

**SAVITRIBAI PHULE PUNE UNIVERSITY  
(FORMERLY UNIVERSITY OF PUNE)**



**MASTERS IN ARCHITECTURE  
M. ARCH (DESIGN AND PROJECT MANAGEMENT)  
(2026 Pattern)**

**BOARD OF STUDIES IN ARCHITECTURE  
FACULTY OF SCIENCE AND TECHNOLOGY**

**To be implemented from**

**AY 2026-27**

# MASTERS IN ARCHITECTURE

## (DESIGN AND PROJECT MANAGEMENT)

### PREAMBLE

Architectural design constitutes a critical subset of Construction, Real Estate, and Infrastructure projects. While it plays a central role in translating the vision of the project promoter into tangible form, the overall success of a project ultimately depends on several other determinants, including financing, regulatory approvals, engineering systems, construction logistics, sustainability considerations, and end-user requirements. Each of these determinants both influences and is influenced by the design process. Ensuring their integration within the project and the final built facility is the responsibility of project management professionals.

Traditionally, architects have shouldered this responsibility of project integration. However, with the growing scale and complexity of projects, this role has become decentralized, requiring more than the involvement of an architectural consultant to maintain coherence. The multidisciplinary nature of architectural education and practice equips architects with the ability to understand business objectives, optimize resources, and balance key project constraints of scope, schedule, quality, and resources. The Masters in Architecture (M.Arch) Program in Design & Project Management seeks to prepare architects with advanced skills, methods, and tools necessary to assume leadership roles in project delivery.

This revised curriculum, hereinafter referred to as the 2026 Pattern Syllabus of the M.Arch in Design & Project Management, continues the intent of developing competencies in project management, streamlining pre-construction and construction processes, and design management through integration of architectural design with engineering systems such as mechanical, electrical, plumbing, lighting, acoustics, fire protection, energy efficiency, and structural performance. The program is structured such that Semesters I and II focus on developing technical knowledge required for project management, while Semesters III and IV emphasize on managerial frameworks and practical application.

The curriculum is organized into the following segments:

#### **1. Technical & Technological Aspects**

Students are trained to view projects holistically, taking into account the engineering disciplines fundamental to functional performance. Courses such as *Advanced Building Services*, *Construction Technology & Alternative Materials*, and *Elective II – Functional Performance of Buildings* impart the necessary technical knowledge. This foundation is reinforced through the *Design Development Process and Interface Management Studio*, where students apply their learning in simulated project environments.

#### **2. Appraising and Planning Aspects**

Effective project management requires context-specific planning that addresses project prerequisites. Courses such as *Elective I – Technical Appraisal of Projects* and *Project Planning & Scheduling Studio* provide students with the ability to evaluate projects and formulate strategic development plans that balance time, cost, and resource considerations across the project lifecycle.

#### **3. Project Management Frameworks**

Project management approaches vary depending on project typology, domain, people, processes, and industry requirements. Courses like *Project Management: PMBoK Framework* and *Design Development Process and Interface Management Studio* introduce students to the identification of project needs and the tailoring of frameworks to suit teams and organizations. These courses provide a structured approach to managing projects, thereby enhancing student employability.

#### 4. Managerial & Practical Aspects

The successful delivery of projects depends on aligning their core and allied aspects with the built facility. Courses such as *Project Cost & Contract Management Studio*, *Project Procurement Management*, *Quality Management Systems*, *Elective III – Specialized Management Areas*, and *Elective IV – Open Electives* expose students to essential management practices that directly affect outcomes, as well as to allied dimensions shaping the project environment. *Professional Practice & Training* with organizations in the AEC sector is mandated to provide students with industry exposure and professional insight.

#### 5. Capacity Enhancement & Skill Building

Beyond knowledge acquisition, students are expected to develop employability skills, including proficiency in software tools, applied research, and interpersonal communication. *Software labs* across three semesters provide exposure to design management tools, project management applications, and analytical platforms. The ability to assess situations and respond systematically is cultivated through courses on *Professional Practice & Training* and *Project*.

The curriculum also incorporates Independent Learning Hours (ILHs), defined under the National Education Policy (NEP) 2020 for self-directed study and exploration beyond formal instruction. Courses such as *Professional Practice & Training*, and *Project* encourage students to pursue independent research and project-based inquiries. In addition to it, *Professional Practice & Training* and experiential activities strengthen the learner-centric orientation of the program, fostering self-reliance, critical thinking, and innovation.

#### PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)

1. **PEO1: KNOWLEDGE AND SKILLS** - To enable students to develop as a project manager having an integrated approach towards design, management, and realization of architecture projects, right from the project feasibility, design stage to the execution stage. Focused understanding of the relation of projects, programs and portfolios and advanced study of architecture & engineering topics i.e., structure, mechanical, electrical, and plumbing services as well as tactical management of the project such that the building functions efficiently for its purpose. The students will be empowered with the understanding of the laws, rules and regulations and codes that govern the AEC sector.
2. **PEO2: RESEARCH** - To enable students to critically evaluate research and practices in the field to arrive at studied solutions within the constraints. To inculcate managerial thinking and critical analysis in the domain of design and project management as an integrated approach towards strategizing and execution of the large scale projects.
3. **PEO3: EMPLOYABILITY**- To enable students to pursue Design Management and Project management roles in the AEC sector. Students will be trained for skills required to coordinate projects that adopt BIM and Cloud based tools, enhancing their employability.
4. **PEO4: ETHICS & VALUES** - To enable students to develop as responsible professionals. To instill students with the ability to work in context specific domains in an interdisciplinary work culture respecting the values of the various disciplines. To provide students with the ability to integrate knowledge of design management and efficient project planning to create responsible projects that demand less resources and render building projects resilient and sustainable.
5. **PEO5: THEORETICAL BASE** - Impart technical expertise on integrating design and project management processes, tools and techniques to achieve project success.

## PROGRAM OUTCOMES (PO's)

Upon successful completion of this program, students will be able to:

1. **PO1: Strategic Design and Planning:**

Graduates will be able to apply principles of strategic design, project planning, and management frameworks to formulate, design, and deliver high-performance large scale projects. They will integrate design, engineering, scheduling and budgeting to achieve efficiency and innovation in complex project environments.

2. **PO2: Research and Analytical Skills:**

Graduates will be able to conduct advanced research using qualitative and quantitative methods, critically evaluate data, and apply findings to solve architectural and managerial problems. They will demonstrate the ability to innovate and contribute to the knowledge base in design and project management.

3. **PO3: Technical Knowledge and Application:**

Graduates will possess an in-depth understanding of construction technologies, building systems, codes, and regulations, along with proficiency in quality management, performance simulations, and emerging digital platforms. They will integrate technical knowledge with managerial aspects to optimize project outcomes.

4. **PO4: Practical and Professional Knowledge:**

Graduates will gain hands-on proficiency in project planning, scheduling, cost and contract management, procurement, and integrating AI in project management. They will demonstrate the ability to execute projects within stipulated time, cost, and quality parameters, with exposure to real-world practices through internships or industry collaborations.

5. **PO5: Sensitization, Ethics, and Responsibility:**

Graduates will demonstrate awareness of sustainability, environmental responsibility, and financial viability in project delivery. They will recognize professional and ethical responsibilities, comply with legal frameworks, and ensure Health, Safety, and Environmental (HSE) considerations in all project phases.

6. **PO6: Communication, Collaboration, and Leadership:**

Graduates will develop effective communication skills (visual, verbal, and written) to engage with diverse stakeholders. They will be able to function in interdisciplinary teams, lead collaborative efforts, manage team dynamics, and deliver integrated design solutions.

7. **PO7: Lifelong Learning and Entrepreneurship:**

Graduates will engage in continuous learning, adapting to emerging trends, technologies, and practices in architecture and project management. They will demonstrate entrepreneurial skills, leadership readiness, and the ability to establish or manage professional practice in a competitive industry.

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**MATRIX OF PROGRAM EDUCATIONAL OBJECTIVES AND PROGRAM OUTCOMES**

	<b>PO1: Strategic Design and Planning</b>	<b>PO2: Research and Analytic- al Skills</b>	<b>PO3: Technical Knowledge and Application</b>	<b>PO4: Practical and Professional Knowledge</b>	<b>PO5: Sensitization, Ethics, and Responsibility</b>	<b>PO6: Communication , Collaboration and Leadership</b>	<b>PO7: Lifelong Learning and Entrepren eurship</b>
<b>PEO1: Knowledge &amp; Skills</b>	✓	✓	✓	✓		✓	✓
<b>PEO2: Research</b>		✓			✓		✓
<b>PEO3: Employability</b>	✓	✓	✓	✓	✓	✓	✓
<b>PEO4: Ethics &amp; Values</b>		✓			✓	✓	✓
<b>PEO5: Theoretical Base</b>	✓	✓	✓	✓			✓

**PROGRAM PROGRAM OUTCOMES AND RELATED COURSES IN CURRICULUM**

<b>Sr. No.</b>	<b>Program Outcomes</b>	<b>Courses in curriculum</b>
1	PO1: Strategic Design and Planning	Project Planning and Scheduling Studio Design Development Process & Interface Management Studio
2	PO2: Research and Analytical Skills	Professional Practice & Training Project Software Lab II - Analytical Tools
3	PO3: Technical Knowledge and Application	Advanced Building Services Construction Technology & Alternative Material Elective I - Technical Appraisal of Projects Elective II - Functional Performance of Buildings Software Lab III- AI in Project Management
4	PO4: Practical and Professional Knowledge	Project Cost & Contract Management Studio Project Procurement Management Project Management: PMBoK Framework Professional Practice & Training Quality Management Systems Elective III - Specialized Management Areas Elective IV - Open Elective
5	PO5: Sensitization, Ethics, and Responsibility	Project Management: PMBoK Framework Professional Practice & Training Project
6	PO6: Communication, Collaboration and Leadership	Project Management: PMBoK Framework Software Lab I - Design Management Tools
7	PO7: Lifelong Learning and Entrepreneurship	Project Management: PMBoK Framework Elective III - Specialized Management Areas Elective IV - Open Elective

<b>Sr.No.</b>	<b>Electives</b>	<b>Tentative Topics of Electives</b>
01	Elective-I [Sem-1]:	Technical Appraisal of Project. 1. Hospitality Projects 2. Industrial Projects 3. Healthcare Projects 4. Commercial/office Projects 5. Residential Projects
02	Elective-II [Sem-2]:	Functional Performance of Buildings 1. Envelope Performance and Energy efficiency optimization 2. Acoustic & Lighting Performance 3. Integrated Building Management System 4. Building Adaptation Techniques
03	Elective-III [Sem-3]	Specialized Management Areas 1. Project Finance Management 2. Project Risk Management 3. Health, Safety & Environment Management 4. BIM in Project Management. 5. Enterprise Resource Planning (ERP) 6. Facility planning, operation & management. 7. Human Resource management & Labour laws for Building Projects 8. Building bye-laws and compliance system in Building Projects 9. Real-estate management
04	Elective-IV [Sem-4]	Open Elective - Choice based - Interdisciplinary Elective

Individual colleges may offer the students one or more topics, depending upon the availability of experts and resource material. The colleges will have the opportunity to focus on one or more of the topics as decided by the institute.

## COURSE STRUCTURE

### Semester I - M. ARCH (DESIGN AND PROJECT MANAGEMENT)

Course Code	Course Title	Course Type	Contact Period (60 mins)	Teaching Scheme			Examination Scheme		
				Th/Week	St/Week	Credits	SS	SV	Marks
2026DPM101	Project Planning & Scheduling Studio	C	9	2	7	9	NA	250	250
2026DPM102	Construction Technology & Alternative Materials	SP1	3	2	1	3	100	NA	100
2026DPM103	Advanced Building Services	SP2	3	2	1	3	100	NA	100
2026DPM104	Elective-I (Technical Appraisal of Project.)	EL	3	1	2	3	100	NA	100
2026DPM105	Software Lab I : Design Management Tools	L	2	1	1	2	50	NA	50
	<b>Total</b>		<b>20</b>	<b>08</b>	<b>12</b>	<b>20</b>	<b>350</b>	<b>250</b>	<b>600</b>
	Human Rights #	Comp. E	1	1	0	1			

# The syllabus for the course titled 'Human Rights' will be as per SPPU.

### Semester II- M. ARCH (DESIGN AND PROJECT MANAGEMENT)

Course Code	Course Title	Course Type	Contact Period (60 mins)	Teaching Scheme			Examination Scheme		
				Th/Week	St/Week	Credits	SS	SV	Marks
2026DPM201	Design Development Process & Interface management Studio	C	9	2	7	9	NA	250	250
2026DPM202	Project management: PMBoK Framework	SP1	3	2	1	3	100	NA	100
2026DPM203	Project Procurement Management	SP2	3	2	1	3	100	NA	100
2026DPM204	Elective-II (Functional Performance of Buildings)	EL	3	1	2	3	100	NA	100
2026DPM205	Software-Lab II : Analytical Tools	L	2	1	1	2	50	NA	50
	<b>Total</b>		<b>20</b>	<b>08</b>	<b>12</b>	<b>20</b>	<b>350</b>	<b>250</b>	<b>600</b>
	Human Rights #	Comp. E	1	1	0	1			

# The syllabus for the course titled 'Human Rights' will be as per SPPU.

**Semester III- M. ARCH (DESIGN AND PROJECT MANAGEMENT)**

Course Code	Course Title	Course Type	Contact Period (60 mins)	Teaching Scheme			Examination Scheme		
				Th/Week	St/Week	Credits	SS	SV	Marks
2026DPM301	Project Cost & Contract Management Studio	C	9	2	7	9	NA	250	250
2026DPM302	Professional Practice & Training**	SP1	3	2	1	3	NA	100	100
2026DPM303	Quality Management Systems	SP2	3	2	1	3	100	NA	100
2026DPM304	Elective-III (Specialized Management Areas)	EL	3	1	2	3	100	NA	100
2019DPM305	Software-Lab III : AI in Project Management	L	2	1	1	2	50	NA	50
	<b>Total</b>		<b>20</b>	<b>08</b>	<b>12</b>	<b>20</b>	<b>250</b>	<b>350</b>	<b>600</b>
	Skill Development #	Comp. E	2	1	1	2			
	Introduction to Constitution of India #	Comp Add-on Audit Course	2	1	1	2			

\*\* Internship (professional training of minimum 40 working days) with an organization operating under AEC sector and offering/performing Project Management services, to be undertaken by each student as part of the course Professional Practice and Training, during intermediate time between 2nd & 3rd Semester, details of which are mentioned in the detailed syllabus. The assessment of the same will be held at the end of Semester III. The course will have both sessional and viva assessment

# The syllabus for the courses titled 'Skill Development' and 'Introduction to Constitution' will be as per SPPU.

**Semester IV- M. ARCH (DESIGN AND PROJECT MANAGEMENT)**

Course Code	Course Title	Course Type	Contact Period (60 mins)	Teaching Scheme			Examination Scheme		
				Th/Week	St/Week	Cre dits	SS	SV	Marks
2026DPM401	Project	C	17	3	14	17	NA	500	500
2026DPM402	Elective -IV *	EL	3	1	2	3	100	NA	100
	<b>Total</b>		<b>20</b>	<b>04</b>	<b>16</b>	<b>20</b>	<b>100</b>	<b>500</b>	<b>600</b>
	Skill Development #	Comp. E	2	1	1	2			

\* Elective-IV can be offered as an open elective- choice based-Interdisciplinary Elective. In case it is not possible to offer an open elective, colleges should offer any elective from the list of electives which the student has not undertaken in any previous semester.

- A 4-credit course on Cybersecurity can be completed in any Semester.
- The 12 mandatory credits (Human Rights-1+1, Skill Development 2+2, Cyber Security- 4, Introduction to Constitution - 2) as prescribed by the university will not be counted for calculation of SGPA and CGPA.
- # The details for courses titled 'Human Rights', 'Cyber security', 'Skill Development' and 'Introduction to Constitution' will be as per SPPU.

# **DETAILED SYLLABUS**

## **SEM I**

M.Arch DPM Draft Syllabus 2026

<b>COURSE TITLE: Project Planning &amp; Scheduling Studio</b>				
Course Code : 2026DPM101				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	2	Sessional	200	NA
Studio Periods per week	7	Viva/Oral	50	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>9</b>			
<b>Total Credits</b>	<b>9</b>	<b>Total Marks</b>	<b>250</b>	<b>NA</b>

### **COURSE DESCRIPTION:**

Real-estate projects are characterized by diverse and multidisciplinary work which needs to be planned and orchestrated by a Project Manager. This course introduces the practical application of project management principles in large-scale projects, with a focus on planning, sequencing, and coordination during design and construction stages. Through this course students will learn concepts of project management and develop skills to interpret scope of work, break-it into manageable tasks and schedule it for the project team. Through live case studies, the course builds skills in strategic decision-making, project scheduling, and resource optimization.

### **COURSE OBJECTIVES:**

This course aims to introduce students to the practical applications of project management principles in large-scale projects across various phases of a building project.

Emphasis is placed on understanding and applying planning strategies throughout the project lifecycle.

Students will engage with real project data such as drawings, soil reports, byelaws, and service layouts to develop a foundational understanding of project logic, sequencing, and coordination.

The course equips students with the ability to use project management tools and software (such as MS Project) to structure and visualize planning processes like Work Breakdown Structures (WBS), activity identification & sequencing, scheduling, milestone tracking, and resource allocation. Key concepts such as resource optimization, delay management, schedule optimization, and Earned Value Management (EVM) are explored in depth with a focus on schedule-based performance analysis. Students will develop skills in strategic decision-making to improve project efficiency.

### **BROAD COURSE OUTCOMES**

At the end of the course, the students are expected to:

1. Explain the fundamentals of Project Management and identify key components of building projects through the study of architectural, structural, and MEP drawings and documents.
2. Define the scope, formulate Work Breakdown Structures (WBS) and sequencing logic of a construction project based on site conditions, structural systems, and service requirements.
3. Determine the activities, durations, milestones, and resource requirements of a project through application of various estimating techniques to analyse time, productivity, and scheduling parameters.
4. Develop and optimize construction schedules as per the Project requirements, using an appropriate tool supporting integration of resource data, activity durations, and logical dependencies.
5. Apply techniques of monitoring progress and delay management through schedule compression techniques.

## **COURSE CONTENT:**

### **UNIT I**

Introduction to Project Management; Familiarisation with Building Projects through studies of project drawing & documents, and extracting information for group projects on:

(a) Project brief (b) Area usage: FAR / Area Statement (c) Bye laws (d) Soil Investigation  
(e) Architectural appraisal, Configuration of spaces, plans, sections, elevations, levels, landscaping etc.  
(f) Structural appraisal: Foundation system, Structural system, Details on structural members including sizes and material specifications (g) MEP appraisal: Conceptual drawings, SLDs, and actual drawings showing location of services. Interaction of MEP with other aspects of project in terms of sequencing, layout etc.

### **UNIT II**

Study of construction logic and its role in developing efficient planning systems for building projects. Methods to develop and compare construction sequences based on site conditions, structural systems, service requirements and available resources. Students will analyse strengths and weaknesses of different sequencing approaches. Introduction to the Work Breakdown Structure (WBS) as a tool to decompose the project into manageable work packages. Emphasis will be on strategic structuring of the WBS for effective coordination, sequencing, and scheduling. Developing and presenting WBS of respective projects as a hierarchy of deliverables that collectively constitute the project;

### **UNIT III - Project planning & scheduling**

Identification of Activities, Milestones and Construction Sequencing considering their relationships and inter-dependencies.

Estimate activity attributes such as duration and resources based on quantity of work and productivity data.

Determining activity durations through deterministic and probabilistic durations;

Concept of Parametric Estimating; Analogous Estimating (Top Down Estimating); Expert Judgement; Three Point Estimates etc.

### **UNIT IV**

The focus of this unit is on understanding the relationship between time and cost in scheduling decisions. Students will be introduced to concepts such as S-curves, utility curves, and basic time-cost trade-offs. Earned Value Management (EVM) will be introduced as a method to assess schedule performance and project progress. Students will learn to compute and interpret Planned Value, Actual Cost, Earned Value, and associated variances to support decision-making in project control.

### **UNIT V**

Resource and Material Management; Resource Histograms and Resource levelling; Developing resource histograms for projects; Achieve uniform resource allocation; Application of Multiple Resource Allocation Procedure, PACK method, Branch and Bound Method; Developing a revised resource-based schedule; Application of MS Project.

## **SESSIONAL WORK:**

Students will work in groups on live projects from the industry analyzing the KM's involved in project planning and scheduling for a given project.

Study of individual topics of assignment from literature and field, present ideas, validate the same with objective discussion and articulate. Each group shall have its own unique real life ongoing project for study. Groups are encouraged to have diverse projects so that peculiarities in specific projects are explored by entire class

## RECOMMENDED READINGS:

- PMBoK 6th Edition by PMI
- Prasanna Chandra- Projects: Planning, Analysis, Selection, Financing, Implementation and review
- P S Gahlot & B M Dhir. . Construction Planning & management. New Age International Limited.
- Charles Patrick, Pearson, (2012). Construction Project planning & Scheduling
- Kumar Neeraj Jha, Pearson, (2012). Construction Project Management Theory & practice
- Knutson, Schexnayder, Fiori, Mayo. Construction management Fundamentals. Tata McGraw.
- Chitkara. Construction Project Management Planning, Scheduling and Controlling. Tata McGraw

M.Arch DPM Draft Syllabus 2026

<b>COURSE TITLE: Construction Technology &amp; Alternative Materials</b>				
Course Code : 2026DPM102				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	2	Sessional	100	NA
Studio Periods per week	1	Viva/Oral	NA	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>3</b>			
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>100</b>	<b>NA</b>

### **COURSE DESCRIPTION:**

This course introduces students to contemporary construction technologies and alternative materials used in building projects. It explores foundations, superstructures, special concrete, steel fabrication, repair and retrofitting techniques, and the impact of environmental factors on structures. Emphasis is placed on material properties, alternatives, quality control, and codal provisions for safe and efficient construction. Through site and lab visits, assignments, and presentations on emerging technologies, students gain practical insights into selecting appropriate systems and materials for diverse building contexts.

### **COURSE OBJECTIVES:**

It aims to develop a conceptual awareness of various typologies of project with regards to impact of site context on structure of project, structural behaviour of building elements, selection of construction technology and its alternatives for various structure systems, selection of appropriate construction material with environmental impact consideration and the codes and standards as mandated by authorities

### **BROAD COURSE OUTCOMES**

At the end of the course, the students are expected to :

1. Understand the latest construction materials available in the industry and their key properties relevant to building performance.
2. Assess materials and technologies based on parameters such as durability, strength, aesthetics, and cost, and to understand the appropriate construction techniques required.
3. Explore advanced materials and construction systems used for different building components considering structural, thermal, and functional requirements.
4. Develop the ability to select sustainable and cost-effective material and technology options in response to specific design and site conditions.

### **COURSE CONTENT:**

#### **UNIT I**

Subsurface Soil Exploration. Planning considerations of foundation and superstructure systems for Multi-storeyed & tall buildings. Construction of basements and water proofing techniques. Landslide vulnerability; detailing of buildings including codal provisions; Technologies for seismic risk reduction.

#### **UNIT II**

Special concrete (High performance concrete, self-compacting concrete, impervious concrete, architectural finishes and aesthetic concrete), Alternative aggregates, Pre-cast, pre-stressed concrete and composite constructions. Quality Control laboratory facilities and processes, experimental investigations; In-situ tests on concrete (including Non – Destructive Testing), Field laboratory tests.

### **UNIT III**

Structural Steel Construction Fabrication and erection of steel structures; Mechanical Fasteners, Welding, Splicing, Clearances For Erection.

Reinforcing Steel: Types, Bending Placing Splicing, Re-bar technologies & jointing, Advancement in steel reinforcement.

### **UNIT IV**

Repair technologies and materials for strengthening and retrofitting for existing / distressed buildings,

Advancements in formwork systems – tunnel form, aluminium forms, slip forms, jump forms, flying forms, ganged forms, etc., temporary works and enabling works;

### **UNIT V**

Critical appraisal of emerging construction materials:

Smart/self-healing materials, and nano-engineered construction systems. Integration of digital fabrication techniques: 3D printing, modular/precast hybrid systems, and robotics in construction. Case studies on application of next-generation materials in high-rise and infrastructure projects. Research directions and global best practices in advanced materials.

### **SESSIONAL WORK:**

Students are required to prepare comprehensive notes or written assignments covering all topics outlined in the syllabus, ensuring thorough engagement with the subject matter. In addition, individual reports based on site and laboratory visits. To encourage awareness of contemporary practices, each student will also deliver a presentation on one advancement in building technology currently adopted in the construction industry.

### **RECOMMENDED READINGS:**

- Ghambhir M.L."Concrete Technology" Tata McGraw Hill education private Limited.
- A.R. Santhakumar, Concrete Technology, Oxford University Press.
- Building Materials, P.C. Varghese, Prentice-Hall India.
- Shetty, M. S., "Concrete Technology" S. Chand Publication.
- Krishnaraju .N., Advanced Concrete Technology, CBS Published.
- Materials Science and Engineering: An introduction, W.D. Callister, John Wiley.
- Nevile. A.M., Concrete Technology, Prentice Hall, New York
- Construction Technology: Analysis and Choice, 2ed,Bryan, Wiley India
- Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication
- Construction Equipment Planning and Applications – Dr. Mahesh Varma
- Journals / Magazines related to Construction technology, Structure Systems and Building Material Technology.
- Construction Technology by Roy Chudley and Roger Greeno, Prentice Hall, 2005

COURSE TITLE: <b>Advanced Building Services</b>				
Course Code : <b>2026DPM103</b>				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	2	Sessional	100	NA
Studio Periods per week	1	Viva/Oral	NA	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>3</b>			
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>100</b>	<b>NA</b>

### **COURSE DESCRIPTION:**

Building services are the enablers of any project's functionality, and must be integrated seamlessly with the Architectural design and Spatial planning. This course leverages the technical knowledge of building services that Architects possess and enhances it with added dimension of holistic understanding of design principles, inter-dependencies and relationship between different service disciplines, equipment & technology selection of the services (their spatial considerations and alternatives), and the standards and practices for optimized performance that balances the requirement of promoter, project team and end users.

### **COURSE OBJECTIVES:**

Equipping students with the knowledge and skills to evaluate design, plan, coordinate, and manage the core building services i.e. Water & Wastewater Systems, Electrical Systems, HVAC, and Fire Protection Systems.

Emphasizing on integrating these systems seamlessly within architectural spaces while evaluating both spatial and technological alternatives.

Critical examination of systems based on regulatory standards, availability of technology, ease of installation, usage, serviceability, longevity, performance efficiency, and cost-effectiveness, enabling them to make informed decisions in real-world project scenarios.

### **BROAD COURSE OUTCOMES**

At the end of the course, the students are expected to develop:

1. Ability to understand the building-service-engineering requirements of a real-estate project.
2. Ability to describe core-building service systems and their components
3. Ability to analyse and compare alternate technologies for efficiency in performance of buildings
4. Compare the practices as prescribed in national/ international codes & standards and Justify design and technology selection decisions

### **COURSE CONTENT:**

#### **UNIT I**

Water & Waste water systems

- a) Water supply systems - demand assessment, quality & quantity of various sources, on-premise treatment facility, underground & overhead storage, pumping, conveyance and distribution system, fittings & fixtures.
- b) Sanitation System - Sanitary fixtures, waste water & soil water conveyance - piping system, ICs & Manholes, Sewage Treatment Plant and Effluent Treatment Plant
- c) Measures for effective water management; Net zero water approach

## UNIT II

### Fire Protection System

- a) Fundamentals of fire behaviour & classification, Fire load & hazard assessment,
- b) Passive Fire Protection system - Fire Tower, Compartmentation, fire doors, fire resistant material & construction.
- c) Active Fire Protection System - detection & alarm system, suppression systems -Fire tanks & pump room, sprinklers, hydrants, gas-based suppression, portable extinguishers, smoke management system etc.
- d) Evacuation & Life Safety - egress route planning, lighting, signages, pressurization

## UNIT III

### Electrical Systems

- a) Overview of electrical systems - Power generation, transmission & distribution
- b) Project Demand assessment, On-premise sub-station for large scale development, cable/busbar distribution system & metering, system isolation & protection devices, emergency power & back-up systems.
- c) Earthing, Lighting Protection system,
- d) Managing demand, renewable sources, Net Zero Approach.
- e) ELV systems, Zoning and distribution strategies, Provisioning for scalability and future upgrades

## UNIT IV

- a) HVAC system types and components, Heating and cooling load determination, ventilation systems
- b) District cooling; Low energy cooling systems e.g., radiant cooling, evaporative cooling, ground earth cooling, Cogeneration systems

### SESSIONAL WORK:

Sessional work is to be carried out as per the interpretation of the course coordinator and faculty team.

Report on relevant Case Studies and Site Visits, that could be performed in groups. Students may undergo documentation and brainstorming exercises to evaluate appropriateness of design layout and proposed technology of services; for an existing case study project. Typology of each group's project could be distinct; highlighting uniqueness in requirement of the project.

### RECOMMENDED READINGS:

- Building Performance Analysis- Pieter de Wilde
- Building Services Design Management -Jackie Portman
- Building Services and Equipment: Volume 1,2, &3-F Hall
- Building Science: Concepts and Applications -Jens Pohl
- Building Services—S.M.Patil---(ISBN-978-81-7525-980-5), 1-C,102,Saamana Pariwar
- Building Maintenance Management, 2ed,---Chanter, Wiley India
- Maintenance of Buildings—A.C.Panchodhari—New Age International Publishers

<b>COURSE TITLE: Elective I (Technical Appraisal of Project)</b>				
Course Code : 2026DPM104				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	01	Sessional	100	NA
Studio Periods per week	02	Viva/Oral	NA	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>03</b>			
<b>Total Credits</b>	<b>03</b>	<b>Total Marks</b>	<b>100</b>	<b>NA</b>

### **COURSE DESCRIPTION:**

This elective enables students to technically appraise construction projects by analyzing design intent, technical specifications, construction methodologies, and building services within the framework of specific typologies. Emphasis is placed on compliance with national and international standards, as well as the integration of supporting infrastructure systems. The course fosters a critical understanding of the relationship between design decisions and functional aspects of construction projects, equipping students with evaluative skills essential for academic inquiry and professional growth.

### **COURSE OBJECTIVES:**

This course develops the ability to systematically document and technically appraise construction projects by analysing design intent, technical specifications, construction methodologies, and technological applications contextualised to the specific typology of the project.

The course also covers the study of basic minimum standards as per good practices and national/international codes, along with supporting infrastructure systems including water supply, sanitation, fire protection, and vertical transportation.

### **BROAD COURSE OUTCOMES**

At the end of the course, the students are expected to:

1. Understand the relationship between architectural design decisions (Construction & services) with respect to the ease of operations and maintenance for that typology of building project.
2. Appraise design and construction details of building projects considering the specific typology.
3. Analyze and assess supporting infrastructure systems such as water supply, sanitation, firefighting, and vertical transportation, with respect to building scale, occupancy, and typology.

### **COURSE CONTENT:**

Project Typology

1. Hospitality Projects
2. Industrial Projects
3. Healthcare Projects
4. Commercial / office Projects
5. Residential Projects

### **SESSIONAL WORK:**

Students are required to select a project under any of the mentioned typologies and conduct technical appraisal, examining design intent, construction details, and the integration of building services with reference to relevant codes and standards. The appraisal shall be documented in a comprehensive report supported by appropriate sketches, diagrams, and explanatory notes wherever necessary. The report should highlight the relationship between design decisions and supporting infrastructure systems. Each student must present their findings to the class through a structured presentation, demonstrating analytical clarity and critical insight.

**RECOMMENDED READINGS:**

- All books / Journals / Magazines / unpublished / published research / websites related to the typology / topic selected by the student and Institute.
- Assessing building performance by Wolfgang F. E. Preiser, Jacqueline Vischer – Elsevier.
- Enhancing Building Performance by Shauna Mallory-Hill, Wolfgang P. E. Preiser, Christopher G. Watson - John Wiley & Sons.

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COURSE TITLE: <b>Software-Lab I : Design Management Tools</b>				
Course Code : <b>2026DPM105</b>				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	1	Sessional	50	NA
Studio Periods per week	1	Viva/Oral	NA	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>2</b>			
<b>Total Credits</b>	<b>2</b>	<b>Total Marks</b>	<b>50</b>	<b>NA</b>

### **COURSE DESCRIPTION:**

Software-Lab I is focused on design management tools that are used for better workflow, access control, version control etc.

Along with introduction of BIM tools for modeling & coordination review, students will be introduced to managing documentation & information among key stakeholders -from preconstruction through construction phase of a project.

### **COURSE OBJECTIVES:**

Developing competence in using contemporary tools and methodologies for effective design management in architecture, engineering, and construction (AEC) projects.

Hands-on exposure to BIM-based coordination, communication and management tools, enabling them to enhance efficiency in the design development process.

### **BROAD COURSE OUTCOMES**

At the end of the course, the students are expected to develop:

1. Ability to select tool for management of design processes
2. Ability to coordinate development and review of information-rich project models using BIM tools.
3. Ability to develop and manage process workflow using tools.
4. Ability to select tools for coordination amongst key stakeholders through exchange of information using management tools.

### **COURSE CONTENT:**

#### **UNIT I**

Role of design management in the AEC industry, Importance of design coordination among consultants, clients and contractors.

#### **UNIT II**

BIM as a design management tool - BIM for coordination among architecture, structure, and MEP, Clash detection and resolution.

#### **UNIT III**

Cloud-based or on-premise centralized documentation and data management, workflow standardization.

#### **UNIT IV**

Communication & review tools - Task assignment, tracking, and design change logs, commenting and redlining

**SESSIONAL WORK:**

Sessional work is to be carried out as per the interpretation of the course coordinator and faculty team.

Report on hands-on exploration of tools and comments on evaluating and selecting computer applications for design management

**RECOMMENDED READINGS:**

- BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers (4th Edition), Rafael Sacks, Ghang Lee, Luciana Burdi, Marzia Bolpagni, 2025
- BIM and Construction Management: Proven Tools, Methods, and Workflows (2nd Edition), Wiley Publication
- The BIM Manager's Handbook: Guidance for Professionals in Architecture, Engineering, and Construction, Dominik Holzer, 2016 (1st edition)

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**DETAILED SYLLABUS**

**SEM II**

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COURSE TITLE: <b>Design Development Process &amp; Interface Management Studio</b>				
Course Code : <b>2026DPM201</b>				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	2	Sessional	200	NA
Studio Periods per week	7	Viva/Oral	50	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>9</b>			
<b>Total Credits</b>	<b>9</b>	<b>Total Marks</b>	<b>250</b>	<b>NA</b>

### **COURSE DESCRIPTION:**

This course strongly aligns with the responsibilities of a design coordinator or design manager. Along with managing the technical aspects, key responsibilities of this role is integration across various interfaces during Preconstruction & Construction stages of a project.

Studio will emphasize on the need for clear communication, robust coordination, and specialized software solutions to bridge informational and organizational boundaries between stakeholders

### **COURSE OBJECTIVES:**

Equipping students with the knowledge and skills to manage the complete lifecycle of design development in AEC projects

Exploring the challenges arising from fragmented teams, diverse specializations, and the unique demands of real-estate projects; challenges such as poor communication, change orders, and slow decision-making.

Learning to manage interfaces across stakeholders, control project information flows, and navigate statutory approvals while aligning design progress with construction schedules, cost objectives, and risk considerations.

### **BROAD COURSE OUTCOMES**

At the end of the course, the students are expected to:

1. Explain the relationship between business vision, financial goals, and project feasibility in the conceptualization of AEC projects.
2. Formulate comprehensive project briefs and design basis reports that align with organizational and project objectives.
3. Plan stage-wise design deliverables, stage gates, and schedules in alignment with pre-construction and construction timelines.
4. Assess statutory and regulatory requirements relevant to design management and integrate them into project workflows.
5. Conduct quality control checks for scope completeness, technical accuracy, interdisciplinary coordination, and compliance with codes and standards.
6. Manage project interfaces by identifying dependencies, coordinating stakeholders, and implementing a Common Data Environment for effective information exchange.

### **COURSE CONTENT:**

#### **UNIT I**

##### Project Conceptualization

- a) Business Vision, Financial Goals of organization, Brand aspirations, Business case of Project in terms of its value addition and feasibility analysis, Detailed project Report
- b) Project Briefing – formulation of design program and design basis report

## **UNIT II**

### Design Development Processes

- a) Design Sourcing: procurement strategy for design services & expertise
- b) Stages of Design development, criteria for stage gates, stage-wise deliverables
- c) Pre-construction process schedule and associated cost & risk management, Alignment with construction schedule
- d) Statutory and Regulatory approvals

## **UNIT III**

### Interface Management

- a) Identifying interfaces of design management in pre-construction & construction stage of a project
- b) Identifying information sources, Managing Project Information, timeline & dependencies
- c) Liaise among internal & external stakeholders, facilitation of design review & approvals, maintain and track design deliverables, change management, turnaround time for issue resolution
- d) Introducing the concept of Common Data Environment for transparency in information exchange.

## **UNIT IV**

### Design Quality Control & Quality Assurance

- a) Coordination review for quality control– Scope coverage, Technical Accuracy and syntax checks, Interdisciplinary coordination, codes & standards, documentation & issue control
- b) Introducing concepts of Quality Function Deployment, Design FMEA (Failure mode and Effect Analysis), Value Engineering, etc. in Design management.

## **SESSIONAL WORK:**

Sessional work is to be carried out as per the interpretation of the course coordinator and faculty team.

It is recommended to conduct assignments in groups and each group may have a live-project allotted to them. The discussions, explorations and managerial interventions could be documented in report format. Groups are encouraged to have diverse projects so that peculiarities in specific projects are explored by entire class

## **RECOMMENDED READINGS:**

- Design Management for Architects, Stephen Emmitt, Taylor & Francis Ltd
- Construction Communication, Stephen Emmitt & Christopher Gorse, Wiley-Blackwell, 2003
- Collaborative Design Management 1st Edition, Stephen Emmitt, Kirti Ruikar, 2013
- PMBoK 6th Edition, PMBoK 7th Edition & Agile Practice Guide, PMI
- Prasanna Chandra- Projects: Planning, Analysis, Selection, Financing, Implementation and review
- Building Services Design Management -Jackie Portman

<b>COURSE TITLE: Project Management: PMBoK Framework</b>				
Course Code : 2026DPM202				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	2	Sessional	100	NA
Studio Periods per week	1	Viva/Oral	NA	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>3</b>			
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>100</b>	<b>NA</b>

## COURSE DESCRIPTION

This course provides students with a foundational and applied understanding of project management in the context of design and construction. It introduces the principles, processes, and frameworks that guide projects across different delivery models, with emphasis on predictive, adaptive, and business analysis approaches. Students will gain insights into project life cycles, planning and scheduling, stakeholder roles, and the ethical dimensions of practice, enabling them to connect theoretical knowledge with the realities of professional project environments..

## COURSE OBJECTIVES

The course will be taken up through a combination of conceptual study, case-based learning, and applied exercises that simulate professional project scenarios. Students will explore predictive and adaptive methodologies, engage in planning and monitoring exercises across cost, schedule, risk, and quality dimensions, and examine intersections with business analysis for informed decision-making. Group projects, simulations, and reflective assignments will be integrated throughout the course to build competencies in leadership, communication, and problem-solving, thereby preparing students to work effectively within multi-disciplinary teams and complex project settings.

## COURSE OUTCOMES

At the end of the course, the students are expected to:

1. Discuss foundational understanding of project management frameworks, and recognize the relevance of the PMBoK
2. Use planning tools and techniques to organize project deliverables, resources, schedules, and risks.
3. Recognize the roles, responsibilities, and ethical considerations of project stakeholders and leaders in execution.
4. Employ predictive and adaptive approaches to manage project scope, quality, and communication.
5. Demonstrate effective problem-solving and collaboration practices that contribute to project success.

## COURSE CONTENT

The course is organized thematically across four interrelated domains of project management practice:

### UNIT I: Introduction to Project Management Frameworks

This unit introduces the concept of project management frameworks as structured sets of principles and practices that guide the planning and delivery of projects. Students study the Project Management Body of Knowledge (PMBOK® Guide) as a globally recognized standard that consolidates best practices across industries. PMBOK's purpose, evolution, and structure, emphasizing its principles and performance domains.

**UNIT II: Project Management Fundamentals and Core Concepts**

Exploration of project life cycles, project versus operations, and the relationship between projects, programs, and portfolios. Study of issues, risks, assumptions, and constraints, with emphasis on scope, ethics, and projects as vehicles for change.

**UNIT III: Predictive, Plan-Based Methodologies**

Examination of structured approaches to project management, including scheduling, critical path analysis, work breakdown structures, quality management, and integration planning. Application of project control measures for monitoring cost, time, and performance in traditional project settings.

**UNIT IV: Agile Frameworks and Adaptive Methodologies**

Introduction to adaptive project management approaches such as Scrum, Kanban, and scaled agile frameworks. Focus on iterative planning, backlog management, adaptive tracking, and stakeholder collaboration in dynamic environments.

**UNIT V: Business Analysis Frameworks**

Study of business analysis roles, acceptance criteria, stakeholder communication strategies, requirement-gathering methods, roadmaps, and validation techniques. Investigation of how methodologies influence business analysis processes and support product delivery.

**SESSIONAL WORK**

Students will engage in applied activities designed to connect theory with practice. They will examine real-world project scenarios through case discussions. Reflective assignments linking project management ethics and professional conduct to practice to be interpreted by the respective course coordinator and faculty team.

**RECOMMENDED READING**

- PMBoK 6th Edition by PMI
- Chitkara. Construction Project Management Planning, Scheduling and Controlling. Tata McGraw
- Process Groups: A Practice Guide (2022)The PMI Guide to Business Analysis (2017)
- Agile Practice Guide (2017) by PMI

<b>COURSE TITLE: Project Procurement Management</b>				
Course Code : 2026DPM203				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	02	Sessional	100	NA
Studio Periods per week	01	Viva/Oral	NA	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>03</b>			
<b>Total Credits</b>	<b>03</b>	<b>Total Marks</b>	<b>100</b>	<b>NA</b>

### **COURSE DESCRIPTION:**

This course introduces students to the principles and practices of project procurement and material management within the AEC industry. It covers procurement processes guided by international institutions, types of contracts, and tendering procedures. Students will learn about procurement of professional services, supply of equipment and materials, as well as fiscal, legal, and contractual aspects. Emphasis is also placed on material management strategies, inventory control, and supply chain management, enabling future professionals to make informed decisions that balance cost, quality, and efficiency.

### **COURSE OBJECTIVES:**

Providing an understanding of procurement processes, guidelines, and contractual frameworks in AEC projects.

Developing knowledge of professional services procurement, fee structures, and performance guarantees in both national and international contexts.

Equipping students with skills in material management, supply chain optimization, and inventory control for efficient project execution.

### **BROAD COURSE OUTCOMES:**

At the end of the course, the students are expected to:

1. Analyze procurement guidelines, tender documents, and bid evaluation processes for effective contract management.
2. Evaluate contractual and allied considerations in procurement of professional services, supplies, and equipment in construction projects.
3. Apply material management and supply chain strategies to ensure timely, cost-effective, and quality delivery of project resources.

### **COURSE CONTENT:**

#### **Unit 1**

Project procurement management process; Study of procurement guidelines of international institutions (e.g. World Bank, ADB); Type of contracts (EPC and other forms); Tender documents (RFP, RFQ); Pre-qualification of contractors; Evaluation of technical and financial bid proposals; Negotiation and award.

#### **Unit 2**

Contracts for procurement of professional services; Selection criterias of professionals for professional services (Design, Project Management services); Fee structures and contractual conditions; Joint ventures of professional teams (including equity in construction organizations in EPC / design build contracts); Norms for engagements of international Consultants; Performance guarantees; Bank guarantees.

### **Unit 3**

Procurement procedures for various supplies, equipment, machineries; Warranties and tax issues; Inspections, testing and release of payments; Fiscal aspects of supplies.

### **Unit 4**

Material Management; Scope, Objective and function of material management; Material classification; Procurement strategies and purchase procedures; Inventory control and management; Supply Chain Management.

### **SESSIONAL WORK:**

Students will work in groups on live projects from the industry.

Study of individual topics of assignment from literature and field, present ideas, validate the same with objective discussion and articulate.

Each group shall have its own unique real life ongoing project for study. Groups are encouraged to have diverse projects so that peculiarities in specific projects are explored by entire class

### **RECOMMENDED READINGS:**

- PMBOK by PMI
- Prasanna Chandra- Projects: Planning, Analysis, Selection, Financing, Implementation and review.
- S.Seetharaman Construction engineering and Management
- P S Gahlot & B M Dhir. . Construction Planning & management. New Age International Limited.
- Charles Patrick, Pearson, (2012). Construction Project planning & Scheduling
- Kumar Neeraj Jha, Pearson, (2012). Construction Project Management Theory & practice
- Knutson, Schexnayder, Fiori, Mayo. Construction management Fundamentals. Tata McGraw.
- Chitkara. Construction Project Management Planning, Scheduling and Controlling. Tata McGraw

<b>COURSE TITLE: Elective-II (Functional Performance of Buildings)</b>				
Course Code : 2026DPM204				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	01	Sessional	100	NA
Studio Periods per week	02	Viva/Oral	NA	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>03</b>			
<b>Total Credits</b>	<b>03</b>	<b>Total Marks</b>	<b>100</b>	<b>NA</b>

### **COURSE DESCRIPTION:**

The course aims to develop the ability to critically evaluate the functional performance of buildings in relation to thermal comfort, lighting, acoustics, security systems, and access control. It emphasizes the integration of design decisions with performance requirements in alignment with national and international codes and standards. Students will also be given a knowhow in the application of IT tools and simulation software for performance analysis, fostering analytical and managerial competence in building performance assessment

### **COURSE OBJECTIVES:**

The objective of the course is to develop competence in evaluating the functional performance of buildings in terms of their ability to satisfy functional needs and environmental requirements.

The course further aims to equip students with the knowledge and skills to make effective managerial decisions that ensure desirable performance in line with good practices and national/international codes and standards.

In addition, students will be introduced to the application of IT tools and software for performance analysis.

### **BROAD COURSE OUTCOMES:**

At the end of the course, the students are expected to:

1. Comprehend the integrated approach to design decisions.
2. Evaluate the functional performance of buildings with respect to its functional needs and environmental requirements
3. Interpret and apply national/international codes, standards, and best practices to ensure desirable building performance.
4. Formulate and justify managerial decisions to improve the functional performance of buildings.

### **COURSE CONTENT:**

The students can choose to work on any aspect of the topics mentioned below:

1. Envelope Performance and Energy efficiency optimization
2. Acoustic & Lighting Performance
3. Integrated Building Management System
4. Building Adaptation Techniques

Individual colleges may offer the students one or more topics, depending upon the availability of experts and resource material. Detailed syllabus for the topics will be finalized by individual colleges in consultation with expert faculty, considering the time and marks allotted to the course.

**SESSIONAL WORK:**

Students are required to undertake any one aspect of functional performance mentioned in the course content with reference to relevant codes and standards. The study shall be documented in a comprehensive report supported by appropriate sketches, diagrams, and explanatory notes wherever necessary. The report should highlight the relationship between design decisions and functional performance. Each student must present their findings to the class through a structured presentation, demonstrating analytical clarity and critical insight.

**RECOMMENDED READINGS:**

- All books / Journals / Magazines / unpublished / published research / websites related to the typology / topic selected by the student and Institute.
- Assessing building performance by Wolfgang F. E. Preiser, Jacqueline Vischer – Elsevier.
- Enhancing Building Performance by Shauna Mallory-Hill, Wolfgang P. E. Preiser, Christopher G. Watson - John Wiley & Sons.

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<b>COURSE TITLE: Software-Lab II : Analytical tools</b>				
Course Code : 2026DPM205				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	1	Sessional	50	NA
Studio Periods per week	1	Viva/Oral	NA	NA
<b>Total Contact Periods ( 60 min period) per week</b>	<b>2</b>			
<b>Total Credits</b>	<b>2</b>	<b>Total Marks</b>	<b>50</b>	<b>NA</b>

### **COURSE DESCRIPTION:**

This course aims to develop students' proficiency in applying statistical analysis tools for effective decision-making in project management. It enables students to conduct both quantitative and qualitative data analysis, interpret findings, and visualize results for clear communication with stakeholders.

### **COURSE OBJECTIVES:**

- Conveying the importance of statistical analysis for project managers in effective decision making
- Introducing tools used for organizing, transforming, analyzing and representing data

### **BROAD COURSE OUTCOMES**

At the end of the course, the students are expected to:

1. Explain the importance of statistical analysis for decision making
2. Apply descriptive and inferential statistical techniques to analyze AEC project data.
3. Utilize software tools (e.g., Advanced Excel, Power BI, or equivalent) to perform statistical calculations and visual analytics.

### **COURSE CONTENT:**

#### UNIT I

Introduction to Statistical Analysis in AEC Context

- a) Role of statistical analysis in design and project management
- b) Introduction to statistical analysis software tools such as MS Excel, SPSS, R-Package etc.

#### UNIT II

Qualitative Data Analysis

- a) Nature and sources of qualitative data in AEC projects
- b) Coding, categorizing, and thematic analysis
- c) Using software-assisted qualitative analysis

#### UNIT III

Quantitative Data Analysis

- a) Descriptive statistics: mean, median, mode, variance, standard deviation
- b) Inferential statistics: hypothesis testing, t-test, ANOVA, correlation, regression
- c) Using software-assisted quantitative analysis

#### UNIT IV

Data Visualization for Project Management

- a) Principles of Data extraction, Transformation, Modeling and Visualizing
- b) Creating charts, graphs, and pivot tables in tools such as Advanced MS Excel, Power BI etc.
- c) Dashboard creation using Power BI or equivalent BI tools

**SESSIONAL WORK:**

Sessional work is to be carried out as per the interpretation of the course coordinator and faculty team.

Report on hands-on exploration of statistical analysis & BI tools for data analysis and interpretation of results. The data must be reflective of building projects or research projects in the AEC domain.

**RECOMMENDED READINGS:**

- Dr. C. R. Kothari, 'Research Methodology: Methods and Trends' New Age International Publishers
- Deepak Chawla and Neena Sondhi, 'Research Methodology: concepts and cases' Vikas Publishing House Pvt. Ltd. (ISBN 978-81-259-5205-3)
- Sekaran, 'Research Methods for Business' Wiley, India.
- Dr. B. Gupta, 'Statistical Analysis' SBPD Publications, 2018
- Stefan Timmermans, Data Analysis in Qualitative Research: Theorizing With Abductive Analysis, 2022
- Irene Tobajas, Business Intelligence Essentials You Always Wanted to Know: A Beginner's Guide to BI Tools, Data Analytics Techniques, Data Visualization & Data-Driven Strategy, Vibrant Publishers, 2025
- Ramesh Sharda, Dursun Delen, Efraim Turban, Business Intelligence, Analytics, and Data Science: A Managerial Perspective, 4th Edition, Pearson Education, 2019

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