

GANPAT UNIVERSITY									
FACULTY OF ARCHITECTURE DESIGN & PLANNING									
Programme		Bachelor of Architecture			Branch/Spec.		INSTITUTE OF ARCHITECTURE		
Semester		IV			Version		2.0.0.0		
Effective from Academic Year			2020-21		Effective for the batch Admitted in			June 2019	
Subject code		IVA01ADD	Subject Name		Architecture Design and detailing- IV				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	-	-	8	-	8	Theory	-	-	-
Hours	-	-	12	-	12	Practical	40	60	100
Objective									
A study of human built form and community living based on lifestyle, culture, nature and economic forces.									
Learning Outcome:									
<p>LO1: To understand the concept of a community, its necessity and its contribution towards the larger role it plays in the development of architectural fabric of that given locality.</p> <p>LO2: Explore systems and methods to analyse the triggers and factors responsible for the generation of that lifestyle and culture, which in turn affects the house form.</p> <p>LO3: To develop an ability to design a house typology, cluster layout and site planning based on the lifestyle & culture study.</p>									
CONTENT AND TEACHING UNITS									
Unit	Content								Hrs
A	Initial exercises and Case studies: <ul style="list-style-type: none"> <input type="checkbox"/> Factors affecting house form (climate, topography, lifestyle and economics) <input type="checkbox"/> Study of settlement types (nomadic, traditional, rural and urban) <input type="checkbox"/> Case studies to learn house form and settlement typology of a community 								12
B	Site analysis and Model making: <ul style="list-style-type: none"> <input type="checkbox"/> Study of context and surroundings <input type="checkbox"/> Study of climate and Topography <input type="checkbox"/> Study of green cover and site landmarks <input type="checkbox"/> Study of built vs. open ration of site <input type="checkbox"/> Study of existing bylaws and regulations <input type="checkbox"/> Preparing a scaled model for the site which is selected for the studio program 								18
C	Program analysis and Conceptual Design development: <ul style="list-style-type: none"> <input type="checkbox"/> Study of Socio economic condition of user group <input type="checkbox"/> Study the occupation/s of user group <input type="checkbox"/> Study the scale of housing (No. of families, No. of houses etc.) <input type="checkbox"/> Study of lifestyle and daily routine of the user group <input type="checkbox"/> Analysis of program through volumetric and diagrammatic representation of spaces 								24

	<ul style="list-style-type: none"> <input type="checkbox"/> Study of inter relation between those spaces and the lifestyle of the user group <input type="checkbox"/> Preparing the intent statement based on the above studies for the vision of the settlement type <input type="checkbox"/> Based on the intent statement make initial configurations for the housing settlement through block models, sketch 3ds etc. <input type="checkbox"/> Develop one or more house forms for the user group keeping in mind various studies which are done while analyzing the program 	
D	<p>Design Development to Finalisation of Design:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Developing the house from/s through continuous iterations done with the help of plans, sections, axonometric and isometric views. <input type="checkbox"/> Formation of streets, clusters and blocks based on the systematic arrangement of houses. <input type="checkbox"/> Addition of common amenities like street furniture, open spaces, play areas etc. based on the overall site plan development. <input type="checkbox"/> Based on the physical and programmatic forces affecting the site, an appropriate site plan should be derived which adheres to the intent statement. <input type="checkbox"/> Generating the site plan through 3d models, digital models, sketch and photographic documentation. <input type="checkbox"/> Documentation of process through continuous photographic and digital scanning process. <input type="checkbox"/> Making finalised drawings (plans, sections, elevations, axes etc.) and models (physical and digital) for the purpose of final assessment and discussions. 	42
Reference Books		
1	House Form and Culture - Rapoport, Amos	
2	Analysis of the Precedents, Simon Unwin	
3	Site, Space and Structure, Todd, Kim	
4	Elements of Architecture from form to place, Miers , Pierr Von	
5	Richard Untermann And Robert Small, Site planning for Cluster Housing	
6	A Pattern Language, Christopher Alexander	
7	A Place in the Shade, Charles Correa	
8	Housing and Urbanisation, Charles Correa	

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Effective from Academic Year			2020-21		Effective for the batch Admitted in			June 2019	
Subject code		2IVA02BMC	Subject Name		Building Materials and Construction - IV				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	-	2	2	6	Theory	-	-	-
Hours	2	-	2	2	6	Practical	40	60	100
Objective:									
<input type="checkbox"/> The primary focus is on materials, their properties and applications, and their intrinsic relationship to structural systems and environmental performance. <input type="checkbox"/> Students will develop application based understanding of: the relationship of materiality to construction systems and techniques. <input type="checkbox"/> Understanding "RCC and Steel" as a building material and its application in a building along with its techniques used in different forms and joinery details of construction.									
Learning Outcome:									
LO1: Understanding Steel and basic constituent elements of RCC- Cement, aggregates, sand and steel etc. as different building materials and their application in a building LO2: Recognizing RCC and Steel as a contemporary building materials and it's evolution with time. LO3: Understanding application of RCC and Steel in different parts of a building and construction techniques and joinery details.									
CONTENT & TEACHING UNITS									
Unit	Content								HRS
1	Introduction to different building materials like steel and constituent elements of RCC - Cement, aggregates, sand and steel etc., their types, properties tensile and compressive strength, weakness, properties and their application in a building								12
2	Sensitizing students with different metals used for building construction, properties and behavior of material in different conditions, their standard sizes, sections, and use of it in construction.								12
3	Understanding Precast and cast-in-situ RCC, pre-stressed, pre-tensioning and post-tensioning of concrete construction. Formwork, Shuttering, Shoring, Shuttering- their techniques and use in building.								18
4	Learning typical RCC foundation; construction techniques in precast and cast-in-situ of different horizontal bands like-DPC, Sills, lintels, beams along with vertical elements like columns, walls and staircase, different types of slabs, floors and roofs								24
5	Understanding construction of different types of steel structures and their elements like foundation, floors, columns, beams, staircase and roofs/ trusses made from steel along with its joinery detail.								18
6	Recognizing different joints in a building like construction joints, expansion/								12

	contraction joints- its use and construction details.	
Text Books		
1	NA	
Reference Books		
1	Construction of Building Vol.-I- R.Berry	
2	Building Construction Metric Vol.-I to IV- W.B.Mckay	
3	Construction Technology Vol.-I-Chudley	
4	Building Construction Illustrated-FransisD.K.Ching.	
5	Fundamentals of Building Construction - Allen Edward	
6	Steel and beyond -LeCuyer	

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Semester	IV				Version	2.0.0.0			
Effective from Academic Year	2020-21			Effective for the batch Admitted in	June 2019				
Subject code	2IVA03HOA		Subject Name	History of Architecture-III					
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	-	-	-	2	Theory	40	60	100
Hours	2	-	-	-	2	Practical	-	-	-
Objective:									
<input type="checkbox"/> To Learn the evolution of world architecture took place at different region in different era of time line in a chronological order <input type="checkbox"/> Western: To study and understand cultural, social, geographical aspects which influenced and played vital role in development of the following eras Early Christian Architecture, Byzantine, Romanesque and Gothic architecture. <input type="checkbox"/> Indian: source of Islamic architecture in India, Imperial style, Provincial Style: Deccan, Jaunpur, Gujarat, Kashmir, Mughal. <input type="checkbox"/> To Study various architectural elements, building techniques of specific architectural style.									
Learning Outcome:									
<p>LO1: To understand architecture as evolving within specific cultural contexts including aspects of geographical location, politics, society, religion and climate.</p> <p>LO2: Understanding of derivation of specific architectural elements construction techniques for local materials availability which became prominent architecture feature of those architectural style.</p> <p>LO3: To establish a connection between religion and architecture and show how the concepts and beliefs have been manifested in a tangible form.</p>									
CONTENT & TEACHING UNITS									
Unit	Content								HRS
A	<p>Early Christian & byzantine architecture Birth and spread of Christianity - early Christian worship. Study of architectural character, evolution of church form, building typologies, and building elements, baptisteries, early basilicas, churches. Development of early Christian church from roman basilica. Evolution of church forms. Development of the dome & pendentive in Byzantium. Typical church planning - 1.basilican concept: St. Clement, Rome; St. Peters, Rome, 2.centralized plan concept: S.Vitale, Ravenna; S. Hagiasophia, Constantinople; St. Marks, Venice.</p>								8
B	<p>Romanesque & Gothic Architecture Introduction to Romanesque architecture. Development of stone vaulting into groined systems - leading to development of church plan. Study of characteristics and typologies of Romanesque buildings. Understanding characteristics of Italian Romanesque Architecture: Central Italy: Pisa Cathedral, British Romanesque: Durham's</p>								12

	Cathedral, French Romanesque: Abbaye-aux-hommes Introduction to Gothic architecture, its evolution of structural systems, arches, vaults and cross vault, decoration, characteristic of French architecture.: Notre - Dame, Paris, Chartes Cathedral. Understanding the general influences and characteristics of British & Italian gothic architecture and its structural developments and decorative motives. Characteristics of British gothic Architecture. Characteristics of Italian gothic Architecture : Milan Cathedral.	
C	Islamic Architecture In India I) Indo Islamic architecture –advent and earlier phase: advent of Islamic architecture in India – background, characteristic elements, typical buildings – mosques, tombs etc.; Imperial era: Slave kings: Qutub mosque, Qutu bminar, Khilji dynasty: Alai Darwaya, Tughlaq Dynasty:Tomb of Ghiyas - ud - din Tughlaq, Sayyid and Lodi Dynasty -: Development of Octagonal & Square tombs:Mothe - Ki - Masjid. Ii) Provincial styles: Jaunpur: Jami Masjid of Jaunpur; Malwa - royal complex at Mandu; Gujarat: earlier period - Jami Masjid at Ahmedabad, middle period - Mosque at Champanir, evolution of Tombs, later period - Siddisayad mosque, Adalaj - step well; Outline idea of Bijapur style; Mughal architecture: Babur - eg. Humayuns Tomb – Delhi, Akbar - eg. Agra fort, Fathepursikri; Jahangir - eg. Akbar's mausoleum at Sikandra, Shah - Jahan - Eg. Red fort, Taj - Mahal - Agra.	12
Text Books		
1	A History of Architecture - Sir Banister Fletcher	
2	A global history of Architecture - Francis D.K. Ching	
3	Indian Architecture (The Islamic Period) - Percy Brown	
4	History of Mughal Architecture - Nath	
Reference Books		
1	The History of Architecture in India – Christopher Tadgill	
2	Indo-Islamic Architecture – Z. A. Desai	
3	Understanding Architecture: Its elements, history and meaning - Leland M Roth	
4	World History of Architecture - Micheal Fazio	

NOTE:

- (I) Assignments to include study of concepts relating to cultural and religious beliefs, structure, climatic interfaces and integration of all these in the resultant forms.
- (II) Models of architectural elements and various monuments, buildings, analytical studies and paper presentations individually or in groups.

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Semester	IV				Version	2.0.0.0			
Effective from Academic Year	2020-21				Effective for the batch Admitted in	June 2019			
Subject code	2IVA04SDS-IV		Subject Name	Structure design and system-IV					
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	-	-	-	2	Theory	40	60	100
Hours	2	-	-	-	2	Practical	-	-	-
PRE-REQUISITES:									
Structure – I, II, III									
OBJECTIVE:									
<input type="checkbox"/> This subject is applications of structural engineering principles to design basic structural elements using of reinforced concrete as materials. This subject is specifically aim to develop understanding of various design philosophy, Indian codal provisions, design basis used in design of basic elements of framed structures and its detailing requirement.									
Learning Outcome:									
LO1: Analyse continuous beam and non-sway single bay single story frames using Moment Distribution Method. LO2: Select various design philosophies to plan, to draw structural layout and to understand analytical approach to be used in the design of structural elements LO3: Evaluate the loading conditions and to calculate loads as per IS Specifications LO4: Propose design of basic structural elements like slab, beams, columns, staircase and foundation etc. using concrete as materials									
CONTENT & TEACHING UNITS									
Unit	Content								Hrs
1	INTRODUCTION TO IS CODE: Introduction to various load & load combinations, Use of IS code for loads, Introduction to 456-2000 for design of RCC element. Limit state of collapse & Serviceability: Safety factors for Material & Loading, Limit State of Flexure: Stress-Strain characteristics of Concrete & Reinforcing steel,								04
2	DESIGN OF BEAMS: Theory and Concept of different type of sections: Under reinforced, over reinforced & Balance section, Neutral Axis depth, Moment of Resistance for singly reinforced and doubly reinforced beam. Design of singly and doubly reinforced beams.								06
3	DESIGN OF COLUMN: Definition, Classifications of column, Assumptions, Design of Short columns considering only axial load.								06
4	DESIGN OF SLAB: Types of Slab, loading transfer behaviour, Design of Simply supported One-Way and Two-Way Slab, Design of One way and Two-Way continuous slab.								06

5	DUCTILE DETAILING: Concepts of Detailing of various structural components as per IS: 13920 provisions. BOND & ANCHORAGE, DEVELOPMENT LENGTH, LAP LENGTH.: Development length L_d , Bond stress, Anchoring of reinforcement.	04
6	DESIGN OF STAIRCASE: Introduction, Concepts of different types of staircases based on structural behaviour, Calculation of trade and riser, Design of waist slab type staircase.	04

Text Books

1

Reference Books

1	1. Junarkar S. B. & Shah H. J; Tata McGraw Hill book Company.
2	Wang C. K.; Intermediate Structural Analysis; Tata McGraw Hill book Company, New Delhi
3	Elements of Civil Engineering (IV Edition) - S. S. Bhavikatti
4	Shah & Karve; Limit State Theory & Design of Reinforced Concrete; Structure Pub., Pune
5	IS: 456 - Code of practice for plain and reinforced concrete.
6	IS: 875 (Part I to V) - Code of practice for structural safety of Buildings Loading standards.
7	Strength of Materials and Theory of Structures; Vol. II - B.C.Punmia
8	IS: 13920 -Code of Practice for ductile detailing of RC structure subjected to seismic force.
9	EQ Tips; IIT Kanpur & BM & TPC New Delhi.
10	Structural Engineering for architecture - A.P. Dongre

List of Tutorials:

1. Prepare model showing reinforcement detail of singly reinforced, doubly reinforced simply supported and continuous beams.
2. Prepare model showing reinforcement detail of one way and two-way slabs with various end conditions.
3. Prepare model for detailing of beam column junction and column-footing junction.
4. Prepare model for detailing of Stair case

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Effective from Academic Year		2020-21			Effective for the batch Admitted in			June 2019	
Subject code	2IVA05BS		Subject Name		Building Services-II				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	-	-	-	2	Theory	40	60	100
Hours	2	-	-	-	2	Practical	-	-	-
Pre-requisites:									
Introduction to all basic Mechanical system of buildings, to understand the co relation of services with building to run the services smoothly.									
Learning Outcome:									
LO1: Understand the networking of all mechanical components of including to understand the working cycle to be generated through the usage of equipment and appliances									
LO2: Apply acquired knowledge to importance of natural and artificial lighting , resources for the both types of lighting arrangement which are the most important requirement of the built environment									
LO3: To adapt newer and latest technology and equipment's for modern and fundamental requirement of Information and communication									
LO4: High tech applications and services to be implemented for all type of functional areas like residential, commercial, corporate and Industrial.									
Theory syllabus									
Unit	Content								Hrs
1	Acoustics Properties of sound, process of hearing, behavior of sound, acoustics for various spaces/ functional areas, noise control, outdoor and indoor sound input/output systems, noise control of building materials, prediction methods and calculations, noise reduction, properties of materials for sound insulation, testing, room acoustics, reverberation time in functional areas.								08
2	Air conditioning Different systems in current use from chilled water cooling systems to air handling package unit etc; their installations requirements and demand in building layouts. Supply air, return air ducting systems, their layouts and requirements along with building systems.								08
3	Building Automation Concept and application of Automation and Management System; Design issues related to building automation and its effect on functional efficiency; Components of building automation system; HVAC, electrical, lighting, security, fire-fighting, communication etc.; Integrated approach in design, maintenance and management system; Current trend and innovation in building automation systems; Impact of Information Technology; Concept of artificial intelligence; Application of expert system in building automation; Stages in development of expert system, expert system application in architecture; Computerizing building management information.								10

4.	Building Security Systems Concept of Building security Systems; Design issues, Components, Integrated approach in design, maintenance and management, Current trend and innovation, Application.	06
Practical content		
Site visits & Case studies for Acoustics, Building Automation system, Building security system. Market surveys of types of Air conditioning system available in the market with its proper working criteria and functions and also add the upgradation coming in the system.		
Text Books		
1	NA	
Reference Books		
2	Mechanical & Electrical Equipment for Building - William J. McGuiness & others	
3	Operation & Maintenance of Electrical Equipment - B.V.S.Rao	
4	Basics Room Conditioning - Klein	
4	Intelligent Buildings and Building Automation - Shengwei Wang	
5	Understanding Building Automation System - Reinhold A. Carlson	

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Semester		IV			Version		2.0.0.0		
Effective from Academic Year			2020-21		Effective for the batch Admitted in			June 2019	
Subject code		2IVA06SPM	Subject Name		Site planning and management				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	-		2	4	Theory	40	60	100
Hours	2	-		2	4	Practical	-	-	-
Objective:									
<ul style="list-style-type: none"> To develop an understanding of the importance of site conditions for the creation of good architectural solutions and focus on the site as a fundamental component of bldg. design. To examines the interrelationship of intended site use with the environment and also topography, vegetation and landscape, climate, geography, as well as theoretical aspects of site development. To emphasize the synthesis of programmatic and environmental requirements into a coherent concept for building placement and site improvements. 									
Learning Outcome:									
<p>LO1: Understanding of the methods of preparing and reading graphical representation of site.</p> <p>LO2: Ability to use analytical database to propose appropriate site planning.</p> <p>LO3: Ability to integrate services like drainage, water supply, storm water, electricity, etc. and by-laws in to the site planning.</p> <p>LO4: Students will get exposure to the various techniques of site analysis and planning.</p>									
CONTENT & TEACHING UNITS									
Unit	Content								HRS
1	INTRODUCTION TO SITE ANALYSIS Introduction to Site analysis, Importance of site analysis ; interrelationship between nature and human interventions , thematic traditions in site design, history of site design as a source for precedent analysis								12
2	SITE INFLUENCING FACTORS On site and off site factors; Analysis of natural, cultural and aesthetic factors; topography, hydrology, soils, landforms, vegetation, climate, microclimate. Influence of water bodies								12
3	DESIGN OF LANDFORMS IN A SITE Contours - representation of landforms and landform design, interpolation of contours, slope analysis, uses and function. Grading - Symbols and grading and alignment of paths/roads, angle of repose and use of retaining walls. Grading terraces. Drainage - surface drainage, functional and aesthetic considerations								16
4	SITE PLANNING PRINCIPLES AND TECHNIQUES Site Zoning. Organization of vehicular and pedestrian circulation; parking ; street widths; turning radii ; street intersections ;steps and ramps. Site planning considerations in relation to water systems, sewage disposal, outdoor electrical systems								16
5	SITE CHARACTERISTICS AND DESIGN REQUIREMENTS Exploration of site planning options for residential, commercial, office, industrial and mixed-use								16

	projects; street network, civic space, and open space planning; emphasis on walkable, mixed-use, transit-oriented sustainable development.	
Text Books		
1	NA	
Reference Books		
1	Kevin Lynch , "Site Planning", MIT Press, 1967	
2	Time Savers Standards for Site Planning, McGraw Hill, Inc, 1995	
3	Richard Untermann and Robert Small, "Site planning for cluster housing", Van Nostrand ReinholdCompany, 1977	
4	Michael Laurie, "An Introduction to Landscape Architecture", Elsevier, 1986	
5	TSS for Landscape Architecture, McGraw Hill, Inc, 1995	
6	John Ormsbee Simonds, "Landscape Architecture: A manual of site planning & design", McGraw Hill,1961.	
7	Joseph De Chiarra and Lee Coppleman, "Planning Design Criteria", Van Nostrand Reinhold Co., NewYork, 1968	
8	Thomas H. Russ, "Site Planning and Design Handbook" Pearson Education, 2002	

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Semester	IV				Version	2.0.0.0			
Effective from Academic Year			2020-21		Effective for the batch Admitted in			June 2019	
Subject code	2IVA07PE		Subject Name		Professional Elective-II				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	-	-	2	-	2	Theory	-	-	-
Hours	-	-	2	-	2	Practical	40	60	100
Objectives:									
<input type="checkbox"/> The prime objective of this course is to introduce the fundamental concepts of computer systems; software and to develop basic skills in programming, Application of Information Technology tools and technical in Architecture and To impart training in computer aided 2D drafting and 3D modelling through projects.									
<input type="checkbox"/> To introduce computer operation principles and explore image editing through a graphical composition.									
Learning Outcome:									
LO1: Ability to express using digital tools in the realm of visual composition, drafting, 3D visualisation and rendering.									
LO2: To enable the use of computer applications to develop a design from the initial stages to the final outcome.									
LO3: To enable the rendering of a building so as to create a photo realistic image.									
Theory syllabus									
Unit	Content (COMPUTER-AIDED VISUALIZATION)								Hrs
A	Computer as a drafting tool: Productivity tools in CAD, organization of layers for working drawings, use of blocks and symbols hatch patterns. Dimensioning systems extracting of areas from drawings, concept of paper space plotting the drawings								4
B	Computer as a design tool: Repetition of forms mirroring, coping, and array etc. calculation of areas, volumes. Creating and using templates, blocks, and symbols and using them in architectural drawings. - Managements of large drawing files. - Working in a network environment-Security systems-converting drawing files into Internet compatible files.								8
C	Photoshop: Creating and saving images, basic image editing, Photoshop tool box and tools, using layers, special effects.								8
Practical content									
Exercises based upon above topics. Models, installations and artworks									
Text Books									
1	NA								
Reference Books									
1	User manual & tutorials of Google Sketch Up software.								
2	Auto CAD reference manual – Autodesk UNC, 1998								
3	Auto CAD architectural users guide – Autodesk Inc. 1998								
4	Photoshop CS Bible – Deke McClelland.								