - III						
LTPS	0,0,2, 2	Credit	4	Subject Category	DC	Year	II	Semester	III

Course Objective:

The overall intend of this subject is to study various construction methods in context with surface finishing's, Glass and fibre materials along with the study of different roofing material available in the market.

Unit 1: Surface Finishing

- Surface Finishing: Types of plastering, types of jointing and pointing. Cladding with natural and artificial stones, their composition, sizes, colours, properties, defects and their fixing details
- PAINTS: characteristic of an ideal paint, types of paints, defects in painting, painting on different surfaces.
- Varnishing: characteristics of an ideal, varnish types of varnishes, process of varnishing.
- Distemper: properties of distempers, process of distempers. Wall finishes: wall paper, whitewashing and color washing for walls.

Unit 2: Glass and Fiber Glass

- Classification of glass, types of glass, physical properties and uses of glass, special varieties of glass and Architectural glass.

Unit 3: Roof Coverings

- Concrete Tiles, Asbestos Cement sheets (Plain & Corrugated),
- Aluminium Sheets (Plain & Corrugated).
- Galvanized Iron Sheets (Plain & Corrugated). Stone, Slating, Shingles, Thatch. Any contemporary roofing material.

Unit 4: Roofing Systems in Timber

- Brief introduction to different roofing systems and typologies like sloping roof, domes, galvanized iron sheet sloping roof, curved vault.

Unit 5: Vertical Transportation

- Brief introduction to stairs, lifts, escalators & conveyor belts. Type of escalators and a sheet describing their typologies.

Unit 6: Types of Staircases

- Straight stairs, L-Shaped Stairs, Dog-Legged Stairs, Winder Stairs, Spiral Stairs, Curved Stairs, Ladders. Their uses, advantages, disadvantages, and limitations. Sheets related to an example of each staircase type with measure drawings and details of joineries.

Learning Outcome

At the end of the course, the student will be able to:

- Understand the advantages and limitation of different surface material, glass etc available in market.
- Able to design the roofing system and staircases.
- Apply the usage of vertical mode of transportation (mechanical) like lift, escalators etc in their design.

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Applicable for Batch 2022-27

Text Books [TB]:

1. Building Construction – Materials by M.V. Naik
2. Building Construction, MACKAY WB Vol. 1-4
3. Construction Technology, BARRY, Vol 1-5.

Reference Books [RB]:

1. W. B McKay, Building Construction
2. Building Construction Illustrated by F.D.K. Ching
3. R.Chudley, Construction Technology
4. Building Construction by Verghese

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF2 03	Subject Title	STRUCTURAL DESIGN & SYSTEMS-III						
LTPS	1,1,0,0	Credit	2	Subject Category	DC	Year	II	Semester	III

Course Objective:

To understand the principle of reinforced concrete elements and to design the structure using limit state analysis.

Unit 1: Plain Cement Concrete

- Introduction to cement, types of cement, aggregates, ingredients of plain cement concrete, grades of concrete, water cement ratio, properties of P.C.C, concrete mix

Unit 2: Reinforced Cement Concrete

- Introduction & properties of concrete and test, reinforcing steels. Requirements of governing & detailing, IS code 456-2000.

Unit 3: Design Method

- Working and Limit State Design of reinforced concrete sections for bending and shear; Bond strength and development length; Serviceability; Limit states of deflection and cracking

Unit 4: Design of Beam

- Theory & Design of Single & Doubly Reinforced Beams, L& T Beams (Simple Supported, cantilever & Continuous), Concept of Over Reinforced & Under Reinforced Sections and balance section

Unit 5: Design of Slab

- Classification, Load Estimation, Design of One Way slab, Two Way slab

Learning Outcome

At the end of the course, the student will be able to:

- Understand the principle of RC Structure
- Understand the design of structure with limit state analysis.
- Identify different elements of a R.C.C structure as per IS code provisions

Text Books [TB]:

1. Design of Reinforced Concrete, 8th Edition by McCormac, Jack C.
2. Reinforced Concrete Design (7th Edition) by George F. Limbrunner and Abi O. Aghayere
3. Design of Concrete Structures by Nilson, Arthur H.

Reference Books [RB]:

1. Timoshenko, S.P. and D.H. Young, Elements of Strength of Materials, Fifth Edition, East West Press, 1993.
2. A.R. Jain and B.K. Jain, Theory and Analysis of Structures, Vol.I, Nemchand and Bros, Roorkee, 1987.
3. B.C. Punmia, 'Strength of Materials and Theory of Structures, Vol.I Laxmi publications, New Delhi, 1994.

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Applicable for Batch 2022-27

Subject Code	ARF2 04	Subject Title	ARCHITECTURAL GRAPHICS SKILLS – III (COMPUTER AIDED)						
LTPS	0,0,4,0	Credit	4	Subject Category	DC	Year	II	Semester	III

Course Objective:

The course should enable the student to be conversant with 3D modelling principles and use of Sketch-Up. The students will be able to create, share and present 3D models and visualizations.

Unit 1: Learning Auto Cad (2-D)

- Two-dimensional drafting work to be handled in detail on Auto Cad. Complete Drafting, Editing and modification work to be done and presentations be made

Unit 2: Sketch-Up Pro (3d Modeling) Basics

- Purpose and use of the software.
- Basic commands and usage of different tools like zoom, pan, rotate etc.
- Selecting toolbars, applying templates, understanding axis.
- Drawing basic geometric shapes, circles and arcs with measurement and learn to use pencil tool

Unit 3: Sketch-Up Pro

- Understanding the Sticky Geometry benefits, Information and database.
- Discovering layers, measuring items inside Sketch-Up
- Learning commands like Simple Array techniques. Rotating objects, Rotate & copy and scale fractional.
- Making components, groups. Comparing and benefits, saving components, reloading them etc.

Unit 4: 3d Modeling Techniques, Creating Texture and Rendering in Sketch-Up

- Learning Modelling techniques, using Push, Pull, follow me and intersecting geometry.
- Creating offset faces & copy, edges, polygon and learn how to use polygon in 2D drawings.
- Understand using Paint bucket, material editor, textures and bitmaps etc
- Create textures, positioning textures.

Unit 5: Scene and Printing in Sketch-Up

- Creating new scenes, styles and saving them.
- Introduction to animation
- Dimensions and Annotations inside Sketch-Up
- Exporting 2D images or PDF's and Printing from Sketch-Up.

Learning Outcome

At the end of the course, the student will be able to:

- Will be able to create 3D models using Sketch-Up.
- Will be able to incorporate textures, scenes and styles.
- Produce visualizations using Sketch-Up's key tools and commands.

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Text Books [TB]:

1. Architectural Design with Sketchup by Alxender C. Schreyer
2. Sketchup for Interior Design by Lydla Sloan Cline

Reference Books [RB]:

1. Google Sketchup for Site Design by Daniel TI
2. Rendering in SketchUp by Daniel Tal.

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Applicable for Batch 2022-27

Subject Code	ARF2 05	Subject Title	HISTORY OF ARCHITECTURE-III						
LTPS	2,0,0,0	Credit	3	Subject Category	DC	Year	II	Semester	III

Course Objective:

The course should enable the students to critically understand architecture in context of geographical, geological, local, climatic, socio-cultural, political and religious influences. It should lay emphasis on influential architectural styles in terms of spaces, form, material and structure etc. and expose students to landmark buildings of different architectural styles flourishing in Europe

Unit 1: Intro to Euro-Centric Civilizations (Classical Periods)

- Greek Architecture: Aegean, Helladic, Hellenic/Classical and Hellenistic Periods
- Roman Architecture: Etruscan and Roman Civilization
- (Constantly correlating the stated topics with World and Indian history throughout the syllabus)

Unit 2: Advent of Christianity and Splitting of Rome into Two Empires: Western and Eastern

- Early Christian Architecture: Flourishing of Early Christian style of Architecture to Collapse of Western Rome into Dark Ages
- Byzantine Architecture: Flourishing and sustenance of Eastern Empire

Unit 3: Medieval History (Middle and Dark Ages)

- Early Medieval and Romanesque Architecture
- Gothic Architecture: Extensive Architecture of Gothic period culminating into Black Death

Unit 4: Early Modern History

- Renaissance Architecture: Early, High and High Mannerism Renaissance
- Baroque and Rococo Architecture

Unit 5: Modern History

- French Revolution and its influence of Architecture: Link with Rococo and Neo-Classical styles
- Neo Classical Architecture: Industrial Revolution, Revival Styles, Architecture till late 19th century

Learning Outcome

At the end of the course, the student will be able to:

- History and context of the important buildings that shaped our culture
- History of technological advances that impact the development of architecture.
- Impacts of certain cultural and religious traditions on architecture
- History of climate and geographical changes that shaped human civilization and its architecture

Text Book [TB]:

1. Sir Banister Fletcher, A History of Architecture
2. S. Lloyd & H.W. Muller, History of World Architecture.

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Reference Books [RB]:

1. Sir Banister Fletcher, A History of Architecture
2. S. Lloyd & H.W. Muller, History of World Architecture
3. A Global History of Architecture by Francis D. K. Ching, M. Jarzombek, V. Prakash
4. Understanding Architecture by Leland M Roth, Amanda C. Roth Clark

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Applicable for Batch 2022-27

Subject Code	ARF2 06	Subject Title	CLIMATOLOGY						
LTPS	1,0,2,0	Credit	3	Subject Category	DC	Year	II	Semester	III

Course Objective:

The course should enable the student in understanding the architecture design of climate adapted buildings as a meaningful process based on the understanding of the Climate as a source for making architecture.

Unit 1: Introduction to Climate

- Importance of climate in architecture, factors affecting climate, elements of climate- Solar radiation, temperature, wind, humidity and precipitation and their measurement.

Unit 2: Tropical Climate

- Climatic zones, Characteristics of tropical climate, macroclimate and microclimate.

Unit 3: Human Thermal Comfort

- Study of body's heat production and heat loss, comfort zone, bio-climatic chart and effective temperature, Isopleths.

Unit 4: Means of Thermal Control

- Shading devices - Method of recording the position of sun in relation to earth, solar chart, shadow angle protractor and its application in design of shading devices.
- Ventilation and air movement - Requirement, size and position of openings, air flow pattern inside and outside buildings.

Unit 5: Day Light

- Natural light, glare, day light factor and day lighting in tropics.

Unit 6: Design Application

- Shelter for Composite Climates, Shelter for Warm Humid Climates, Shelter for Hot Dry Climates, Shelter for Tropical Upland Climates.

Learning Outcome

At the end of the course, the student will be able to:

- Comprehend the various concepts of climate analysis and its use in Architecture.
- Design the built spaces with human thermal comfort as an essential function of building.
- Design the fenestrations as required in the different climatic zones.

Text Book [TB]:

- Manual of tropical housing and building, Koenisberger
- Solar power, Behling

Reference Books [RB]:

- Climate responsive Architecture, Arvind Krishan
- Architecture as response, Greer.

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Applicable for Batch 2022-27

Subject Code	ARF2 07	Subject Title	ARCHITECTURAL DESIGN-IV						
LTPS	0,0,0, 9	Credit	9	Subject Category	DC	Year	II	Semester	IV

Course Objective:

- Understanding the theoretical and practical aspects of building design as per the specified scale and complexity with a three dimensional form development
- To work on context based design problem also considering cost effective building technology and earthquake resistant structure.

Unit 1: Bioclimatic Design Approach

- Introduction to bioclimatic design approach, having an agglomeration of simple spaces with particular emphasis on the design of the building envelope

Unit 2: Exploration of Light Quality in Spaces

- Study of the intensity & quality of natural light under various circumstances and its transformation in interiors due to location, size and material of glazed openings – Use of high openings, clear-storey's, dormer windows, light wells, courtyards and other contraptions to bring light into the interior of buildings –To analyze how space such as corridors, lobbies, courtyards etc can be designed to foster interaction

Unit 3: Presentation

- Enhancement of presentation skills using multiple media. Creation of 3-D models based on the design.

Surveying to be used for the site analysis of project site.

Unit 4: Architectural Research-IV

Types of research. Literature review. Study and present the literature review related to the studio project

Unit 5: Site Planning

Learning Outcome

At the end of the course, the student will be able to:

- Understand the bio climatic design approach.
- Understand the impact of openings in a living space.
- Apply the inferences derived from various case studies to the assigned studio project.

Text Book [TB]:

1. Jan Bilwa and Leslie Fair weather A.J. Metric Handbook
2. Department of Road and Transport, Residential roads and footpath, HMSO, 1992

Reference Books [RB]:

1. Boaz Joseph, Architectural Graphic standards, Wiley Publications
2. Joseph D.C. and John Callender, Time Saver standards for building types, Tata McGraw Hills

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Applicable for Batch 2022-27

Subject Code	AR208	Subject Title	BUILDING CONSTRUCTION & MATERIALS - IV						
LTPS	0,0,3,2	Credit	5	Subject Category	DC	Year	II	Semester	IV

Course Objective:

To help students understand the properties and behaviour of concrete as a building material along with that they will also acquire knowledge about the different types of foundations and where they are used.

Unit 1: Concrete & Concreting

- Concrete: Ingredients - suitability requirements for aggregates, grading of aggregates - role of water in concrete - reinforcement - admixtures - properties of concrete. Manufacture of concrete and concreting - mix proportioning - batching, mixing, transporting, placing, compaction, curing formwork - quality control.
- Outline of tests for concrete -
- Concreting: effect of form work in terms of finishing of concreting, mixing, transporting and placing, consolidating and curing of concrete. Various types of cement concrete. The properties and uses.

Unit 2: Special Concrete & Concreting Methods

- Lightweight, high-density, fiber reinforced, polymer concrete - outline of manufacture, properties and uses of the above - ready mixed concrete - gUniting - cold weather and underwater concreting – current developments in concrete products and methods of concreting.

Unit 3: Foundation

- Introduction to RCC framed structures concrete in foundation:
- FOOTING FOUNDATIONS – types and construction details.
- Shallow Foundations: All types and details with special reference to Rafts – situations where adopted, raft with basement, water proofing of basements below ground water table.
- Deep Foundations: Pile foundations – situations where adopted, types of piles, methods of construction, pile capacity from pile loading tests, under reamed piles.
- Concrete slabs: one-way two way continuous & cantilever.
- Concrete beams: singly reinforced, doubly reinforced, cantilever & continuous beams. Concrete columns, floors, walls, partitions, lintels, arches, sunshades.

Unit 4: R.C.C. Joints

- Introduction to different types of RCC joints

Unit 5: R.C.C Staircase

- Types according to profile – straight flight, doglegged, quarter turn half turn, bifurcated and Spiral. Structural system for the above types sloped slab, cranked slab, cantilevered slab, continuous slab& folded plate, foundation for RCC stair case.

Learning Outcome

At the end of the course, the student will be able to:

- Understand the advantages and limitations of Concrete as building material used at different places.
- To be updated with special types of concrete available in the market.
- To understand the concept of foundation and draw the constructional details of various types of foundation.

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Text Book [TB]:

1. Building Construction – Materials by M.V. Naik
2. Strength of Materials – Khurmi R. S.
3. Applied Mechanics and Strength of Materials – Khurmi R. S.
4. Civil Engineering Handbook – P.N. Khanna

Reference Books [RB]:

1. Building Construction Illustrated by Francis D. K. Ching
2. Exercises in Building Construction by Edward Allen
3. Soil Mechanics & Foundations by Budhu, Muni
4. Soils & Foundations by Cheng Liu & Jack Evett

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Applicable for Batch 2022-27

Subject Code	ARF2 09	Subject Title	Structural Design & Systems - IV						
LTPS	1,1,0,0	Credit	2	Subject Category	DC	Year	II	Semester	IV

Course Objective:

To understand the principle of reinforced concrete elements and designing of structure using limit state analysis. Students will also know about various elements of a reinforced concrete structure

Unit 1: Design of R.C.C. Column

- Design of rectangular column
- Design of circular column
- Design of square column

Unit 2: Design of Stairs

Effective Span, Load Distribution on Stairs, Design (Simple Problems) of dog legged, tread-riser, type stair.

Unit 3: Pre-stressed Concrete

Introduction, different method of pre-stressed concrete, losses of pre-stressed concrete, advantages and disadvantages, Analysis of pre-stressed concrete members.

Unit 4: Design of Flat Slab

Introduction, advantages and disadvantages of flat slab, analysis and design of flat slab.

Unit 5: Foundation

Introduction to foundation, Purpose of foundation, Types of foundation, Safe bearing capacity, RCC Foundation Design

Learning Outcome

At the end of the course, the student will be able to:

- Understand the principle of R.C.C Structure
- Understand the design of R.C.C structural members and stairs.
- Understand design of R.C.C foundation

Text Book [TB]:

1. N. Subramanian, Design of Reinforced Concrete Structures, Oxford University Press
2. Nilson, Arthur H, Design of Concrete Structures, McGraw Hill Education

Reference Book [RB]:

1. McCormac, Jack C Design of Reinforced Concrete, 8th Edition, Wiley
2. George F. Limbrunner and Abi O. Aghayere Reinforced Concrete Design (7th Edition), Pearson
3. Nilson, Arthur H, Design of Concrete Structures, McGraw Hill Education

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF2 11	Subject Title	ARCHITECTURAL GRAPHICS SKILLS – IV (COMPUTER AIDED)						
LTPS	0,0,4,0	Credit	4	Subject Category	DC	Year	II	Semester	IV

Course Objective:

- The course should enable the student to bring ideas from concept to construction with a coordinated and consistent model-based approach. The program will enhance the visualization for creating building design view, capturing of design ideas in a photo realistic state.

Unit 1: Introduction to BIM

- Introduction to BIM and Revit Architecture, Special Features of Revit Architecture.
- Understanding Revit Elements, Working in one model with many views,
- Understanding Recent files and Application Menu, Using Ribbon & Quick Access Toolbar (QAT), Using Properties Palette, Modifying Properties & Professional Palette, Using Project Browser, Salutation and Modifying Basics, Understanding Selection toggles, Accessing Revit Operation.
- Understanding view extends and cropping regions Navigation Views (Zoom, Pan, and Rotate).

Unit 2: Working with Project and Modeling

- Creating a new project from file, Accessing Multi-user Projects using work share, Configure Project Settings, Adding Levels, Adding Grids, Referring Layout with temporary dimensions, Adding Columns
- Adding Walls - Using snaps, Wall Properties and Types, Locating Walls, Using Modifying Tools, Adding Doors and Windows, Using Constraints, Adding Plumbing Fixtures and other components, Wall Joints
- Linking AutoCAD Drawing Files
- Creating Topography Link, Understanding CAD Inserts, Import Tips, create a Group, Minor Groups to Create a Layout, Creating Revit Links, Rotating and Aligning a Revit Link, Establishing Shared Co-ordinates, Managing the links, Understanding File Formats.

Unit 3: Modeling Roof, Ceiling & Floor and Stairways

- Making Working with Footprint Roofs, working with Ceilings, working with Floors, working with Extrusion Roofs, Attaching Walls to Roofs, Using Slope Editing tools, Create a Flat Roof.
- Working with Stairs, Railings to Stairs, working with Component based Stairs, Adding Extensions to Railings, working with Slope Arrows, Adding Openings.

Unit 4: Working with Complex Walls, Views, Visibility & Graphic Controls

- Creating Custom Basic Wall Type, Understanding Stacked Walls, Adding Curtain Walls, Adding Curtain Grids, Mullions and Panels, Creating Wall Sweeps and Reveals, Model Lines.
- Using Object tiles, working with Visibility & Graphics, Using View Templates, Hiding and Isolating objects in a model, Understanding View Range, Displaying Objects Above and Below in Plan Views, Using Line Work Tool, Using Cutaway Views, Using Sketchy Lines.

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Unit 5: Documentation, Annotations, Detailing & Plotting

- Understanding the Tags, Adding Schedule Views, Modifying Schedule Views, Creating Key Schedule, Using Images in the Schedule, Adding Sheets, working with Place Order Sheets, Aligning Views with Guide Grid, Outputting Sheets to DWF file, Exporting to AutoCAD
- Adding Text, Adding Dimensions, Adding Symbols, Adding Legend Views.
- Creating Detail Callout, Adding Detail Component, Using Arrays to Duplicate Parametrically, Adding Filled and Masking Regions
- Plotting Sheets, 15.2: Creating PDF.

Learning Outcome

At the end of the course, the student will be able to:

- Will be able to develop higher-quality, more accurate architectural designs; use tools specifically built to support Building Information Modeling workflows.
- Will be able to capture and analyze concepts, and maintain your vision through design, documentation, and construction.
- Will able to crop non-rectangular model areas faster; easily manage elevation cut-line configuration; automatically display dimension values; annotate multiple elements with a single tag; define geometry and position for beams and braces; get greater control of schedule formatting; derive construction insight from design models.

Text Books [TB]:

1. Jeff Hanson, Revit 2018 Architectural Command Reference, SDC Publications

Reference Books [RB]:

1. Lance Kriby, Mastering Autodesk Revit, Sybex, 2018
2. Eddy Krygiel, Mastering Autodesk Revit, Sybex, 2018

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Applicable for Batch 2022-27

Subject Code	ARF2 12	Subject Title	CONTEMPORARY ARCHITECTURE						
LTPS	2,0,0,0	Credit	2	Subject Category	DC	Year	II	Semester	IV

Course Objective:

- The course will enable the students to critically understand the theory of Modern and Contemporary Architecture in the 20th and 21st Century. To study the development in material, structure, social and economic changes as well as Architectural Theory.

Unit 1: Brief introduction of Theory of Design in 20th Century

- Emphasis should be on Post-Independence Period in Indian Context.

Unit 2: Overview of World Architecture since 1970

- With the study of Late Modernism, Post Modernism & De-constructivism.

Unit 3: Theories governing Contemporary Architecture

- Through case studies, evolving architectural trends and their impact on urban built environment.

Unit 4: Emerging Building Typologies

- With emphasis on Residential Developments, Offices, Skyscrapers, Institutional & Public Buildings.

Unit 5: Works of Architects in Last 10 years

- Review through case the award winning works of national and international architects in last 10 years under various categories.

Learning Outcome

At the end of the course, the student will be able to:

- History and context of the important buildings that shaped our culture and built environment.
- History of technological advances that impacted the development of architecture.
- Visually recognised Architectural Illustrations and identify main characteristic of Modern Architecture.
- Describe, using format and technical vocabulary, the defining characteristic of Modern and contemporary buildings.

Text Book [TB]:

- S. Lloyd & H.W. Muller, History of World Architecture, Faber & Faber
- Le Corbusier, Towards the New Architecture, Dover Publications

Reference Books [RB]:

- William J.Curtis, Modern Architecture Since 1900, Phaidon Press
- Francis D. K. Ching, M. Jarzombek, V. Prakash, A Global History of Architecture, Wiley

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Applicable for Batch 2022-27

Subject Code	ARF2 13	Subject Title	BUILDING BYE LAWS & CODE OF PRACTICE						
LTPS	2,0,0,0	Credit	2	Subject Category	DC	Year	II	Semester	IV

Course Objective:

- To study the development controls as applicable to building design.
- To acquaint the students to compulsory building bye-laws and permits.

Unit 1: Introduction to Building Bye Laws

- Introduction to Building Bye Laws and regulation, their need and relevance, general definitions such as building height, building line, FAR, Ground Coverage, set back line etc. Role of various statutory bodies governing building works like development authorities, municipal corporations etc. Introduction to Master Plan and understanding various land uses like institutional, residential etc. and related terminology.

Unit 2: Application of Building Bye Laws

- Interpretation of information given in bye laws including ongoing changes as shown in various annexure and appendices. Application of Bye Laws like structural safety, fire safety, earthquake safety, basement, electricity, water, and communication lines in various building types.

Unit 3: Introduction to Codes of Practice

- Introduction to various building codes in professional practice emphasizing the importance of codes and regulations to protect public health, safety and welfare and to ensure compliance with the local authority.

Unit 4: Application of Codes of Practice and Building Bye Laws

- Understanding the applications of various codes as per various building types. Conducting a comprehensive code search process and representing the above analysis by preparing detailed code data sheets as applicable in the domain which has been chosen for the research.

Unit 5: Application of Building Bye Laws

- Preparation of complete Local Development Authority drawing for a small two storied building that may have been designed in any of the previous semester.

Learning Outcome

At the end of the course, the student will be able to:

- Building Bye laws and other building regulations required for the approval of plans form local authority.
- Will be able to apply the codes related to health, safety and welfare in the development of Architectural Design
- Will be able to prepare submission drawing as per the bye laws of the Local Authority.

Reference Books [RB]:

1. Delhi Building Bye-Laws – Nabhi Publications
2. D.D.A. – Delhi Master Plan
3. MDDA Building Bye Laws
4. Model Building Bye Laws
5. Various IS Codes
6. NBC

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Applicable for Batch 2022-27

Subject Code	ARF2 41	Subject Title	THEORY OF DESIGN						
LTPS	3,0,0,0	Credit	3	Subject Category	DE	Year	II	Semester	

Course Objective:

Understanding the architectural development in different periods over centuries in history along with the understanding the Need, demand and supply in different periods by various great designers.

Unit 1: Theory

- Discuss the evolution and development in design process from past to present. Discuss the principles and Elements of design followed in buildings in past and how the trend changed over the period as per demand. Compare the buildings of past with the present and study the technological, form, shape, design, planning and construction material etc. from earlier days to present day.

Unit 2: Historical Study

- Purity of form with structural honesty obtained in different periods – Roman, Romanesque, Baroque etc. leading to modern Architecture. Study of important palaces and public buildings in Britain and France.

Unit 3: Modern Architecture

- Belief in creation of “new” and “ideal” world through the fundamentals of true and original. Origin of geometry, nature, simplicity, abstraction, non-objective, construction and technology available at that times. Equating technology and progress with present functionalism and appropriateness.
- Works of great masters – Frank Lloyd Wright, Le-Corbusier, Alvar Alto, Mies Vender, Louis Kahn, Louis Sullivan, Edwin Lutyen etc.

Unit 4: Post Independence and Contemporary Architecture (1950 onwards)

- Introduction to post independence development in India, Introduction to contemporary development in India and other parts of world, various architectural theories, thinking, building materials and construction technology adopted in high rise structures, architectural styles and urbanism.

Unit 5: Great Masters of the Period

- Works of the great masters of the period in India i.e.- Charles Chorrea, B.V. Doshi, Raj Rewal, Achyut Kanvinde, Hafeez Contractor etc.

Learning Outcome

At the end of the course, the student will be able to:

- Understand the evolution and development process from past to present of different trend and ideology in terms of technology, form design, planning etc.
- Understand about development and style of Post-Independence Architecture.
- Understand the concept of modern buildings designed by master architects.

Text Book [TB]:

1. “Glimpses of World History” by Pt. Jwahar Lal Nehru
2. “Urbain Pattern” by A.B. Gallion
3. “The History of Architecture” by Sir Bannister Fletcher
4. “Buddist and Hindu Architecture” in India by Satish Grover.

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Reference Books [RB]:

1. History of Architecture – J E Swain
2. History of Architecture by Dora Couch
3. A study of History – Almond Toynbee
4. Traditions in Architecture – Dora Couch.

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Applicable for Batch 2022-27

Subject Code	ARF2 42	Subject Title	INTERIOR DESIGN						
LTPS	2,0,0,3	Credit	3	Subject Category	DE	Year	II	Semester	

Course Objective:

Interior design, being one of the important/essential area of Architectural practice, the subject deals in detail with various aspects of space interiors. Students will get an opportunity to understand the qualities of spaces and develop their skills in designing for functional and meaningful space interiors.

Unit 1: Introduction and Basic Principles of Design

- Elements and principles of design in context of interior design- Space, Light, Color, Texture, Form, Shape, Size, Volume, Plane, Balance, Symmetry, Rhythm, Proportion, Scale, Emphasis etc.

Unit 2: Interior Lighting

- Direct and indirect lighting, location and light grid systems, luminaire types, quality of lighting. Ambient, task and accent lighting.

Unit 3: Understanding Furniture Work

- Understanding furniture layout, furniture design with the construction technique, types of furniture and their usage, construction materials and fabrics used in furniture designing, cost estimation, understanding works of great masters.

Unit 4: Modern Trends in Interior Design

Understanding and designing modern interiors using modern materials and techniques. Modular Concept)

- Interior Design of any one of the building types of approximate area of 500 sq m with estimation.

Learning Outcome

At the end of the course, the student will be able to:

- To design the Space organization and alteration of interior space.
- Apply the parameters related to qualitative aspects of space.
- Understanding of various materials used in Interiors (from traditional to latest) along with its technology of application and specification.
- To know different surface treatments in interiors, e.g. on walls, floors, ceilings etc.

Text Books [TB]:

1. Architectural Graphics: C. Leslie Martin
2. Perspective for the Architect: Themes and Hudson
3. Perspective and Sciography, Shankar Mulik
4. Interior Design: Ahmed Kasu.

Reference Books [RB]:

1. Interior Design in the 20th Century by Allen Tate, C.Ray
2. Interior Graphic & Design Standards by S.C.Reznikoff.
3. Beginnings of Interior Environment by Phyllis Sloan, Allen & Miriam F. Stimpson.
4. Interior Design, John F. Harry Abrams Inc.
5. Interior Design Course, Mary Gilliat Coyran, Octopus Ltd. London

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Applicable for Batch 2022-27

Subject Code	ARF2 43	Subject Title	FURNITURE DESIGN						
LTPS	0,0,0, 3	Credit	3	Subject Category	DE	Year	II	Semester	

Course Objective:

To provide the knowledge on History of Furniture Design and various aspects involved in the design of furniture for various spaces.

Unit 1: History of Furniture Design

- Furniture designs during Egyptian, Greek, Roman, Romanesque, Gothic, Renaissance, Industrial Revolution – Contributions in the beginning of the 20th century by the four pioneer architects in furniture design – Bauhaus, De Stijl & other modern furniture designs.

Unit 2: Human Factors

- Study of Anthropometry & Design criteria involved in the design of
- Sofa, settee, couch, etc.
- Cot, bedside lockers, wardrobes
- Cupboards, shelves
- Bunk beds, study table
- Display furniture
- Furniture for the physically challenged

Unit 3: Principles of Design & Detailing

- Form – Color - Symbols
- Materials & finishes – Wood, Glass, Metal, Plastics and Upholstery - include various finishes.
- Fabrication Techniques involved
- Multiple Utility Oriented Approaches to Furniture Design.

Unit 4: Room Plans and Furniture Arrangement

- Types of furniture – Built in furniture – Movable furniture – Systems furniture – Specially Designed furniture – Readymade furniture – Modular, Knockdown & Economy Furniture. Traffic pattern and furniture layout for residence, commercial and office areas

Learning Outcome

- At the end of the course, the student will be able to:
- To help the students understand about the various anthropometric aspects, human factors & other design criteria involved in the design of furniture.
- To make the students understand about the various materials & technology involved in the making of furniture.
- To prepare a scale model of any furniture

Text Books [TB]:

- John F. Pile, Harry N, Interior Design, Abrams Inc Publishers, New York
- Mary Gilliat Coyran, Interior Design Course, Octopus Ltd., London

Reference Books [RB]:

- Joseph Aronson, The Encyclopaedia of Furniture, Crown Publishers, New York
- Sherril Whiton, Interior Design & Decoration, Prentice Hall

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Applicable for Batch 2022-27

Subject Code	ARF2 44	Subject Title	ARCHITECTURAL PHOTOGRAPHY						
LTPS	0,0,0 ,3	Credit	3	Subject Category	DE	Year	II	Semester	

Course Objective:

To provide the students' knowledge on different aspects of Professional photography and its application in architecture.

Unit 1: Introduction to Photography

General introduction to the art of photography; concept of color; concepts of lighting, distance, visual angle, frames; media

Unit 2: Photographic Techniques

Types of camera, properties and priorities; Exposure, Aperture, Speed; Photographic films, Film processing color, black and white, printing techniques, developing.

Unit 3: Analysis of Works

Works of Indian and international photographers will be presented and discussed. Seminars on Indian architectural photography

Unit 4: Field Program

Exercise on integrating photography in architectural journalism

Learning Outcome: At the end of the course, the student can:

- Understand the basics of photography.
- Understand the importance and relevance of photography in architecture field.
- Implement the techniques of photography in a small exercise.

Text Book [TB]:

1. Dave Saunders, Professional Advertising Photography, Merchurst, London 1988
2. Roger Hicks, Practical photography, Cassell, London 1996

Reference Books [RB]:

1. Julian Calder and John Garrett, The 35mm Photographer's Handbook, Pan Books, London 1999
2. Julie Adair King, Digital Photography for Dummies, COMDEX, New Delhi 1998

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Applicable for Batch 2022-27

Subject Code	ARF3 01	Subject Title	ARCHITECTURAL DESIGN-V						
LTPS	0,0,0, 9	Credit	9	Subject Category	DC	Year	III	Semester	V

Course Objective:

- The course should enable the student to comprehend with different types of structural system in design.
- Develop skill for making models of various structural forms with appropriate and innovative materials.

Unit 1: Trabeated

- Brick and stone, columns and beams.

Unit 2: Arcuted

- Corbelled, Radiating Arch, Vault and Dome, Squinch and Pendentives.

Unit 3: Vector Structure

- Trusses and space frames, slabs, one way and two way, coffers.

Unit 4: Form Structure

- Folded slabs, shells, Hyperbola-paraboloid.

Unit 4: Tensile Structure

- Tents, Cables, and Pneumatic vis-à-vis materials and plan shapes.

Unit 5: Architectural Research-V

Data collection methods- case study, interviews. Application of methods for the studio project

Unit 6: Site planning

Learning Outcome

At the end of the course, the student will be able to:

- Will be able to make a balance between design and structure.
- Have a comprehensive knowledge about the basics of different types of structure.
- Understand the concept through on scale model of important historical buildings incorporating one of the structural forms. e.g. Trabeated-: Parthenon, Arcuated-: Santa Sophia, Parthenon, Vector Active-: Pompidou Center, Form Active-: Sydney Opera House, Tensile-: any of the famous bridges or stadiums.

Text Book [TB]:

1. Form, Space and Order, Francis D.K.Ching.
2. Pneumatic structures: A Handbook of Inflatable Architecture by Thomas Herzog

Reference Books [RB]:

1. Bousmaha Baiche & Nicholas Walliman, Newfert Architect's Data
2. DeChiara & Callender, Time Saver Standards for Building Type
3. Pneumatic structures: A Handbook of Inflatable Architecture by Thomas Herzog
4. Tensile Structures (v. 1 & 2) by Frei Otto
5. Building Construction Illustrated by Ching, Francis D. K.
6. Form and Forces: Designing Efficient, Expressive Structures by Allen, Edward and Zalewski, Waclaw
7. Long Span Roof Structures by Committee on Sp Structures of Committee on Metals

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Applicable for Batch 2022-27

Subject Code	ARF3 02	Subject Title	BUILDING CONSTRUCTION & MATERIALS – V						
LTPS	0,0,4 ,1	Credit	5	Subject Category	DC	Year	III	Semester	V

Course Objective:

To inculcate awareness of the constructional aspects of structural steel and its application in various building components of an industrial building.

Unit 1: Ferrous Metals

Brief study on manufacture, properties and uses of cast iron, wrought iron, pig iron and steel. Market forms of steel - structural steel, stainless steel, steel alloys - properties and uses - current developments.

Unit 2: Aluminum & Aluminum Alloys

- Aluminium and Aluminium Alloys - brief study on manufacture, properties and uses - Aluminium products -extrusions, foils, castings, sheets, etc.-tin and lead, properties and uses - current developments.
- Use of nonferrous metals e.g. copper & copper based alloys (brass & bronze), tin, cadmium, chromium, zinc, lead, nickel etc., in architectural construction
- Aluminium roofing, Aluminium doors - open able, sliding, pivoted, Aluminium windows - open able, sliding, fixed, pivoted, Aluminium ventilators - top hung, bottom hung, pivoted, louvered, fixed

Unit 3: Gypsum Products

- Introduction – Gypsum Board, Suspended Ceiling (Boards & Tiles), Gypsum Plaster, Mineral fibre tiles, Components and Accessories, Jointing and Finishing

Unit 4: Steel Trusses Frames, Gates and Steel Components

- Structural Steel Sections - types of connections in steel - steel in foundations, columns and beams – and different structural members.
- Steel trusses – saw tooth roof truss with north light glazing, simple trusses in steel
- Space frames: - single, double & triple layered tubular space, frames with globe connections,
- Gates: collapsible gate, entrance gate.
- Steel components: Steel doors, (hinged, sliding), steel windows (casement window & sliding window), Steel stairs (dog legged, spiral stair) steel hand rails and balustrade grill designs for windows
- Virendeel Girder

Unit 5: Partitions & Paneling

- Pressed steel door frames.
- Metal stud Partitions, single layer and double layer.
- Mezannine Floors
- Different types of Structural and curtain walling along with its fitting and fixtures.

Unit 6: Cladding & False Ceiling

- Metal false ceiling... Different types of ceiling options available in Market.
- Use of steel as external cladding material.
- Use of Aluminium and other non-ferrous metals in cladding, panelling, and in kitchen fittings.

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Learning Outcome: Each student shall be able to apply steel & aluminium products strategically & in a proper manner, judiciously in different elements of building. Understand the nature and properties of ferrous & non Ferrous metals and their applicability in Building Construction.

Text Book [TB]:

1. Building Construction Illustrated by Francis D. K. Ching
2. Exercises in Building Construction by Edward Allen

Reference Books [RB]:

1. Gypsum Construction Handbook with Product and Construction Standards by United States Gypsum Company

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Subject Code	ARF3 03	Subject Title	STRUCTURAL DESIGN & SYSTEMS- V						
LTPS	1,1,0 ,0	Credit	2	Subject Category	DC	Year	III	Semester	V

Course Objective:

To understand the concept of innovative structural forms and its application in architectural design studio.

Unit 1: Classification of Structures

- Vector Active
- Force Active
- Surface Active

Unit 2: Arches, Shells & Domes

- Arches, Shells, Vaults & Domes: concept, classification and application.

Unit 3: plate structures

- Introduction, classification and application
- Folded Plates: concept & application
- Flat Slab and Coffered Slab

Unit 4: Tensile Structures

- Concept, formation, classification and application.

Unit 5: Pneumatic & Kinetic Structures

- Concept, classification and application

Learning Outcome: At the end of the course, the student can:

- Identify the concept of various structural elements and system
- Understand the structural geometry based on strength and stability criteria.
- Apply the concept of structural forms in architectural design studio

Text Book [TB]:

1. Building Structures Illustrated: Patterns, Systems & Designs by Francis D.K. Ching; Wiley Publication
2. Tensile Structures: Vol-II, Pneumatic Structures, Cable Structures by Frei Otto; The MIT Press London

Reference Book [RB]:

1. Structures, Daniel Schodek & Martin Bechthold, Pearson
2. Structure in Sculpture, Daneil Schodek, Pearson

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Applicable for Batch 2022-27

Subject Code	ARF3 04	Subject Title	BUILDING SERVICES-I (WS)						
LTPS	2,0,0 ,0	Credit	2	Subject Category	DC	Year	III	Semester	V

Course Objective:

To understand the various types of water supply and plumbing systems

Unit 1: Water Supply & Water Management

- Comprehensive understanding of water
- Sources of water supply, quality of water, impurities, requirement of water supply to different types of buildings
- Hot and cold water supply system in low and high rise buildings
- Pipes and their sizes
- Jointing and fittings

Unit 2: Plumbing System and Plumbing Bye Laws

- Sanitary system for individual and group of buildings
- Indian standards and bye laws, Shells.

Unit 3: Sanitation

- Purpose and principle of sanitation, Collection and conveyance of waste water
- Quantity and quality of refuse
- Sanitary appliances, traps and its varieties, pipes and joints
- Rain water storage and water harvesting principles.

Learning Outcome: At the end of the course, the student can:

- Understand the water supply systems in buildings
- Understand the active and passive components of plumbing
- Design plumbing system for residential building

Text Book [TB]:

1. S.C. Rangwala, Water Supply & Sanitary Engineering, Charotar Publications
2. The Sanitation of Water Supplies by Murray P. Horwood

Reference Book [RB]:

1. Plumbing, Electricity, Acoustics by Norbert M. Lechner
2. Water Distribution System Handbook by Mays, Larry

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Applicable for Batch 2022-27

Subject Code	ARF344	Subject Title	Barrier Free Built Environment						
LTPS	3,0,0,0	Credit	3	Subject Category	DE	Year	III	Semester	

Course Objective:

The course will provide knowledge about concept of accessibility and universal design with focus on implications of ability and different ability on usage of built environment.

Unit 1: Basic Concepts

Understanding of human ability relevant to design problems in home, workplace, infrastructure etc.

Unit 2: Concept of Accessibility and Universal Design

Evolution and limitations of accessible design and difference between accessible and universal design.

Unit 3: Accessibility Standards

Theory of disability, devices and controls, defining design requirements, classification of buildings and access provisions. Design elements within the buildings. Site planning, parking, approach to plinth level, corridors, entrances, exits, windows ramps, stairways, lifts, toilets, signage, floor finishes. Design elements outside buildings

Unit 4: International Theory of Universal Design

Principles of universal design that enable usability and inclusion across the spectrum of age, size, gender, ability and conditions and contextual derivation of universal design principles in India

Unit 5: Accessibility Consideration in Building Typology

Provisions in various buildings- residences, restaurants, auditorium, parks railway stations etc. Case studies

LEARNING OUTCOME:

1. The student will be able to understand the basic concepts of accessibility and universal design.
2. The students will be able distinguish between concepts of accessibility and universal design
3. The students will be able to apply the knowledge in building design, landscape architecture and interior design.

Text Books:

1. Universal Design by Goldsmith

Reference Books:

1. Centre for Universal Design, North Carolina State University, Mullick A, Ostroff
2. Universal Design Handbook, Preiser, Wolfgang

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF3 45	Subject Title	HILL ARCHITECTURE						
LTPS	3,0,0 ,0	Credit	3	Subject Category	DE	Year	III	Semester	V

Course Objective:

To impart a comprehensive knowledge of architecture suited for hilly regions and to develop an understanding of historical and environmental responsiveness for building up on the hills.

Contents:

Unit-01

- Study of historical perspective of hill architecture and its unique attributes and concerns, constraints of climate, topography and availability of materials.
- Study of unique built form, topographical, ecological and hydrological features of hilly regions with suitable examples. Design factors such as access, circulation, gradients, slope analysis, grading and interpolation of contours.

Unit-02

- Study of major hill settlements in various regions of the world with focus on settlements in Himalayan region of India. Understand traditional hill architecture of India, medieval European settlements and other places.

Unit-03

- Case study of vernacular hill architecture of Himachal Pradesh like building types, techniques and materials. Study of structural aspects, environmental and ecological aspects of modern buildings and necessary safeguards at hills.

Unit-04

- Typical construction techniques and details for roads, drainage and retaining walls in hilly region.

Course outcomes:

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

1. Understand challenges in the development of hilly areas.
2. Work out pathways, roads and zoning for a campus on the hilly terrain and prepare architectural drawings.
3. Design while considering associated environmental and ecological impact of such development.

References:

1. The Architecture Heritage of Himachal Pradesh, Thakur
2. Hill Cities of Eastern Himalayas, Sinha and Chacko
3. Himalayan Architecture, by Ronald M. Bernier

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Applicable for Batch 2022-27

Subject Code	ARF3 05	Subject Title	LANDSCAPE DESIGN						
LTPS	0,0,2 .2	Credit	4	Subject Category	DC	Year	III	Semester	V

Course Objective:

To introduce the elements of landscape design and its relevance in architecture

Unit 1: Introduction

- Introduction to Landscape Architecture- its meaning, experience of a landscape.
- History of landscape architecture, evolution of garden design- Italian, French, Mughal, Persian, Japanese, Chinese and English.

Unit 2: Principles and Theories

- Landscape Perceptions- The biophilia hypothesis, Prospect-refuge theory, Information processing theory and Landscape preferences.

Unit 3: Elements of Landscape Design

- Natural elements- Landforms- soil dynamics, rock, water, vegetation. Plant types, their characteristics, structure and colour.
- Man-made elements- Hardscape, Softscape, garden furniture, lighting fixtures, signage and sign boards, paving materials.

Unit 4: Site Analysis & Planning

- Site study and analysis of all natural and man-made factors of site like site-topography and slope, soil, hydrology and drainage, vegetation, climate and visual analysis.
- Principles of site planning, integrating the building and open space.

Unit 5: Disciplines of Landscape

- Urban landscape, Heritage Landscape

Studio component of the semester may be integrated with Architectural Design of the current semester.

Learning Outcome: At the end of the course, the student can:

- To introduce the students to the discipline of Landscape architecture & its relevance to Architecture.
- To classify historical gardens and identify their characteristics.
- Identify the elements of landscape design
- To develop the skill of integrated design of open and built spaces.
- To design, develop and prepare landscape plan.

Text Book [TB]:

1. Landscape Architecture: A Manual of Land Planning & Design by Simonds J.O
2. The Experience of Landscape by Appleton J.
3. Site Planning, Lynch Kevin
4. Design with Nature by Ian Mcharg

Reference Book [RB]:

1. Site Planning, Lynch Kevin
2. Design with Nature by Ian Mcharg

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Applicable for Batch 2022-27

Subject Code	ARF306	Subject Title	ARCHITECTURAL DESIGN-VI						
LTPS	0,0,0,10	Credit	10	Subject Category	DC	Year	III	Semester	VI

Course Objective:

To make the students aware about how materials, processes of construction, and the structure are integral to design in rural areas.

Unit 1: Theory of Housing

Shelter as a basic requirement, determinants of housing form, Census of India definitions, Introduction to policies, housing need, demand and supply, dilapidation, structural conditions, materials of constructions, housing age, occupancy rate, crowding, housing shortage, income and affordability, poverty and slums, houseless population. Various housing typologies viz. traditional houses, plotted development, group housing, multi-storied housing, villas, chawls, etc., slums and squatters, night shelters, public health issues related to housing, various theories of housing, concept of green housing, green rating of housing projects

Unit 2: Housing Project

The various types of housing projects in a typical urban scenario can be taken with suitable design parameters that get established after conducting a rigorous study. Analysis of existing design trends & user preferences need to be ascertained. Awareness about special building byelaws applicable for Group housing schemes is essential. In addition to design issues such as security, accessibility, identity, social interaction, comfort, economy etc that would be investigated, the application of Fractals in design can also be explored. Ex. Housing for the poor / Slum dwellers, Multi-storeyed apartments for Govt. / corporate employees, Multi-storeyed condominiums for the rich etc.

Unit 3: Architectural Research-VI

Other data collection methods to be applied for studio project.

Unit 4: Site planning

Learning Outcome

At the end of the course, the student will be able to:

- Will be able to Design based on the socio-economic survey.
- Understand the context for design: site attributes and surroundings in the design and linked it with the planning.

Text Book [TB]:

1. Ching, F.D.K., "A Visual Dictionary of Architecture", John Wiley & Sons
2. The Housing Design Handbook: A Guide to Good Practice by Levitt, David

Reference Books [RB]:

1. Norberg-Schulz, C., "Principles of Modern Architecture", Andreas Papadakis
2. New rural housing design theory [Paperback] by NING YU LUO ZHONG ZHAO ZHANG HUI FANG
3. Housing Design: A Manual by Bernard Leupen and Harald Mooij

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Applicable for Batch 2022-27

Subject Code	ARF3 07	Subject Title	BUILDING CONSTRUCTION & MATERIALS - VI						
LTPS	0,0,4,1	Credit	5	Subject Category	DC	Year	3 rd	Semester	VI

Course Objective:

To help students understand the use of various forms plastics as a construction material.
To understand the structural systems in high rise construction.

Unit 1: Floor Finishing

Brick flooring, Cement Concrete, Different types of Stones (natural and artificial) used in floor finishing, Terrazzo, Ceramic & Vitrified Tiles, Wooden (natural and artificial). Rubber, cork.

UNIT 2: Thermoplastics and Thermosetting Plastics

- Properties and architectural uses of plastics – structural plastics –Reinforced plastics and Decorative laminates-plastic coatings, Adhesives and sealants – Modifiers and Plasticizers
Ex: Thermoplastics – Polythene, Polyvinyl chloride, polyvinyl acetate, Polypropylene, Polymethyl metha Crylate, Polystyrene, Acrylo-nitrile butadiene styrene, Nylon, Polycarbonate.Thermosetting Plastics-Polyesters resin, Polyurethane, Synthetic resin, Rubber.

Unit 3: Adhesives and Sealants

- Introduction, Natural Adhesives – Animal, Cassin,
- Bituminous, Thermoplastic Adhesives – Polyvinyl Acetate, Modifiers and Plasticizers. sealants used for aluminium work, epoxy etc.

Unit 4: Ceramics, Pvc and Upvc

- Terracotta, Faience, Fireclay, Stoneware, Earthen ware, Vitreous China, Porcelain. Jointing and Finishing.
Primary plastic building products for walls, roof and partitions. Secondary building products for rooms, windows, roof lights, domes, gutters and handrails.etc.

Unit 5: Special Structures

- Definition –single, double and multilayered grids- two way and three-way space grids connectors, Grid domes-various Forms-Geodesic domes.
- Shell, Folded Plates and Tensile Structures – Shell types, Classification as per BIS- Relative merits and applicability, folded plates- types-comparison with shell-applicability, suspended cable structures- types of cable network systems-shapes of cable suspended systems, examples of tensile membrane structures-types of pneumatic structures.
Various systems of construction of high-rise buildings in RCC and steel.

Unit 5: Damp Proofing and Water Proofing

- Damp proofing: Hot applied and cold applied – Emulsified asphalt, Bentonite clay. Butyl rubber, silicones Vinyl's, Epoxy resins and metallic water proofing materials, their properties and uses.

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- Water proofing: water proofing membranes such as rag, asbestos, glass felt, rplastic and synthetic rubber- vinyl, butyl rubber, polyvinyl chloride – prefabricated membranes sheet lead, asphalt their properties and uses.
- Application: application of the above in basement floor, swimming pool, and terraces

Learning Outcome: At the end of the course, the student can:

Each student shall be able to apply ceramics, and forms of Plastics strategically & in a proper manner, judiciously in different elements of building.

Understand the construction techniques and structural systems in high rise construction.

Understand the damp proofing and water proofing process and details

Text Book [TB]:

1. Goyal, M.M., “Handbook of Building Construction”, Thomson Press (I) Ltd

Reference Books [RB]:

1. Deplazes, A. (Editor), “Constructing Architecture: Materials, Processes, Structures: A Handbook”, Birkhäuser
2. Ching, F.D.K., “Building Construction Illustrated”, Wiley

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Applicable for Batch 2022-27

Subject Code	ARF308	Subject Title	STRUCTURAL DESIGN & SYSTEMS- VI						
LTPS	1,1,0,0	Credit	2	Subject Category	DC	Year	3 rd	Semester	VI

Course Objective:

To enable the students to design steel structures and basic components.

Unit 1: Introduction

- Steel as structural member
- Advantages & disadvantages of steel Rolled steel sections.

Unit 2: Steel Connections- I

Rivets, bolts, pins: introduction, types of joints, methods.

Unit 3: Welded Connections

- Introduction, types, symbols
- Design of different types of welded connections

Unit 4: Members Subjected to Axial Compression

Steel struts, columns and built up sections.

Learning Outcome: At the end of the course, the student can:

Understand types of steel sections, concept of load distribution in steel structures
Design of steel connections- rivets, bolts, pins
Design of welded connections

Text Book [TB]:

1. Steel Structure Vol I & II by B.C. Punamia
2. Design of Steel Structures by S.K. Duggal

Reference Book [RB]:

1. Design of Steel Structures by P.C. Varghese
2. Steel Structure: Design & Behaviour, Charles G Salmon & John E Johnson, Pearson, 2008

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Applicable for Batch 2022-27

Subject Code	ARF3 09	Subject Title	SPECIFICATION AND ESTIMATION						
LTPS	2,0,0 ,0	Credit	2	Subject Category	DC	Year	3 rd	Semester	VI

Course Objective:

To introduce the techniques of preparing estimates and writing the specifications.

Unit 1: Specification

- Definition, Importance and scope of the subject. Correct form of writing specifications, avoiding ambiguity and conflicting statements. Form and sequence of clauses, study and uses of standard specification viz; drafted by C.P.W.D. etc.
Writing detailed specifications for various building constructions works e.g. earthwork for foundations, concreting the trenches for foundations, superstructure in cement mortar, R.B. work, plastering and painting, lime punning, flooring, whitewashing, distemping and painting. Snowcem wash, stone masonry, mud phuska, terracing and others.

Unit 2: Estimation

- Estimates-types of estimates-approximate and detailed methods of estimating – plinth area method, carpet/ floor area method cubic content method, approximate quantity method and number system, detail estimates procedure of estimating, taking out quantities schedule of rates.
- Exercise in estimating (with different methods) of small buildings, estimating exercises for interior schemes, plumbing work and electrical installations etc.

Unit 3: Rate Analysis

- Principles of analysis of rates, rates of labour and materials, exercises in rate analysis of different building works, e.g. earthwork for foundations, flooring, timber work etc.
- Introduction to P.W.D. accounts procedure, measurement book, daily labour, muster roll, stores, stock, and issue of material from stock, indent form, imprest account, cash book, mode of payment.

Learning Outcome: At the end of the course, the student can:

Understand the various processes of estimation
Execute the appropriate methods for preparing estimates
Write the specification
Understand the rate analysis

Text Book [TB]:

1. B.N. Dutta, "Estimating and Costing in Civil Engineering", 24th Ed., UBS Publishers Distributors Ltd.
2. S.C. Rangwala, Estimating, Costing & Valuation

Reference Book [RB]:

1. Cost Estimating, 2nd Edition by Rodney D. Stewart
2. Estimating, Costing, Specification & Valuation, M Chakraborti

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Applicable for Batch 2022-27

Subject Code	ARF311	Subject Title	TOWN PLANNING						
LTPS	2,0,0,0	Credit	2	Subject Category	DC	Year	3 rd	Semester	VI

Course Objective:

The intention is to make students aware of the problems of cities and how to address the various issues. The course focus is on the physical and spatial aspects of planning of cities. How have these being affected because of out-population, housing shortage, infrastructure and related problem.

Unit 1: Introduction

Definitions of **town planning**, levels of planning and steps for preparation of a town plan, survey techniques in planning, concepts, functions, components and preparation of a development plan. Planning concepts related to garden city, geddesian triad, neighbourhood planning, radburn layout, satellite towns and ribbon development.

Unit 2: Ancient Planning Systems

Indus valley civilization - Mohenjodaro, Harappa, Extracts from Chanakya's Arthashastra, manasara's Vastushastra, planning thought behind Fatehpur Sikri, Shahjahanabad, Jaipur and Delhi

Unit 3: Town Planning Terminology

Town planning surveys, Preparation of MASTER PLAN for old and new towns.

Unit 4: The Planning Process

Land use, Concept of F.A.R. and Density, Zoning and Subdivision Regulations, Master Plan

Unit 5: Transport Planning

Traffic and urban environment. Traffic design Elements. Traffic control devices, road intersections.

Unit 6: Development Laws

Need of urban development laws, study of evolution of urban development laws in India, development authority, land acquisition act, land acquisition process, land ceiling act etc.

Learning Outcome: At the end of the course, the student can:

Identify the elements of planning concepts.

Identify various infrastructure of town and cities.

To understand the present growth trends and future needs.

Text Book [TB]:

1. John Ratcliffe, An Introduction to Town and Country Planning
2. Modak & Ambedkar (1971) Town and Country Planning & Housing, Orient Longman Ltd.

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Reference Book [RB]:

1. Arthur B. Gallion and Simon Eisner, The Urban Pattern – City planning and Design
2. RameGowda, Urban and Regional planning

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Applicable for Batch 2022-27

Subject Code	ARF312	Subject Title	BUILDING SERVICES-II (EMS)						
LTPS	2,0,0,0	Credit	2	Subject Category	DC	Year	3rd	Semester	VI

Course Objective:

To understand various systems of services in built environment.

Unit 1: Electrical Services

- Basic principles, electricity demand calculations
- Distribution networks at site level and building level
- Electrical wiring – main and distribution boards
- Types of conductors, wiring system and conduits
- Earthing for safety and its types
- Fixing of electrical fixtures and switches

Unit 2: Illumination

- Visual tasks, synthesis of light
- Additive and subtractive synthesis of colour- Luminous Flux, Candela, Solid Angle, Utilization factor, Deprecation Factor,
- Classification of lighting- Artificial light sources, spectral energy distribution, luminous efficiency, colour temperature, colour rendering index

Unit 3: Heating Ventilation and Air Conditioning

Basic principles, terminologies, psychometric chart and comfort zone

- Refrigerant cycle
- Evaporative cooling system
- Types of air conditioning systems and selection criteria for these systems

Unit 4: Vertical Transportation System

- Lifts- types, working of lifts with details of lift sections, carrying capacity, rated load, rated speed, RTT, installation requirement, grouping of lifts and design standards for lift lobby
- Escalators- introduction and working of escalators

Unit 5: Fire Safety in Buildings

- Fire, causes of fire in buildings, firefighting, protection & fire resistance, equipment and methods of firefighting, fire safety codes, fire regulations, egress route, fire detection and suppression equipment and systems

Learning Outcome: At the end of the course, the student can:

- Understand electrical systems at building level
- Understand illumination systems involved at domestic level.
- Understand HVAC system and vertical transportation system for buildings

Text book [TB]:

1. Lighting Design Basics by Benya, James R., Karlen, Mark and Spangler, Christina
2. Basic electrical engineering by D.P Kothari, I.J Nagrath
Introduction to the design and analysis of building electrical system by John Mathew

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Reference book [RB]:

1. Handbook for Building Engineers in Metric systems, NBC
2. Fred Hall & Roger Greeno, Building Services Handbook
3. The Elevator Family by Evans, Douglas

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Applicable for Batch 2022-27

Subject Code	ARF313	Subject Title	PRINCIPLES & PRACTICES OF SUSTAINABLE BUILDING DESIGN						
LTPS	1,0,2,0	Credit	2	Subject Category	DC	Year	3rd	Semester	VI

Course objective:

To introduce the Theories and Concepts of sustainable buildings.

Unit 1: Introduction

Definition & concept of sustainability

Need of sustainable buildings

Features of sustainable buildings

Unit 2: Solar Energy & Building

Solar geometry and built form – Various techniques of shading to reduce heat gain in tropical climate – Various methods of Maximising exposure to solar radiation in cold & temperature climate. Heating & cooling loads – Energy estimates - Energy conservation – Efficient day lighting – Solar Water heating system. Exercises on heating and cooling load calculations in buildings

Unit 3: Passive Cooling Concepts

General principles – Evaporative cooling, Nocturnal radiation cooling, Passive Dessicant cooling, induced ventilation, earth sheltering, Berming, Wind Towers, earth – Air tunnels, Curved Roofs & Air Vents, Insulation, Vary Thermal wall etc. Case studies on buildings designed with passive cooling techniques.

Unit 4: Overall Design Concept

Land form & orientation – Vegetation & Pattern – Water Bodies – Open Space & Built form - **Plan form & Elements** – Roof form – Fenestration pattern & Configuration – Building envelope & finishes

Unit 5: Intelligent Building

Definition & Concept Of Intelligent Building

Services in Intelligent buildings- lighting, hvac, plumbing, security, access control, CCTV & alarm systems, audio- visual & entertainment system etc.

Course Outcome:

At the end of the course, the student can:

- Understand the Concept of sustainability and its application in built environment
- Understand the relationship between solar heat gain and built form
- Understand the various passive cooling techniques used in built environment
- Understand the concept of intelligent building

Text Books [TB]:

1. Mili Majunder, Teri – *Energy – Efficient Bldg in India* – Thomson Press, New Delhi
2. J. K Nayak & Others, *Energy Systems Energy Group*, - Isa Annal of Passive Solar Architecture

Reference Books [RB]:

1. George Basid & Others – *Energy Performance of Bldg* – CRC Press, Florida
2. New Direction in Sustainable Design by PARR
3. Sustainable Construction: Green Building Design and Delivery by Kibert, Charles

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Applicable for Batch 2022-27

Subject Code	ARF34 1	Subject Title	ARCHITECTURAL DOCUMENTATION						
LTPS	0,0,0, 3	Credit	3	Subject Category	DE	Year	III	Semester	

Course Objective:

The course will enable the students to understand the character of a settlement, street, building, spaces and materials through a process of documentation.

Unit 1: Introduction

- Need for documentation, purpose, tools for documentation in architecture

Unit 2: Project Selection

- Heritage Documentation, Monograph of an architect, Contemporary project.

Unit 3: Research

- Historical research related to styles & contemporary works, influence of culture & technology, context, its role.

Unit 4: Geodetic Survey

- Topographic maps, road maps, site maps etc., Architectural survey, survey methodology, physical measure drawings, photographic survey, digital architectural photogrammetry (2D-3D digital drawings) etc.

Unit 5: Presentation

- Document of a small architectural example or a part of the structure, where the content will cover various issues mentioned above.

Learning Outcome: At the end of the course, the student can:

- Understand the purpose and importance of documentation in architecture.
- Understand the complete process of documentation
- Understand and apply the technique of documentation.

Text book [TB]:

1. The little book of documentation by Anita Cheria-Edwin
2. Building the architecture documentation by Safari books online

Reference book [RB]:

1. Analysing Architecture, Simon Unwin, Psychology Press, 1997

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Applicable for Batch 2022-27

Subject Code	ARF342	Subject Title	ARCHITECTURAL JOURNALISM						
LTPS	3,0,0,0	Credit	3	Subject Category	DE	Year	III	Semester	

Course Objective:

To provide the students' knowledge on different aspects of Professional communication skills and develop Investigative skills regarding Architectural Design and become a good Architectural Critique.

Unit 1: Journalism in General

- Basic understanding of the subject and related theories

Unit 2: Theories of Journalism, Techniques and Processes.

- Analysis of recent historical and contemporary examples of written and journalistic criticism of architecture, including selected writings by Indian and overseas critics; discursive techniques, analysis of major critical themes, thematic categories in architectural writing over the past three centuries.

Unit 3: Contemporary Architectural Reportage

- Works of Indian and international writers and critics will be presented and discussed. Seminars on Indian architectural writers, journalists and critics, Develop Academic Honesty in Architectural reportage.

Unit 4: Digital and Print Journalism. In Architecture

- Use of Digital Still and Video Photography in Architecture
- Expose students to various types of storytelling styles in Architecture, trends in digital reporting, and hands-on learning.

Learning Outcome: At the end of the course, the student can:

- To write and speak effectively and use representational media appropriate for both within the profession and with the general public.
- To help the students become able to gather, assess, record, and comparatively evaluate relevant information and performance in order to support conclusions related to a specific project or assignment.
- To help the students develop understanding of the parallel and divergent histories of architecture and the cultural norms of a variety of indigenous, vernacular, local, and regional settings in terms of their political, economic, social, ecological, and technological factors.

Text book [TB]:

1. Exploration of Architectural Journalism in India, Pappal Suneja, COPAL Publishing

Reference books [RB]:

1. Architecture and the Journalism of Ideas by Bender Thomas.
2. Architectural Criticism and Journalism: Global Perspectives by Mohammad Al Asad and Majd Musa

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Applicable for Batch 2022-27

Subject Code	ARF401	Subject Title	ARCHITECTURAL DESIGN-VII						
LTPS	0,0,0,12	Credit	12	Subject Category	DC	Year	IV	Semester	VII

Course Objective:

Learning from modern technology and modes of construction and design. The course would focus on the core philosophy to harmonise the office/commercial building form and fabric with the site and climate thereby reducing ecological impacts and achieving energy efficiency.

Unit 1: Office Buildings

Office spaces require special care in design & detailing. Students get exposed to the various services, structural systems and vertical access systems such as elevators, escalators etc of multi-storeyed buildings. Knowledge about various types of cores, fire-fighting systems and special building rules applicable to multi-storeyed buildings are implied. Scholars will be required to do the Interior design scheme in detail. Ex. Multi-storeyed office buildings that do not exceed G+6 floors.

Unit 2: Commercial Buildings

Acoustical study should also be there with reference to different buildings- multiplexes, auditorium, conference room etc. The teacher will introduce acoustical terminology, concepts and defects as well as the latest acoustical materials available.

Unit 3: Architectural Research-VII

Apply the understanding of research in studio project for literature review and data collection

Unit 4: Site planning

Learning Outcome

At the end of the course, the student will be able to:

- At the end of the sequence each student will have created all the pieces they need for the design of an office/commercial building.
- The form of the building will have evolved week by week from the issues covered.
- At the end of the sequence each student will have developed their own set of design criteria against which their final building design can be evaluated.
- Students shall be able to work in any climate, in context of local topography.

Text books [TB]:

1. Shopping Malls by Yeal Xie
2. Malls & Department Stores by Van Chris Uffelen

Reference books [RB]:

1. Ching, F.D.K., "A Visual Dictionary of Architecture", John Wiley & Sons
2. Norberg-Schulz, C., "Principles of Modern Architecture", Andreas Papadakis
3. The Office Building of the Future by Pickard Chilton
4. Office Space Planning: Designs for Tomorrow's Workplace (Professional Architecture) by Marmot, Alexi and Eley, Joanna

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Applicable for Batch 2022-27

Subject Code	ARF402	Subject Title	BUILDING CONSTRUCTION & MATERIALS - VII						
LTPS	0,0,2,1	Credit	4	Subject Category	DC	Year	4th	Semester	7th

Course objective:

To develop the understanding of non-conventional energies and the various technologies involved. To appreciate different techniques used to construct building elements. To display the sensitivity to different non-conventional energy resources, materials and construction techniques.

Unit 1: Introduction to Non-Conventional Materials and Technologies in The Architectural Field.

- Renewable Energy Resources: Solar Energy, Biomass Energy, Hydro Power Energy, Wind Energy, Tidal Energy, Bio Fuel
- Appropriate technology and rural development: with respect to government policies and initiatives

Unit 2: Appropriate Walling Materials and Technologies

- Types of non-conventional walling techniques: mud walls: adobe, wattle and daub, rammed earth, cob walls, compressed earth blocks, etc.
- Sun dried bricks, stabilized soil blocks, hollow concrete blocks, etc.
- Ferro-cement and similar materials
- Use of precast aesthetical materials: Bricks jaalis, cement jaalis, mouldings etc.

Unit 3: Appropriate Roofing Materials and Technologies

- Alternative non-conventional materials and techniques used for roofing: Bamboo roofing, Composite material, Mangalore tiles, etc
- Types of other Roofs: Jack arch roof, Thatch roofing, Filler slab roofing with various filler material, Clay/micro-concrete tiled roofing, etc.

Unit 4: Use of Bio- Mass as A Non-Conventional Source of Energy Leading to Various Non- Conventional Techniques

- Various uses of bio mass and techniques involved in the same.

Unit 5: Use of Bamboo as A Renewable Building Material

- Importance and Potential of Bamboo
- Uses of bamboo as a building material including the techniques involved.

Unit 6: Region Specific Non – Conventional Techniques

- Non - Conventional techniques in general but conventional for a specific region developed in response to the locally available materials and construction techniques in response to the climate of a region in an urban or rural set up may be taken for study.
- Students can integrate the same exercise to various allied subjects like climate responsive architecture, BMC, Building Services, etc. Students may also study works of other architects.

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Course Outcome:

The students will be able to

Understand the application of non-conventional materials in architecture field

Understand the application of appropriate materials in wall construction

Understand the non-conventional energy sources and techniques

Apply the non-conventional materials and techniques in their design projects

Text Books [TB]:

1. J. Sengupta, "Cost Effective Building Materials from Industrial and Agricultural Wastes", Proceedings of Winter School on Alternative Building Materials, Vidisha, India, 2005
2. Ching, F.D.K., "Building Construction Illustrated", Wiley

Reference Books [RB]:

1. Green Architecture: Design for a sustainable future by Brenda and Robert Vale- Thames and Hudsson; 1996
2. Steven Harris and Deborah Berke; Architecture of the Everyday; Princeton Architectural Press; 1997

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Applicable for Batch 2022-27

Subject Code	ARF4 03	Subject Title	STRUCTURAL DESIGN & SYSTEMS- VII						
LTPS	1,1,0,0	Credit	2	Subject Category	DC	Year	4th	Semester	7th

Course Objective:

To enable the students to understand the structural significance of foundation and retaining walls

Unit 1: Introduction to Foundation

- Introduction to foundation, Purpose of foundation, Types of foundation, Rafts – situations where adopted, Pile foundations – situations where adopted, types of piles, methods of construction, pile capacity from pile loading tests, under reamed piles.

Unit 2: R.C.C Foundation Design Process

- Rivets, bolts, pins: introduction, types of joints, methods

Unit 3: Basics of Soil Mechanics

- Soil formation and resulting soil deposits, nomenclature of different soil types, basic physical properties and their inter-relationships.

Unit 4: Retaining Wall

- Use, types and tentative proportioning of retaining walls.

Course Outcome:

At the end of the course, the student can:

- Understand the importance and structural significance of foundation
- Understand the process of R.C.C Foundation design
- Understand the concept and application of retaining walls

Text Books [TB]:

1. Design of R.C. Elements by B.C. Punamia
2. Soil Mechanics and Foundation Engineering by V.N.S Murthy
3. Foundation Engineering by P.C. Varghese

Reference Books [RB]:

1. Basic Soil Mechanics, R. Whitlow, Pearson
2. Reinforced Concrete Design, N. Sharma, Katson

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF4 04	Subject Title	THEORY OF URBAN DESIGN						
LTPS	2,0,0 ,0	Credit	2	Subject Category	DC	Year	4th	Semester	7th

Course Objective:

To introduce the Theories and Concepts of Urban Design

Unit 1: Introduction

- Introduction to Urban Design
- Importance, Elements and the Dimensions of Urban Design

Unit 2: The Morphology

Key Concepts – Land use, Building Structures, Plot Pattern, The Street Pattern

- The Public Space Network
- Buildings in Space and Buildings Defining Space
- Traditional Urban Space
- Urban block Patterns and Road Networks

Unit 3: Understanding and Perceiving Spaces

- Human sensory perception of environment
- Meaning and symbolism in urban form
- Sense of Place and personalization
- CASE STUDIES AND LITERATURE STUDIES to understand: Place Identity, Key Attributes of Successful places

Unit 4: The Social, Visual and Functional Dimension

- Relationship between people (Society) and (Urban) space
- Neighbourhood Unit- Size, Boundaries, Social relevance and Meaning, Social mixed and Balanced Communities
- Patterns and Aesthetic Order
- Streets and Squares
- Townscape and Urban Architecture
- Hard and soft Landscaping
- Street Furniture
- Public Private Interface – Comfort, Relaxation, Passive & Active Engagement, Discovery
- Social use of Space
- Movement
- Privacy- Visual and Oral
- Land use, Density and Urban Form
- Environmental Design- Microclimate, Wind shading, Designing for Sun and Shade, Natural Lighting, Parking, Servicing and Infrastructure
- Growth of Car Free Streets and Squares

Course Outcome:

At the end of the course, the student can:

Understand the History and Concept of Urban Design

Understanding of Urban Design in International and Indian Context

Developing the knowledge of Urban Design Principles and mapping of Urban spaces

FFCBCS Course structure and Syllabus of B.Arch. Applicable for Batch 2022-27

Text Books [TB]:

1. Lynch, K. (1984). Good city form. Boston: MIT Press.
2. Lynch, K. (1980). Image of the City, MIT Press, Cambridge, Mass.
3. Carmona, M., Heath, T., Oc, T. and Tiesdell, S. (2010). Public Places Urban Spaces. Oxford: Architectural Press.

Reference Books [RB]:

1. Whyte, W. H. (1980). The social life of small urban spaces. Washington D.C: Conservation Foundation.
2. Broadbent G (1994). Emerging concepts in Urban Space Design, Von Nastrand Reinhol, New York
3. Watson, D., Plattus, A. and Shibley, R. (2003). Time-Saver standards for urban design. New York: McGraw Hill.

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF413	Subject Title	SEMINAR						
LTPS	0,0,0,3	Credit	3	Subject Category	DC	Year	IV	Semester	

Course Objective:

To enable students for writing research paper based on literature review and secondary research. The course will develop the skill to conduct research study and write research papers.

Students will be asked to select the topic of their interest and to be finalized by the faculty members. The topic should be related to architecture or allied areas. The students will do extensive research on the selected topics and discuss the same with faculty members for further paper writing.

Unit-1

Differentiate between referenced sources /websites and non-referenced sources, identify a research paper, newspaper article, report and book chapter, categorize papers within a subject area, Identifying key authors in a subject area

Unit-2

Understand the structure of a research paper, Descriptive writing about a paper demonstrating comprehension of subject matter, academic format, research methods & vocabulary- involving paraphrasing.

Presentation of the paper read, Analytical writing based on readings

Unit-3

Formulation of aims and objectives, prepare methodology and study proposal

Unit-4: Paper Writing

Unit-5: Paper Presentation

Learning Outcome

At the end of the course, the student will be able to:

- Identify research papers published in journals.
- Prepare and present paraphrase readings.
- Write and present a paper

Reference books [RB]:

1. Introducing Architectural Theory: Debating a Discipline; Routledge-Taylor and Francis Group, New York, London, Smith, Korydone
2. A step by step guide for the first time researcher; Vistaar Publications; New Delhi, Walliman Nicholas

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF405	Subject Title	WORKING DRAWING						
LTPS	0,0,0,5	Credit	5	Subject Category	DC	Year	3rd	Semester	VII

Course Objective:

The Design of a building prepared needs to be executed and constructed on the site. The building drawings so prepared become part of the contract documents with proper labelling and dimensioning, specifications, detailing.

The drawings shall be based on building design prepared as design studio assignment in the previous semester. The learning of building material and construction will be implemented for preparing various drawings throughout the semester.

Unit 1: Structural Layout Drawings

- Preparing detail drawing for layout of the building with respect to the site.
- Illustrate and prepare drawings for layout of the foundations.
- Preparation of detail layout of the beam and columns, or structural member as per the design.

Unit 2: Architectural Drawings at Building Level

- Preparation of detail floor level plan/s and roof level plan required for the execution of work on the site.
- Preparation of drawing giving detail of Section/s and Elevation/s to depict building heights, projections and floor levels.

Unit 3: Architectural Drawings of Opening

- Design and prepare detail drawings of doors, windows, openings with specifications of materials.
- Detail drawing for the grill, jail work etc. as required for the building.

Unit 4: Architectural Drawings of Vertical Circulation as Staircase/ Lift Etc.

- Preparation of drawing for the layout of staircase, its detail and specification for the execution on the site as per the design.
- Illustration drawing of the handrail, baluster, rail fitting etc. as per the design.

Unit 5: Architectural Drawings for Landscape and Site Development

- Preparation of drawing for the landscape layouts at the building level and at site level as per the design.
- Detailing of the site for example different level on the site, as required for the site development.

Unit 5: Building Services Drawings

Plumbing layout of kitchen and toilet, electrical layout

Small building block should be taken for preparing all sets of working drawing

Learning Outcome: At the end of the course, the student can:

- Preparation of drawings with illustrations
- Site visit and case studies to know the various details
- Data collection from the market survey regarding construction material and detailing.

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Text book [TB]:

1. Architectural Graphics by Francis D.K. Ching
2. Architectural Graphics Standard for Residential Construction by Dennis J. Hall

Reference book [RB]:

1. Architectural Working Drawing, Ralph W. Liebing
2. Drafting & Design: Basics for Interior Design by Travis Kelly Wilson

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Applicable for Batch 2022-27

Subject Code	ARF4 06	Subject Title	ARCHITECTURAL DESIGN-VIII						
LTPS	0,0,0, 12	Credit	12	Subject Category	DC	Year	IV	Semester	VIII

Course Objective:

- Understanding the theoretical and practical aspects of building design as per the specified scale and complexity with a three dimensional form development
- To work on context based design problem also considering cost effective building technology and earthquake resistant structure.

Unit 1: Designing for Sustainability

Sustainable architecture and planning has become vital factor in the design of all buildings because the building activity is considered as one of the major pollutants of the natural environment. Study of the various techniques of Energy-efficient design and recycling technologies for water & wastes is mandatory as these have to be incorporated in the design proposals. Awareness about LEEDS rating and best practices is expected.

Unit 2: Institutional Buildings

These are buildings with complex spatial organizations, multifunctional spaces, large spans and variable circulation patterns. Environmental issues are emphasized and the Design studio aims to inculcate the techniques of designing for sustainability. Students are expected to do the landscape layout in detail to develop appreciation of a holistic environmental design. Ex. College/single specialty Hospital/theatre etc.

Unit 3: Urban Intervention Projects

- Design of buildings/ building complexes in specific urban context such as heritage zones, near existing and within built environments.
- Redevelopment, rehabilitation and urban improvement projects.
- Development Projects such as Universities, District Centers and City Centers etc.

Unit 4: Architectural Research-VIII

Application of research in architectural design project.

Learning Outcome

At the end of the course, the student will be able to:

- Understand the bio climatic design approach.
- Understand the impact of openings in a living space.
- Apply the inferences derived from various case studies to the assigned studio project.

Text books [TB]:

1. Norberg-Schulz, C., "Principles of Modern Architecture", Andreas Papadakis
2. The Office Building of the Future by Pickard Chilton

Reference books [RB]:

1. Ching, F.D.K., "A Visual Dictionary of Architecture", John Wiley & Sons
2. University Planning and Architecture: The Search for Perfection by Coulson, Jonathan, Roberts, Paul and Taylor, Isabelle

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF407	Subject Title	ADVANCE CONSTRUCTION & NEW BUILDING MATERIALS						
LTPS	0,0,2,1	Credit	3	Subject Category	DC	Year	IV	Semester	VIII

Course Objective:

- To help students understand the importance of mechanization in construction industry and the associated issues.
- Summarize the application of modularization and mass production in construction industry.

Unit 1: Construction Equipment's

- Electric hand tools, Vibrators, Power Floats, Pumps, Rollers. Earth Moving & Excavation: Dozers, Scrapers, Graders, Shovels, Skimmers, Backactor, Dragline, Trenchers. Transportation: Lorries, Trucks, Dumpers, Elevators, Conveyors, Hoist, Cranes (mobile, static, tower). Concrete Mixers, Pumps etc.

Unit 2: Defects, Remedies & Building Failures

- The study of various defects in buildings and their remedies, Defects caused by dampness, applied forces and changes in size
- Building failure

Unit 3: Fire Protection

- Causes and spread of fire, Fire detection equipments, Fire extinguishers and other firefighting equipments, Methods of firefighting. Combustibility of materials and fire resistance. Means of escape, fire doors, water curtains etc. Code of Safety prescribed in National Building Code

Unit 4: Special Details

- Construction details associated with the services of the buildings (e.g. drainage, water supply, septic tank, firefighting etc.)
- Construction details associated with the context of site and application (e.g. drainage system in mountains, industrial construction, geographical challenges like floods and drought etc.)
- The examples mentioned are not mandatory but explanatory.

Unit 5: Specialized Construction Techniques

- Modern Formwork techniques in steel. Lift slab construction and slip form formwork and formwork of special profiles. D.P.C- Vertical and horizontal (basement, sunken floors, roof slab etc)
- Pre- fabrication: Introduction to pre- fabrication technology, column and beam system /panel system / box system, advantages of pre- fabrication. Pre- fabrication techniques and various building components – foundation, walls, floors, roofs, doors, windows,
- Ferro cement products: sanitary and service core Unit, trusses and rafters, water tanks. Design: Design considerations for pre fabrications

Unit 6: Modular Coordination

- Aims, basis, planning, dimensioning,
- Assembly of components, tolerances, modules, reference system, grids, positioning of functional elements – slabs, walls, staircases; Standardization in buildings' design and their components

FFCBCS Course structure and Syllabus of B.Arch. Applicable for Batch 2022-27

Learning Outcome:

- Explain different types of construction equipment available in the market and their implication on design / construction process.
- Understand the principles of fire planning in building construction
- Understand the formwork for special profiles
- Understand the contemporary fast construction techniques

Text Books [TB]:

Reference Books [RB]:

1. Goyal, M.M., "Handbook of Building Construction", Thomson Press (I) Ltd
2. Deplazes, A. (Editor), "Constructing Architecture: Materials, Processes, Structures: A Handbook", Birkhäuser
3. Ching, F.D.K., "Building Construction Illustrated", Wiley

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF408	Subject Title	PROFESSIONAL PRACTICE-I						
LTPS	2,0,0,0	Credit	2	Subject Category	DC	Year	IV	Semester	VIII

Course Objective:

The course will develop attitude towards highest standards of professionalism, integrity, and competence.

Unit 1: Legalities of Profession

- Architectural profession and legalities
- Identify and discuss the provisions of architectural practice in various acts namely, The Architects Act 1972, Labour Laws in India, The Companies Act 2013, The Arbitration and Conciliation Act 1996, Indian Copyright act 1957.
- Role of Professional Bodies
- History of Architecture Profession in India, Ancient Indian texts on duties of architect and architecture profession

Unit 2: Morals and Ethics of Practice

- Code of ethics for architectural practice, Moral duties of an architect
- Standards of professionalism, integrity, and competence, discussions on provisions of Competition Commission of India
- Architectural practice and building byelaws & national building code

Unit 3: Social Responsibilities and Duties

- Social responsibilities of profession, Contributions to non-profit organizations, Public awareness of important architectural issues
- Architecture as an agent of change- socio-economic perspective

Unit 4: Architectural Competition

- Types of competitions; need and procedure for conducting competitions.

Course Outcome:

At the end of the course, the student can:

- Develop the practice and office management
- Identify and define the legal provisions for architectural practice
- Appraise the morals and ethics in architectural profession
- Acknowledge the social responsibilities and duties of an architect
- Comply with social norms and responsibilities.

Text Books [TB]:

1. R H. Namavati, Professional practice
2. Hand book on Professional Practice by I. I. A,

Reference Books [RB]:

1. CMDA-Development control rules for CMA.
2. Estimating & Costing, Dutta & Dutta

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Applicable for Batch 2022-27

Subject Code	ARF409	Subject Title	RESEARCH METHODS						
LTPS	2,0,0,0	Credit	2	Subject Category	DC	Year	IV	Semester	VIII

Course Objective:

To Develop an Understanding and apply the fundamentals of Research.

Unit 1: Introduction

- Understanding Need of Research
- Exploring methods and approach to develop a Research Subject

Unit 2: Research Methodology

- Steps and Methods involved in Research: Data Collection and Organisation
- Exploring ways to approach and developing/limiting scope of Research
- Importance of Referencing and Citations in a Research

Unit 3: Dissertation

- Selection of research topic related to architectural design
- Preparation & Submission of Draft proposal
- Drawing Inferences, conclusions and questions from the research argument and Submitting a final report on a specific area in which students want to do their Thesis.

Course Outcome:

At the end of the course, the student can:

- Understand the need of Qualitative Research
- Critically introspect, analyse and discuss ISSUES by Research
- To make NEW/ALTERNATE propositions based on Research

Text Books [TB]:

1. A step by step guide for the first time researcher by Walliman Nicholas; 2008; Vistaar Publications; New Delhi.
2. Qualitative Research Methods by Hennink, Monique, Hutter, Inge and Bailey, Ajay- 2011; Sage, New Delhi

Reference Books [RB]:

Architectural Research Methods, Linda Groats

FFCBCS Course structure and Syllabus of B.Arch. Applicable for Batch 2022-27

Subject Code	ARF412	Subject Title	DISSERTATION						
LTPS	0,0,0,2	Credit	2	Subject Category	DC	Year	IV	Semester	

Course Objective:

- To enable students for establishing strong theoretical foundation and orient them for research study.
- To enable students to finalize their research topics which will be aligned to their final thesis project.

Students will be asked to select the topic of their interest and to be finalized by the faculty members. The topic should be related to architecture or allied areas. This dissertation will be a pre thesis study and students will encouraged to carry forward the learning and apply the same in thesis project.

Learning Outcome

At the end of the course, the student will be able to:

- Conduct case studies and literature review of the topics of their interest.
- Present their study before the panel of experts and defend the rationale and viability of the study.
- Prepare a dissertation report.

Reference books [RB]:

1. The Dissertation: an architecture students' handbook. 2nd Ed. Oxford: Architectural Press, Borden, I and Ray, K.R (200[^])
2. Conducting research literature reviews: from paper to internet, Thousand Oaks: Sage, Fink, A

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF441	Subject Title	EARTHQUAKE RESISTANT ARCHITECTURE						
LTPS	3,0,0,0	Credit	3	Subject Category	DE	Year	IV	Semester	

Course Objective:

Students would be able to understand the formation and causes of earthquakes and factors to be considered in the design of buildings and services to resist earthquakes.

Unit 1: Fundamentals of earthquake.

- Earth structure, seismic waves, plate tectonic theories, origin of continents, seismic zones in India.
- Predictability, intensity and measurement of earthquake.
- Basic terms like faultline, focus, epicentre, focal depth etc.

Unit 2: Site planning, performance of ground and buildings.

- Historical experience, site selection and development.
- Affects of earthquake on ground, soil rupture, liquefaction, landslides.
- Behaviour of various types of building structures, equipments, lifelines, collapse patterns.
- Behaviour of non-structural elements like services, fixtures in earthquake prone zones.

Unit 3: Seismic design codes and building configuration.

- Seismic design code provisions- Introduction to Indian codes.
- Building configuration – scale of building, size, horizontal and vertical plane, building proportions, symmetry of building- torsion, irregularities in buildings like shortened floor heights and short columns etc.

Unit 4: Various types of construction details used in urban planning and design.

- Seismic design and detailing of non-engineered construction- masonry structures, wood structures, earthen (mud) structures.
- Seismic design and detailing of RCC and steel structures.
- Design of non-structural elements – Architectural elements, water supply, drainage, electrical and mechanical components.
- Vulnerability of existing buildings, planning of facilities, fires after earthquake, socio-economic impact after earthquakes.

Course Outcome:

The students should be able to:

CO 1: To understand the fundamentals of earthquake and basic terminology related to earthquake resistant design concepts.

CO 2: Develop a familiarity with design codes and building configuration.

CO 3: Understand the various types of construction details to be adopted in a seismic prone area.

CO 4: To apply the knowledge gained in the architectural design assignment.

Text Books:

1. Guidelines for earthquake resistant non engineered construction, National information centre for earthquake engineering (NICEE). IIT Kanpur, 2006.
2. C.V.R Murthy Andrew Charlson, 'Earthquake Design Concepts', (NICEE).IIT Kanpur, 2006.
3. Agarwal. P, 'Earthquake resistant Design', Prentice Hall of India,2006.

FFCBCS Course structure and Syllabus of B.Arch. Applicable for Batch 2022-27

Reference Books:

1. Ian Davis, 'Safe shelter within unsafe cities: Disaster vulnerability and rapid urbanization', Open House International. UK, 1987.
2. Socio-economic development record – Vol.12, No.1, 2005.
3. Mary c. Camrio, Lugia Binda, 'Learning from practice-A review of Architectural Design and construction experience after recent earthquakes' – Joint USA-Italy Workshop, October 18-23, 1992, Orvieto, Italy.

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF442	Subject Title	MEGA STRUCTURES						
LTPS	3,0,0,0	Credit	3	Subject Category	DE	Year	IV	Semester	

Course Objective:

Detailed and comprehensive study of any type of mega structure; the structure, systems, services, traffic transportation, parking, erecting and commissioning of components.

Particulars:

Hours

Unit 1: Bridges and Stadiums

Detailed and comprehensive study of the structure, system, services, traffic transportation, parking, erecting and commissioning of components of stadiums and bridges. Understand the role of architects in design of bridges.

Unit 2: High Rise Buildings

Detailed and comprehensive study of the structure, system, services, traffic transportation, parking, erecting and commissioning of components of high rise buildings.

Unit 3: Modular Megastructure

Understanding the concepts and designing of modular in megastructure design. Use of modular concepts by architects in high rise structures.

Unit 4: Mega Structures in different parts of the world

Understanding and detailed analysis of contemporary mega structures in different parts of the world (Asia, America, Europe)

Course Outcome:

The students should be able to:

CO 1: To design the Space organization and alterations of bridges and stadiums

CO 2: Apply the parameters related to qualitative aspects of space.

CO 3: Understanding of various aspects involved in designing modular megastructure along with its technology of application and specification.

CO 4: To know different megastructure projects around the world, e.g. Asia, America, Europe etc.

Reference books:

1. Manmade Modular Megastructure by Ian Abley
2. Stadium Design (Design Books) by Daab
3. Bridges of the World: Their Design and Construction by Charles S. Whitney

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Applicable for Batch 2022-27

Subject Code	ARF443	Subject Title	CITY PLANNING CONCEPTS						
LTPS	0,0,0,3	Credit	3	Subject Category	DE	Year	IV	Semester	

Course Objective:

The course is intended to introduce the concept of city planning.

Unit 1: Introduction

City planning concepts. History of planned cities and their planning pattern.

Unit 2: Planning Theories

Concentric zone theory, sector theory, multiple nuclei theory. Garden City Concept, Green Belt Concept, City as an organism, Global City Concept, Inclusive City, City of the future and future of city

Unit 3: Sustainable Development of Cities & Communities

Sustainable site selection and development. Sustainable building materials and technologies. Low impact construction. Bio Mimicry. Dimensions of sustainable cities and sustainable community

Unit 4: Case Study

Case studies of planned cities to recognize the contribution of Patric Geddes, Lewis Mumford, C.A. Doxiadis, Clarence Stein, Peter Hall etc.

Learning Outcome:

1. The student will be able to understand the historical overview of city planning.
2. The students will be able to understand the various theories of city planning.
3. The students will be able to recognize the contribution of Renowned Planners

Text Books:

1. The Urban Pattern, A.B. Gallion, John Wiley & Sons
2. The City of Tomorrow, Le Corbusier, Courier Corporation

Reference Books:

Garden Cities of Tomorrow, Ebenezer Howard, Swan Sonnenschein & Company Ltd

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Applicable for Batch 2022-27

Subject Code	ARF445	Subject Title	CONSTRUCTION & RESOURCE MANAGEMENT						
LTPS	3,0,0,0	Credit	3	Subject Category	DE	Year	IV	Semester	

Course Objective:

The course is intended to introduce the understanding of construction management as well as resource management

Unit 1: Introduction

Need for construction management, its aims and objectives and available management tools. Role of architect in construction management

Unit 2: Tools & Techniques

Management techniques and tools for one off projects. Management techniques and tools for repetitive projects. Site clearance, safety precaution, noise and pollution control

Unit 3: Resource Management-I

Challenges of managing people in construction; organization and management theory; HRM theory; strategic HRM approaches;

Unit 4: Resource Management-II

Operational HRM approaches; employee relations; employee empowerment; diversity and work/life balance; employee welfare; strategic human resource development; employment legislation

Learning Outcome:

- The student will be able to understand the requirement and objective of construction management tools.
- The students will be able to understand various management techniques for construction projects
- The students will be able to understand the components of resource management

Text Books:

1. Construction Planning and Management by P.S.Gehlot.
2. Project: Appraisal, Analysis. Financing, Implementation and review by Prassana, Chandra.

Reference Books:

1. Construction Project Management: A Complete Introduction by Alison Dykstra
2. Project Management For Dummies by Portny, Stanley E.
3. Construction Management by Daniel W. Halpin
4. Resource Management for Construction: An Integrated Approach (Building & Surveying Series) by M.R. Canter

FFCBCS Course structure and Syllabus of B.Arch. Applicable for Batch 2022-27

Subject Code	ARF501	Subject Title	PRACTICAL TRAINING						
LTPS	-----	Credit	15	Subject Category	DC	Year	V	Semester	9th

Course Objective:

The students shall have to go for practical training in an architectural firm/ organization working in the field of architecture. They have to work under an experienced architect registered with COA and the training would include the process of development of conceptual ideas, presentation skills, involvement in office discussions, client meetings, development of concepts into working drawings, tendering procedure and site supervision etc.

Course Outcome:

At the end of the course, the student can:

The students would be able to understand the practical aspects of architecture profession and office management

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Subject Code	ARF502	Subject Title	ARCHITECTURAL THESIS						
LTPS	0,0,0,15	Credit	3	Subject Category	DC	Year	V	Semester	10th

Course Objective:

This is culmination of undergraduate studies and hence shall display the capability of the candidate to conceive/ formulate a design project and provide solution, aptly demonstrated through supporting research. The main areas of study and research can include advanced architectural design, including contemporary design processes, urban design, environmental design, conservation and heritage precincts, housing etc. However, the specific thrust should be architectural design of built environment. Preparation of presentation drawings, working drawings, detailed drawings and study model are part of the requirements for submission.

Course Outcome:

At the end of the course, the student can:

The students would be able to understand the evolution of architectural project from design to execution.

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Applicable for Batch 2022-27

Subject Code	ARF503	Subject Title	PROFESSIONAL PRACTICE-II						
LTPS	2,0,0,0	Credit	2	Subject Category	DC	Year	V	Semester	10th

Course Objective:

The goal is to appraise the future architects/designers/planners for social responsibility works for peace, environmental protection, ecological building, social justice, and the development of healthy communities.

Unit 1: Valuation

- Valuation of immovable properties, elements of valuation and factors affecting valuation; Value classification and types of valuation. 6

Unit 2: Easement and Arbitration

- Introduction to various easements processes, & precautions to protect easement rights.
- Arbitration, Arbitrator, Umpire, Nature of arbitration, Appointment, Conduct, Powers and duties of arbitrators and umpires; Procedure of arbitration and preparation of awards

Unit 3: Management of Office

- Work Structure of office
- Conditions of engagement of an architect – Duties; Responsibilities and liabilities of a professional architect; Scale of charges, mode of payment etc
- Client management, Human Resource management, Financial management

Unit 4: Contracts and Tenders and Fee Structure

- Type of building contracts, their demands, preparation of contract documents, general conditions of contract, interim certificated, defect liability period, retention amount and virtual completion
- Preparation of tender documents, method of inviting tenders, opening of tenders, preparation of comparative statement, recommendation and award of projects

Course Outcome:

At the end of the course, the student can:

- Develop the practice and office management
- Identify and define the legal provisions for architectural practice
- Appraise the morals and ethics in architectural profession
- Acknowledge the social responsibilities and duties of an architect
- Comply with social norms and responsibilities.
- Defend and practice professional ethics.

Text Books [TB]:

- R H. Namavati, Professional practice
- Hand book on Professional Practice by I. I. A,

Reference Books [RB]:

- CMDA-Development control rules for CMA.
- Estimating & Costing, Dutta & Dutta

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF541	Subject Title	ARCHITECTURAL CONSERVATION						
LTPS	0,0,0,3	Credit	3	Subject Category	DE	Year	V	Semester	

Course Objective:

The course is intend to introduce the basics of conservation in architecture.

Unit 1: Introduction

- Definition of Conservation and its socially accepted Meanings.
- Why Conservation? Justification for conservation.
- Development of Theory of conservation and various charters of International importance like Venice charter, Burra charter, Bombay Heritage Act, etc.
- Concepts of Values, Significance, Authenticity and Integrity.
- Ethics in Conservation

Unit 2: Research in Conservation

- Importance of Research in conservation.
- Sources of information like books, archival photographs and maps, folklores, mythology, oral tradition and memories.
- Structuring and interpretation of collected information

Unit 3: Degrees of Intervention

- Prevention of deterioration, Preservation of the existing state, Consolidation of the fabric, Restoration, Rehabilitation, Reproduction, Reconstruction

Unit 4: Decays & Remedies

- Introduction to Decay in Cultural property, Materials and Structural failures
- Internal and External environment of historic buildings
- Climatic causes of decay
- Botanical, biological and microbiological causes of decay
- Insects and other pests as causes of decay
- Man-made causes of decay

Course Outcome:

At the end of the course, the student can:

CO1. Understand the theory and science of architectural conservation

CO2. Comprehend the methods and tools for recording and documentation of structures.

CO3. Learn the degrees of intervention in historic buildings

REFERENCE BOOKS:

1. Conservation of Historic Buildings by Fielden, Bernard, 2003, Architectural Press.
2. Guidelines for Conservation by Fielden, Bernard, 1989, INTACH, New Delhi.
3. Historic England, Practical Building Conservation: Conservation Basics, 2013, Routledge.
4. Contemporary Theory of Conservation by Salvador Munoz-Vinas, 2005, Elsevier.

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Applicable for Batch 2022-27

Subject Code	ARF542	Subject Title	SUSTAINABLE CITIES AND COMMUNITIES						
LTPS	3,0,0,0	Credit	3	Subject Category	DE	Year	V	Semester	

Course Objective:

The course is intended to introduce the concept of sustainability for cities and communities.

Unit 1: Introduction

Introduction to green concept and its need at present time. Green cities or sustainable cities: is there any difference? Sustainable communities from history.

Unit 2: Issue of Climate Change & Depleting Resources

Factors responsible for climate change, overuse of resources by communities and its affects. Good practices of rural regions which can be adopted in cities to mitigate the climate change process

Unit 3: Sustainable Development of Cities & Communities

Sustainable site selection and development. Sustainable building materials and technologies. Low impact construction. Bio Mimicry. Dimensions of sustainable cities and sustainable community

Unit 4: Case Study

Case studies of eco cities and communities.

Learning Outcome:

- The student will be able to understand the concept of sustainability.
- The students will be able to explore the various dimensions of sustainability in cities and communities.
- The students will be able to recognize the sustainable practices of rural communities which are also relevant for urban regions.

Text Books:

1. J. Sengupta, "Cost Effective Building Materials from Industrial and Agricultural Wastes", Proceedings of Winter School on Alternative Building Materials, Vidisha, India, 2005

Reference Books:

Sustainable Communities, Clark II & Woodrow W., Springer

FFCBCS Course structure and Syllabus of B.Arch.
Applicable for Batch 2022-27
FFCBCS SYLLABUS: Bachelor of Architecture

Subject Code	ARF344	Subject Title	Barrier Free Built Environment						
LTPS	3,0,0,0	Credit	3	Subject Category	DE	Year	III	Semester	

Course Objective:

The course will provide knowledge about concept of accessibility and universal design with focus on implications of ability and different ability on usage of built environment.

Unit 1: Basic Concepts

Understanding of human ability relevant to design problems in home, workplace, infrastructure etc.

Unit 2: Concept of Accessibility and Universal Design

Evolution and limitations of accessible design and difference between accessible and universal design.

Unit 3: Accessibility Standards

Theory of disability, devices and controls, defining design requirements, classification of buildings and access provisions. Design elements within the buildings. Site planning, parking, approach to plinth level, corridors, entrances, exits, windows ramps, stairways, lifts, toilets, signage, floor finishes. Design elements outside buildings

Unit 4: International Theory of Universal Design

Principles of universal design that enable usability and inclusion across the spectrum of age, size, gender, ability and conditions and contextual derivation of universal design principles in India

Unit 5: Accessibility Consideration in Building Typology

Provisions in various buildings- residences, restaurants, auditorium, parks railway stations etc. Case studies

Learning Outcome:

- The student will be able to understand the basic concepts of accessibility and universal design.
- The students will be able distinguish between concepts of accessibility and universal design
- The students will be able to apply the knowledge in building design, landscape architecture and interior design.

Text Books:

1. Universal Design by Goldsmith

Reference Books:

1. Centre for Universal Design, North Carolina State University, Mullick A, Ostroff
2. Universal Design Handbook, Preiser, Wolfgang

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF345	Subject Title	HILL ARCHITECTURE						
LTPS	3,0,0,0	Credit	3	Subject Category	DE	Year	III	Semester	V

Course Objective:

To impart a comprehensive knowledge of architecture suited for hilly regions and to develop an understanding of historical and environmental responsiveness for building up on the hills.

Contents:

Unit-01

- Study of historical perspective of hill architecture and its unique attributes and concerns, constraints of climate, topography and availability of materials.
- Study of unique built form, topographical, ecological and hydrological features of hilly regions with suitable examples. Design factors such as access, circulation, gradients, slope analysis, grading and interpolation of contours.

Unit-02

- Study of major hill settlements in various regions of the world with focus on settlements in Himalayan region of India. Understand traditional hill architecture of India, medieval European settlements and other places.

Unit-03

- Case study of vernacular hill architecture of Himachal Pradesh like building types, techniques and materials. Study of structural aspects, environmental and ecological aspects of modern buildings and necessary safeguards at hills.

Unit-04

- Typical construction techniques and details for roads, drainage and retaining walls in hilly region.

Course outcomes:

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

- Understand challenges in the development of hilly areas.
- Work out pathways, roads and zoning for a campus on the hilly terrain and prepare architectural drawings.
- Design while considering associated environmental and ecological impact of such development.

References:

1. The Architecture Heritage of Himachal Pradesh, Thakur
2. Hill Cities of Eastern Himalayas, Sinha and Chacko
3. Himalayan Architecture, by Ronald M. Bernier

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	ARF5 44	Subject Title	ADAPTIVE RE-USE OF BUILT FORM						
LTPS	3,0,0 ,0	Credit	3	Subject Category	DE	Year	5	Semester	X

Course Objective:

To understand the theoretical and practical background for a systematic process to support adaptive re-use of built environment for sustainable development.

Unit 1: Introduction

- Introduction to the concept of adaptive reuse history and various theories of adaptive reuse. Understanding adaptive re-use of buildings as a key to sustainable development. To explore the relationship between financial, environmental and social parameters associated with the adaptive re-use of buildings.

Unit 2: Case studies

- Understanding the application of the concept of adaptive-reuse through various case studies (within the country and abroad). Critical appraisal of the design approach of the case studies. Case studies should include examples of domestic, commercial, industrial, ecclesiastical and public building types. Analysis of the case studies should be based on the spatial attributes, structural knowledge and materiality of the existing structures and the strategies and tactics of adaptive reuse in architecture.

Unit 3. Design generation processes in Adaptive re-use

- Analysis of the existing structure - Importance of building assessment report process of documentation and condition mapping in deciding design recommendations. Understanding the design logic. Role of various parameters in concept generation. Strategies for re-modelling.

Unit 4. Adaptive re-use of heritage buildings

- Understanding Adaptive re-use as an important strategy towards conservation of built heritage. Appreciation of the various values (architectural, cultural, historical, associational, social, etc.) that is associated with heritage buildings. Developing an ethical approach for adaptive re-use.

Note: The culmination of the elective could be a smaller scale adaptive re-use project done by the students inculcating all the ideas covered throughout the subject. - Field visits and case studies help on better understanding of the concept of adaptive re-use.

References:

1. Liliane Wong, " Adaptive Reuse: Extending the Lives of Buildings", 2016, Birkhauser Architecture, Switzerland.
2. J. Stanley Rabun, "Building Evaluation for Adaptive Reuse and Preservation", 2009, John Wiley & Sons.
3. Robert W. Burchell, "The Adaptive Reuse Handbook", Transaction Publishing, New Jersey.
2. Chris Van Uffelen, "Re-use Architecture", 2010, Braun Publishing, Switzerland.
3. Robert T. Ratay, "Structural Condition Assessment" 2005, Wiley

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Subject Code	LAF184	Subject Title	CORPORATE COMMUNICATIONS AND SOFT SKILLS						
LTPS	2,0,2	Credit	3	Subject Category	HL	Year	IV	Semester	

This course is to enhance the soft skills of the students. It also focuses on Business communication. It will help the students to develop professional skills and how to be effective communicator at work place.

Course Objective:

- To introduce to students to the business & corporate environment and its expectations.
- To help students to identify and sharpen their personal and professional skills.
- To ensure employability of students through a perfect blend of hard & soft skills.

Unit 1: Business Communication

Importance & Features of Business Communication, Flow of Communication: Channels & Networks, Business Presentation, Business Etiquette, Telephonic Etiquette, Interview Skills, Impression Management

Unit 2

Business Letter Writing, Job Application Letter & Resume, Communication: E mails & E-Tools

Unit 3: Personal Skills for Corporate Communication

SWOT Analysis: Self-Assessment, Identifying Strength & Weakness
Self-Awareness, Self-Disclosure & Self-Management (Stress, Anger)
Goal Setting: Personal & Professional Goals, SMART-ER Goals
Human Perception: Understanding People, Perceptions, Attitudes
Personality (Personality Test)

Unit 4: Professional Skills for Corporate Communication

Decision Making: Techniques, Six Thinking Hats
Creative Thinking, Lateral Thinking
Team Building & Leadership Skills
Time Management: Planning Organizing, Time Wasters
Conflict Resolution Skills
Negotiation Skills

Lab 1 Telephone Etiquette: Making an appointment, answering calls (Role Play)

Lab 2 Telephone Etiquette: Making an appointment, answering calls (Role Play)

Lab 3 Business Presentations (PPT Presentation)

Lab 4 Business Presentations (PPT Presentation)

Lab 5 Interview Skills: Mock Interview

Lab 6 Interview Skills: Mock Interview

Lab 7 Panel Discussion

Lab 8 Panel Discussion

Lab 9 Conflict & Negotiation (Situational Role Play)

Lab 10 Conflict & Negotiation (Situational Role Play)

FFCBCS Course structure and Syllabus of B.Arch.

Applicable for Batch 2022-27

Text Books

1. Rizvi, Ashraf. Effective Technical Communication, McGraw Hill, New Delhi, 2005.
2. Gulati, Sarvesh. Corporate Soft skills, Rupa & Company, 2006

Reference Books

1. Steven R. Covey. The Seven Habits of Highly Effective People, Simon and Schuster, London, 2007.
 2. Robbins, Stephen. Management, Pearson Prentice Hall. 2009
 3. Carnegie, Dale. How to Win Friends and Influence People, Simon and Schuster, London, 2009.
 4. Dr. Alex. Soft Skills: Know Yourself & Know the World, S. Chand Publications, 2001.
 5. Gopalswamy, Ramesh. The ACE of Soft Skills: Attitude, Communication and Etiquette for Success, Pearson, New Delhi, 2008.
 6. Ghosh, B. N. Managing Soft skills for Personality development, Laxmi Publications Ltd., New Delhi, 2013.
- Elizabeth B. Hurlock. Personality Development, TMH Publication, 2010