Estd. 1962
"A++" Accredited by NAAC (2021)
With CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR
416 004, MAHARASHTRA
PHONE : EPABX – 2609000, BOS Section – 0231-2609094, 2609487
Web : www.unishivaji.ac.in Email: bos@unishivaji.ac.in
शिवाजी विद्यापीठ, कोल्हापूर ४१६ ००४, महाराष्ट्र
दूरध्वनी - इपीबीएक्स - २०६०९०००, अभ्यासमंडळे विभाग : ०२३१- २६०९०९४. २६०९४८७
वेबसाईट : www.unishivaji.ac.in ईमेल : bos@unishivaji.ac.in

जा.क./शिवाजी.वि/अं.म./459 दिनांक:- ०६/११/२०२६

प्रति,

मा. संचालक / प्राचार्य,
सर्व संलग्नित आर्किटेक्चर महाविद्यालये,
शिवाजी विद्यापीठ, कोल्हापूर

विषय:- M. Arch. Part I अभ्यासक्रमातील किरकोळ दुरुस्तीबाबत.
संदर्भ:- एसयु/बीओएस/सायन्स-टेक/१७९ दि.१०/०६/२०२६

महोदय,

उपरोक्त संदर्भिय विषयास अनुसररुन आपणास आदेशान्वये कळविण्यात येते की, शैक्षणिक वर्ष २०२६-२७ पासून लागू करण्यात आलेल्या M. Arch. Part I अभ्यासक्रमामध्ये Rule No.8 Grading System for Passing Heads (Theory and External Viva) मध्ये तसेच सत्र १ मध्ये विषय Services Management - I या विषयामध्ये Viva Minimum Passing चे हेड इ. मध्ये किरकोळ दुरुस्ती करण्यात आलेली आहे.

सोबत सुधारीत अभ्यासक्रमाची प्रत जोडली आहे. तसेच विद्यापीठाच्या https://www.unishivaji.ac.in (NEP-2020@suk/ Online syllabus) या संकेस्थळावर ठेवण्यात आला आहे. सदर दुरुस्ती ही शैक्षणिक वर्ष २०२६-२७ पासून लागू राहील.

सदर अभ्यासक्रम सर्व संबधित विद्यार्थी व शिक्षकांच्या निदर्शनास आणून द्यावेत ही विनंती.

कळावे.

आपला विश्वासू,

उपकुलसचिव
अभ्यास मंडळे विभाग

सोबत - अभ्यासक्रमाची प्रत,
प्रत :- माहितीसाठी व पुढील योग्यत्या कार्यवाहीसाठी

मा. संचालक, परीक्षा व मुल्यमापन मंडळ	प्र. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा
अध्यक्ष, संबंधित अभ्यास/अस्थायी मंडळ	इतर परिक्षा ४ विभागास.
परीक्षक नियुक्ती ए व बी विभागास.	संलग्नता टी. १ व टी. २ विभागास
पीजी प्रवेश विभागास	पीजी सेमिनार विभागास
संगणक केंद्र / आयटी सेल	पात्रता विभागास

SHIVAJI UNIVERSITY, KOLHAPUR

Syllabus for

M. Arch. I & II

Architectural and Construction Project Management

(To be implemented from June, 2026 onwards)

MASTER OF ARCHITECTURE
(ARCHITECTURAL CONSTRUCTION AND PROJECT MANAGEMENT)
(M.ARCH.)

RULE NO. 1: ELIGIBILITY CRITERIA:

The student seeking admission to M.Arch. Course must have passed Bachelor's Examination in Architecture from recognized University securing minimum Second Class (min 50% marks and above, for grade equivalency refer to council of Architecture, India Norms). The admission will be based on the rules framed by the Council of Architecture competent authority from time to time.

Common Entrance Test (CET) will be conducted as per rules & regulations of Council of Architecture, New Delhi.

RULE NO. 2: SCHEME OF ASSESSMENT:

A candidate to be eligible for the Master's Degree in Architecture will be required to appear for and pass examinations as under:

1. First Year M.Arch. SEM I AND SEM II
2. Second Year M.Arch. SEM III AND SEM IV

RULE NO. 3: GRANTING OF TERM:

- Academic Year will consist of TWO SEMESTERS of 90 teaching days each Sessional work / assignments prepared by the students shall be continuously assessed by the Internal Teacher throughout the semester.
- The candidate will be permitted to appear for the examinations at the end of each semester only if he/she keeps term at a college affiliated to the university and produces testimonials from the Principal for,
- 75% attendance in each head of passing of Theory and / or Sessional work as prescribed by the university.
- Completion of the Sessional Work prescribed for each subject and secured at least 50% marks in the Internal Sessional & Oral Assessment.
- Good conduct.
-

RULE NO. 4 EXAMINATIONS

At each examination

- Theory paper
- Sessional and
- Sessional and viva-voce based on Sessional Work, as prescribed in the syllabus for the

  Examination at the end of the each Semester, shall constitute separate heads of passing.

RULE NO. 5 SESSIONAL WORK ASSESSMENT:

- In respect of Sessional work in First, second, third and Fourth semesters, target date shall be fixed for the completion of each assignment. All the assignments shall be continuously assessed by the Internal Teacher during each semester.
- For First, Second, Third and Fourth Semester examinations, Viva Assessment will be done by an External Examiner.

- An examiner for any of the subjects of examination from First to Third semester shall have minimum of 3 years of teaching/professional experience as per norms of Council of Architecture (COA).
- To qualify as an External Examiner at Fourth Semester, the examiner shall have a minimum of 5 years of teaching / professional experience.

RULE NO. 6 PRE-REQUISITES AND RULES OF A.T.K.T. FOR ADMISSION TO HIGHER CLASSESS:

- A student would be admitted to the third semester if he/she earns minimum 50 % credits of the total first and second semester.
- A student would be admitted to the fourth semester if he/she earns 100 % credits of the total first, second and third semester.
- A student would be awarded M.Arch only if he/she earns 100% credits and clears all the courses specified in the syllabus.
- If the student passes all heads of passing but if his aggregate is below 50%, student will have to appear for improvement with maximum four passing heads.

RULE NO. 7: CRITERIA FOR PASSING.

- To pass in each semester Examination a candidate must obtain minimum 45% marks in each subject and shall not be less than 50 % in aggregate.

RULE NO. 8: GRADING SYSTEM FOR PASSING HEADS (THEORY AND EXTERNAL VIVA)

	Semester Numbers	**Credits**
1	Semester 1	23
2	Semester 2	23
	Total credits for First Year B.Arch.	**46**
3	Semester 3	24
4	Semester 4	10
	Total credits	**80**

Grade	**Grade Points**	**% of Marks Obtained**	**Remarks**
O	10	90-100	Outstanding
A+	9	80-89	Very good
A	8	70-79	Good
B+	7	60-69	Fair
B	6	50-59	Average
C	5	45-49	Below average
F	0	Below 45	Fail

Table 2
GRADING SYSTEM FOR [INTERNAL SESSIONAL and AGGREGATE]

Grad	Grade Points	% of Marks Obtained	Remarks
O	10	90-100	Outstanding
A+	9	80-89	Very good
A	8	70-79	Good
B+	7	60-69	Fair
B	6	50-59	Average
F	0	Below 50	Fail

RESULT

Based on the performance of the student in the semester examinations, the Shivaji University will declare the results and issue the Semester grade sheets. The class shall be awarded to a student on the CGPA calculated in rule no. 10(3). The award of the class shall be as per the table no. 3 below.

The result of each Semester shall be declared as Pass or Fail. However, ATKT rules will be followed

AWARD OF CLASS AS PER TABLE NO. 3 BELOW:

Table 3

Grade	Grade Points	% of Marks Obtained	Remarks
O	10	90-100	Outstanding
A+	9	80-89	Very good
A	8	70-79	Good
B+	7	60-69	Fair
B	6	50-59	Average
F	0	Below 50	Fail

Marks Obtained	Numerical Grade (Grade Point)		CGPA	Letter Grade
Absent	0 (zero)		-	-
0 – 44	0 (zero)		0.0 – 4.99	F (Fail)
45 – 49	5		5.00 – 5.49	C
50 – 59	6		5.50 – 6.49	B
60 – 69	7		6.50 – 7.49	B+
70 – 79	8		7.50 – 8.49	A
80 – 89	9		8.50 – 9.49	A+
90 – 100	10		9.50 – 10.0	O (Outstanding)

Note:
1. Marks obtained > = 0.5 shall be rounded off to next higher digit.
2. The SGPA & CGPA shall be rounded off to 2 decimal points.

Calculation of SGPA & CGPA

1. Semester Grade Point Average **(SGPA)**

$$SGPA = \frac{\sum (\text{Course credits} \times \text{Grade points obtained}) \text{ of a Semester}}{\sum (\text{Course credits}) \text{ of respective Semester}}$$

2. Cumulative Grade Point Average **(CGPA)**

$$CGPA = \frac{\sum (\text{Total credits of a Semester} \times \text{SGPA of respective Semester}) \text{ of all Semesters}}{\sum (\text{Total course credits}) \text{ of all Semesters}}$$

For example : Suppose in a given semester a student has registered for five courses having credits C1, C2, C3, C4, C5 and his / her grade points in those courses are G1, G2, G3, G4, G5 respectively,

Then the SGPA would be

$$SGPA = \frac{C1G1 + C2G2 + C3G3 + C4G4 + C5G5}{C1 + C2 + C3 + C4 + C5}$$

RULE NO. 9: DURATION OF COURSE:

Students should have to complete the course within 5 years from admission date.

ABBREVIATIONS:

PC = Professional Core Courses

BC & AE = Building Science and Applied Engineering

PAEC = Professional Ability Enhancement Courses

PE = Professional Electives

SEC = Skill Enhancement Courses

SUMMARY OF TEACHING AND EXAMINATION SCHEME:

Course	Subject	TEACHING SCHEME						EXAMINATION SCHEME (marks)								
		THEORY			STUDIO											
		CREDISTS	No. of Lectures	Hours	CREDISTS	No. of Studios.	Hours	Paper	Min.	Hours	Sessional	Min.	Viva	Minimum.	Total	Total Credits
Semester I																
PC 101	Advanced Construction Technology-I	2	2	2	2	2	2	100	45	3	50	25	-	-	150	04
PC 102	Research Methodology	1	1	1	2	2	2	-			50	25	-	-	50	03
PC 103	* Project Management – I	3	3	3	3	3	3	100	45	3	100	50	100	45	300	06
PAEC 104	Information Technology in Management	2	2	2	1	1	1	-			50	25			50	03
BS&AE 105	* Services Management -I	2	2	2	2	2	2	100	45	3	50	25	50	23	200	04
PC 106	Operation Research	2	2	2	1	2	2	100	45	3	100	50	-		200	03
		12	**12**	**12**	**11**	**12**	**12**	**400**			**400**		**150**		**950**	**23**
Semester II																
PC 201	Advanced Construction Technology – II	2	2	2	2	2	2	100	45	-	50	25	-	-	150	04
PC 202	*Project Management – II	3	3	3	3	3	3	100	45	-	100	50	100	45	300	06
PAEC 203	Business Development & Project Marketing	2	2	2	-	-	-	-	-	-	50	25	-	-	50	02
PE 204	Integrated Energy Conservation in Construction	2	2	2	2	2	2	100	45	-	50	25	-	-	150	04
BS&AE 205	*Services Management - II	2	2	2	2	2	2	100	45	-	50	25	50	23	200	04
PC 206	Dissertation Stage – I	1	1	1	3	3	3	-	-	-	100	50	-	-	100	03
		12	**12**	**12**	**11**	**12**	**12**	**400**			**400**		**150**		**950**	**23**

Course	Subject	TEACHING SCHEME						EXAMINATION SCHEME (marks)								
		THEORY			STUDIO											
		CREDISTS	No. of Lectures	Hours	CREDISTS	No. of Studios.	Hours	Paper	Min.	Hours	Sessional	Min.	Viva	Minimum.	Total	Total Credits
Semester III																
PC 301	*Project Management – III	2	2	2	4	4	4	100	45	3	100	50	100.	45	300	06
BS&AE 302	Laws & Legal Aspects in Project Management.	2	2	2	2	2	2	100	45	3	50	25			150	04
PAEC 303	Real Estate Management	2	2	2	-	-	-	-			50	25	50	23	100	02
PE 01 304	Quality & Safety Management	2	2	2	-	-	-	-			50	25	50	23	100	02
PC 305	Project Finance Management	2	2	2	2	2	2	100	45	3	50	25			150	04
SEC 306	Elective – I	2	2	2	1	1	1				50	25	50	23	100	03
SEC 307	Elective – II (Practical Training)	-	-	-	3	-					100	50			100	03
		12	**12**	**12**	**12**	**9**	**9**	**300**			**450**		**250**		**1000**	**24**
SEMESTER IV																
PC 401	Dissertation Stage – II	2	2	2	6	6	6	-			**250**	**125**	**250**	**113**	**500**	**10**
															Total no of credits = 80	

The Weightage in terms of Credits are as per Council of Architecture
*Theory paper & External Viva – combined passing
** Practical training is to be undertaken and completed during the vacation after Sem II

SEMERTER -I

Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
PC-101	**Advanced Construction Technology – I**	2	2	4	100	50	--	150	04

Advanced Construction Technology – I

Aim:
To give a coverage on aspects of construction technologies related to building projects, the understanding of which are essential for the construction manager.

Course Objectives:
The objectives of this course are to:
1. To provide comprehensive coverage of advanced construction technologies related to building projects, enabling construction managers to understand planning, execution, and management aspects effectively.
2. To develop an understanding of geotechnical aspects and foundation systems for different soil conditions.
3. To familiarise students with modern techniques in basement, tunnel, pile, and formwork construction.
4. To introduce advanced concrete technologies and construction chemicals used in practice.
5. To develop analytical and practical skills through laboratory work, studio exercises, and site exposure.

Course Outcomes (COs):
CO-1. To equip students with the ability to analyze soil characteristics and geotechnical conditions for selecting appropriate foundation systems.
CO-2. To equip students with the knowledge to explain basement construction methods, earth retention systems, and waterproofing techniques used in building projects.
CO-3. To equip students with an understanding of the basic principles, construction methods, and safety requirements involved in tunnel construction.
CO-4. To equip students with the ability to apply advanced concrete technologies in modern building construction practices. To equip students with the competence to identify, evaluate, and compare modern formwork systems with respect to safety, economy, and efficiency.
CO-5. To equip students with an understanding of the role and application of construction chemicals in enhancing the durability, repair, and rehabilitation of structures. To equip students with the ability to perform laboratory and field tests, interpret results, and assess construction quality effectively.

Course Content:
The course coverage includes the following:
Unit 1: **Substructure** (15%)
Geotechnical aspects, Soil characteristics and behaviors, Soil/ground improvement techniques, Planning and design considerations of foundation systems
Unit 2: Basement Construction (20%)
Methods of basement construction, Earth retention systems, Waterproofing systems and techniques,

Drainage considerations

Unit 3: Tunnel Construction (20%)

Types of tunnels**,** Tunnel construction methods**,** Equipment used in tunnelling**,** Safety and support systems

Unit 4: Concrete Technology (25%)

Advanced concrete materials**,** Spectrum of concretes and special concretes**,** Properties of concrete in fresh and hardened states**,** Methods of concrete production, transportation, placing, compaction, and curing**,** Joints in concrete structures: types, detailing, and functional requirements**,** Quality control and quality assurance in concrete construction**,** Precast concrete construction systems**,** Prestressed concrete construction: principles and applications

Unit 5: Pile Construction (05%)

Types of piles and pile foundations**,** Pile construction methods**,** Practical applications

Unit 6: Advanced Formwork (10%)

Types of modern formwork systems, Selection criteria and advantages, Safety and economy considerations

Unit 7: Construction Chemicals (05%)

Admixtures and additives: types, properties, and applications**,** Waterproofing chemicals for building construction**,** Materials for repair, retrofitting, and rehabilitation of structures**,** Application techniques**,** Market survey and comparative study of commercially available construction chemicals

Laboratory Work:

Experimental investigations; Non – Destructive Testing Techniques, In-situ and other field tests

Studio Exercises:

The studio program includes preparation of assignments based on the above Units in a structured question-and-answer format along with digital presentations, conducting soil investigation work for a selected building project, planning, design, and costing of an appropriate foundation system for a specific case study, undertaking foundation studies of building projects with emphasis on selection and construction methodology, and organizing site visits related to concrete technology covering materials, construction practices, and quality control, supported by detailed reports.

References Books: -

1. Construction Technology: Analysis and Choice, 2nd Edition – Bryan, Wiley India
2. Construction Planning, Equipment and Methods – Peurifoy, Tata McGraw Hill
3. Construction Equipment Planning and Applications – Dr. Mahesh Varma
4. Brochures published by various agencies associated with construction
5. Journals: CE & CR, Construction World, International Construction
6. Documented reports of actual major construction work
7. Construction Technology – Roy Chudley and Roger Greeno, Prentice Hall, 2005
8. Handbook dock and tunnel engineering TWENTY-FIRST -
9. R. Srinivasan
10. Prestressed concrete, THIRD ED. - N. KRISHNA RAJU
11. Soil mechanics and foundation engineering -K.R. ARORA
12. Concrete technology theory and practice -SHETTY M. S.

Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
PC-102	**Research Methodology**	Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
		1	2	3	-	50	-	50	03

Research Methodology

Aim:

To develop students' ability to understand research fundamentals and apply scientific methods for formulating problems, designing proposals, collecting and analyzing data, and communicating research findings ethically and effectively.

Course Objectives: -

1. To provide a clear understanding of research fundamentals, problem identification, and hypothesis formulation.
2. To develop skills in preparing research proposals and conducting effective literature reviews.
3. To train students in data collection, measurement, sampling, and statistical analysis techniques.
4. To enhance abilities in research documentation, report writing, presentation, publication, and ethical practices.

Course Outcomes (COs)

After completion of the course, students will be able to:

CO1: Research concepts and be able to identify and formulate suitable research problems.

CO2: Prepare structured research proposals and conduct comprehensive literature surveys.

CO3: Apply appropriate data collection methods and perform basic to advanced data analysis.

CO4: Produce well-structured research reports and effectively present and publish their research ethically.

Course Content:

Unit-1: (10 %)

Introduction to Research, meaning of research, types of research, process of research, Sources of research problem, Criteria / Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem, formulation of research hypotheses. Search for causation.

Unit-2: (10 %)

Developing a Research Proposal Format of research proposal, Individual research proposal, Institutional research proposal, Significance, objectives, methodology, Funding for the proposal, Different funding agencies.

Framework for the planning.

Unit-3: (10 %)

Literature survey- Definition of literature and literature survey, need of literature survey, sources of literature, elements and objectives of literature survey, styles of literature survey, and strategies of literature survey.

Unit-4: (10 %)

Data collection, Measuring, Sampling and Scaling—Classification of data, benefits and drawbacks of data.

Unit-5: (10 %)

Preliminary data analysis- Testing of hypothesis- concepts and testing, analysis of variance techniques,

introduction to non-parametric tests. Validity and reliability, Approaches to qualitative and quantitative data analysis.

Unit-6: (10 %)

Report writing—Need of effective documentation, importance of report writing, types of reports, report structure, report formulation, Plagiarism.

Unit-7: (40 %)

Presentation of research---Research briefing, presentation styles, impact of presentation, elements of effective presentation, writing of research paper, presenting and publishing paper, patent procedure

Studio Exercises:

The progress of the research work is presented and discussed by the student periodically in the classroom environment and progress monitored continuously. This, develops comprehension and presentation skills of the students. The chosen topic may be further extended with additional scope of study in the third semester or taken up for thesis work in the final semester. The students are also encouraged to seek guidance from the experts in the related fields.

Reference books:

Research Methodology: concepts and cases—Deepak Chawla and Neena Sondhi, Vikas Publishing House Pvt. Ltd. (ISBN 978-81-259-5205-3)

Research Methodology: Methods and Trends', by Dr. C. R. Kothari

Research Methodology: An Introduction' by Wayne Goddard and Stuart Melville

Research Methodology: A Step-by-Step Guide for Beginners', by Ranjit Kumar

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Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
PC-103	**Project Management-I**	3	3	6	100	100	100	300	06

Project Management-I

Aim:

*The aim of the subject **Project Management**-I is to equip M. Arch. students with comprehensive knowledge and practical skills to plan, manage, and deliver architectural and construction projects effectively. The subject focuses on integrating managerial principles with architectural practice to ensure projects are completed **on time, within budget, and to the desired quality standards**, while addressing technical, contractual, environmental, and stakeholder-related challenges in sustainable way.*

Course Objectives: -

1. To understand the role and responsibilities of project managers in construction projects
2. To familiarize students with project life cycle stages in architecture and construction
3. To develop skills in project planning, scheduling, and resource management
4. To introduce basic cost, time, quality, and risk management concepts
5. To enhance decision-making and coordination skills in multidisciplinary projects

Course Outcomes (COs)

After completion of the course, students will be able to:
CO1: Explain fundamental concepts, principles, and processes of project management in construction
CO2: Identify and analyse project life cycle stages and stakeholder roles
CO3: Apply project planning and scheduling techniques for architectural projects
CO4: Understand basic cost estimation, budgeting, and resource allocation methods
CO5: Recognize risks, quality parameters, and control measures in construction projects

Course Content:

Unit-1: (20%)
Basics of Management:
Definition, history, elements project, project life cycle and various management functions and styles
Unit-2: (15%)
Construction Project Management:
Construction project, importance, Indian construction industry, project management and its relevance with construction, stakeholders, role and responsibilities of project Manager, Role of Project Management Consultants
Unit-3: (20%)
Project planning:
Types of plans, work breakdown structure, planning techniques, bar chart, network diagram, program evaluation and review technique (PERT), critical path method (CPM), ladder network, precedence network, the line of balance (LOB) and network technique advantages.
Unit-4: (15%)
Project scheduling:
Resources, resource levelling and allocation, importance of scheduling, other schedule derived from project schedule, network crashing and cost time trade-off.

Unit-5: (05%)
Project resource management:
All types of resources required for Project Management.
Unit-6: (10%)
Human resource management:
Concepts of organizational and individual behavior; Perception and attitudes; Motivation concepts and processes; Group behavior and teams; Communication process and information management; Conflict management; Leadership; Nature of organizations; Organizational development; Principles of organization structure; Human resource policies & practices; Selection, training and assessment; Performance Appraisal; Training need assessment and dissemination of training; Participative management; HRM trends; Philosophies of values, morals and ethics; Societal responsibilities and good citizenry. Good practices and managerial responsibilities.
Manpower estimation for company and for projects. Methods and procedures of estimation at the tender stage and detailed work out at execution stage, risk due to lead time under of over manning.
Understanding workers and supervisors in their socio-cultural milieu. Flex I labour force, flex i wage and flex I work.
Methods of recruitment, selection, placement, training, financial compensation discipline, separation etc. in employing and retaining engineers, managers.
Personnel office at the head office and at the project site. Role, its functions, status, and relationship with other departments. Personnel office records and procedures. Grievances handling and inquiry procedure.
Unit-7: (10%)
Material management:
Study of various new and emerging building materials with regards to composition, physical and chemical properties and characteristics, durability and performance requirements, inspection and testing procedures, construction specifications and working details. Study of performance of new materials in live case studies. Exposure to various provisions of Bureau of Indian Standards and other national standards like British standards, ASTM standards etc. Good practices and managerial responsibilities. Material handling at site, inventory management, ABC analysis of materials for procurement.
Unit-8: (05%)
Machinery management:
Importance and role in construction, various types of machinery used in construction, earth moving, pile driving, road construction, concrete placing, materials handling, off site and on-site fabrication and repairs, mechanical and electrical equipment installation, tunneling, etc. their techniques, performance characteristics in relation to the jobs in hand. Equipment hires – purchase, their depreciation, salvage value calculation and planning for the equipment for a given project.

Studio Exercises:
Project management:
Familiarization with the building projects Conceptualize Construction Logic
Work breakdown Structure
Identification of activities, Milestones and construction sequencing Calculation of quantities, cost and productivity data
Time calculation of AON-PERT Network. Cost on Time Graph and Crashing.
Resource Histograms and Resource Leveling.
Human resource, material and machinery management:
Exercises on all the above respective topics.

Reference book:

Project Management Reference Books:

1.) Construction project management planning scheduling controlling twelfth ed.- k.k. Chitkara
2.) Project Management - A Problem Based Approach-Bennett
3.) Gething started in project management- Martin paula/ tate Karen
4.) Construction project management- Frederick Gould Nancy joyce
5.) Project management of complex and Embedded Systems Ensuring Product Integrity and Program Quality-Kim H Pries
6.) Project Management Theory and Practices-Gary L Richardson
7.) Principles of construction management second ed.
8.) Site management for construction projects- Vanvari Vinod / Kirty Dave
9.) PERT and CPM principles and applications third ed.- Srinath l.s.
10.) Organization behavior- Shajahan

Materials Management Reference Books:

1. Materials Management, P. Gopalkrishnan, Prentice Hall
2. Handbook of materials management, P. Gopalkrishnan, Sundershan, Prentice Hall.
3. Inventory Management, L.C. Jhamb, Everest Publ.
4. Purchasing and Inventory Control- by K. S. Menon, Wheeler Publication.

Human Resource Management Reference Books

1. Human Resource Management by Biswajeet Pattanayak
2. Managing Human Resources by Bohlander& Snell
3. Personnel Management' by Monappa A. – Tata McGraw Hill, new delhi.1997

Harvard Business Review, "Appraising Performance Appraisal," Tata McGraw Hill

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Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
PAEC-104	**Information Technology in Management**	2	1	3		50	--	50	03

Information Technology in management

Aim:

Computing and communication technology, commonly known as Information Technology (IT) has been radically transforming the way we live, learn and play. A large number of software packages are available to all disciplines of architectural construction management teams at every stage of the project process. These applications can be grouped in the following Units.

Course Objectives: -

The objectives of this course are to:

1. Introduce the role of Information Technology in architectural design, construction, and project management.
2. Familiarize students with computer-aided design, visualization, and building engineering application software.
3. Develop competence in using computer-based tools for cost estimation, planning, scheduling, and site management.
4. Provide understanding of computer-aided facility management systems and lifecycle management of buildings.
5. Expose students to business, information, and data management systems used in the construction industry. Develop practical skills through hands-on studio exercises and case studies using relevant software applications.

Course Outcomes (COs)

On successful completion of the course, the student will be able to:

CO-1. Ability to use IT tools in planning, designing, and managing construction projects

CO-2. Competence in preparing WBS, schedules, and cost estimates using project management software

CO-3. Understanding of information management systems in construction practice

Course Content:

The course coverage includes the following:

Unit 1: (10%)

Computer-Aided Design and Visualization

CAD systems and applications, 2D drafting and 3D modeling, Visualization techniques for architectural and construction projects., Introduction to BIM concepts

Unit 2: (10%)

Building Engineering Applications

Structural analysis and design software

Unit 3: (30%)

Computer-Aided Cost Estimation

Quantity take-off software, Digital measurement techniques, Rate analysis and cost databases, Preparation of detailed estimates using software

Unit 4: (40%)

Planning, Scheduling, and Site Management

Project planning techniques and methodologies, Development of Work Breakdown Structure (WBS),

Preparation of Gantt charts and network schedules, Resource allocation, resource levelling, and optimization, Project monitoring, updating, and tracking using MS Project, Preparation and interpretation of project outputs: Gantt charts, task sheets, resource sheets, and visual reports

Unit 5: (05%)

Computer-Aided Facility Management

Software tools for operation and maintenance

Unit 6: (05%)

Business and Information Management

Construction business information systems, Database management systems (DBMS), Basics of computer networking, Information flow and documentation control in construction projects

Studio Exercises:

Studio exercises are designed to illustrate theoretical concepts through model case studies and problem-based learning, with extensive hands-on experience using computers and relevant software.

Practical Components

Selection of a construction project

Project quantification and preparation of detailed estimates

Preparation of Work Breakdown Structure (WBS)

Strategic breakdown of project into work packages

Identification of appropriate WBS approach considering coordination, time, and cost efficiency

Development and presentation of WBS

Implementation of WBS in MS-Project

Preparation of:

- Gantt Charts
- Resource Sheets
- Project schedules with logical linkages

Project tracking and progress monitoring using MS-Project.

Reference Books: -

1. Construction project management planning scheduling controlling twelfth ed.-K.K. Chitkara
2. M.S. Project Handbook
3. Information Technology Management- S, Srinivasan
4. Integrated Project Management- Hall Juliane Johnson Prenticehal

Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
BS & AE-105	**Service Management I**	2	2	4	100	50	50	200	04

Service Management -I

Aim:

The subject provide exposure to management aspect of planning design execution and operating of services on building campus and township level.

Course Objectives:

1. Understand the role of services management in successful planning, design, execution, and operation of buildings, campuses, and townships.
2. Analyze planning and design strategies for efficient, sustainable, and code-compliant service infrastructure at multiple scales.
3. Integrate sustainability, energy efficiency, and resilience principles in the management of building services.
4. Apply project management tools for scheduling, cost control, risk management, and coordination of services in complex projects.

Course Outcomes (COs)

After completion of the course, students will be able to:

CO1: Apply advanced knowledge of architecture, building technology, and project management principles.

CO2: Integrate multidisciplinary services and coordinate with stakeholders for effective project delivery.

CO3: Demonstrate professional, ethical, and leadership skills in architectural and project management practice.

CO4: Apply sustainability, energy efficiency, safety, and regulatory compliance in built environment projects.

Course Content:

Unit-1: (30%)

Water supply

Water demand for construction and project operation for life span, quantity and quality.

Sources of water supply, quantity, quality, reliability, ownership, authority right.

Temporary and permanent arrangement, cost of water.

Water facility, materials, land acquisition issues, construction materials.

Co-ordination of water supply construction materials at site with other agencies at site.

Hot water need, cost, energy, systems

Measures for effective water management; Net zero water approach.

Unit-2: (25%)

Sanitary and drainage

Problems of drainage, problems of terrain, waterbody pollution, drainage as asset, recycling

Rainwater drainage, storage, use

Construction for above, materials, co-ordination at site with other agencies

Unit-3: (20%)

Waste disposal

Waste generation, norms, collection system, disposal system, bye product. Management of collection, awareness

Unit-4: (15%)

Electricity

Generation, co-generation, net metering, HT, LT, low voltage, load sanctions.
Sub-station, installation erecting, management, maintenance, supply problem in rural area, stand by system.
Materials, fittings fixtures facilities.
Co-ordination of electric work with other contractors.
Net zero approach

Unit-5: (10%)

Lifts escalators

Lifts, travellators, escalators need, planning, installation and maintenance.

Studio Exercises:

Students will work on case studies and different site visits to understand the design and integration of the services in building projects and present this in a form of a report.
Market Study of equipment and technologies for each unit.

Reference books:

Building Services Design Management -Jackie Portman
Building Services and Equipment: Volume 1,2, &3-F Hall
Building Services—S. M. Patil---(ISBN-978-81-7525-980-5), 1-C,102, Saamana Pariwar
Building Maintenance Management, 2ed, Chanter, Wiley India
Building Science: Concepts and Applications -Jens Pohl

Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
PC-106	**Operations Research**	2	2	4	100	100	-	200	03

Operations Research

Aim:

To make informed, systematic, and rational decisions by applying operational research techniques and deterministic decision models to planning, scheduling, and managing architectural and construction projects effectively.

Course Objectives:

1. To equip the students in decision making through operational research techniques
2. To introduce various deterministic decision models

Course Outcomes (COs):

After completion of the course, students will be able to:
CO1: Analyze the data available for decision making.
CO2: Solve various managerial decision problems in functional areas of organization.

Course Content:

Unit-1: (25%)

Introduction to Operations Research (OR)

Historical Development, Characteristic features of OR, Models in OR, Methods for solving OR models, Methodology of OR, Opportunities and short comings of OR, Introduction to software's in OR. Linear Programming (LP)-I: Mathematical Formulation, Assumptions of LP, Solution by Graphical Method, Special Cases of LP, Solution by Simplex Method-Maximization Problem with less than or equal to constraints, Primal Dual Relationship.

Unit -2: (25%)

Transportation & Assignment Problem

Mathematical model of TP, Methods to find initial basic feasible solution (Least Cost Method, Vogel's Approximation Method), Finding Optimal Solution by Modified Distribution Method, Unbalanced transportation problem, Maximization Case of TP. Comparison between Assignment & Transportation Problem, Mathematical model of AP, Hungarian Assignment Method, Solving Minimization-Maximization Problem

Unit -3: (25%)

Decision Theory

Decision under certainty, Decision under risk, expected value criterion, Decision under uncertainty, Laplace criterion, Maxi Max Criterion, Maxi Min Criterion, Mini Max criterion, Mini Max regret criterion, Decision Making Under Expected Value Principle, Expected Payoff of Perfect Information, Expected Value of Perfect Information (EPPI-EMV-EVPI), Decision making under conflict,

Game Theory:

Introduction to game theory-Terminologies, Game with pure strategies, Game with mixed strategies, Dominance properties, Solving Game by Graphical Method.

Unit -4: (25%)

Queuing:

General structure of a queuing system, Operating characteristics of a queuing system, Kendall's Notations for representing models, Classification of queuing models (M/M/l): (/ FCFS),

Simulation:
Definition, Steps in simulation process, Monte Carlo simulation, Simulation of an inventory system, simulation of a queuing system. Advantages and Disadvantages of simulation

Note:

1. Case Studies on Each of the Aspects Mentioned in the Syllabus need to be discussed.
2. Video cases and Documentary Films relating to the syllabus to be exhibited in the class

Text Books:

1. Sharma J K, Operations Research
2. Sharma S D, Operations Research

Reference books:

1. N.D. Vohra: Quantitative Techniques in Management (1990), Tata MacGraw Hill
2. R. Panneerselvam: Operations Research (2002), Prentice Hall of India.
3. J.K. Sharma: Operations Research Problems and Solutions (2004), Macmillan India.
4. J.G. Ecker and Michael Kupferschmid: Introduction to Operations Research (1988), John Wiley & Sons.
5. Hamdy A. Taha: Operations Research (2002), Pearson Education.

Journals

1. IUP Journal of Operations Management
2. Journal of Operations & Strategic Planning (New)
3. Vikalpa: The Journal for Decision Makers

Websites

1. http://www.pondiuni.edu.in/storage/dde/downloads/mbaii_qt.pdf

Supplementary Reading

1. Albright, Winston, Zappe, Decision Making Using Microsoft Excel, Cengage Learning.

Practical Component

1. Analyzing various decision situations and finding appropriate model for taking decisions.
2. Analyzing real managerial decision problems through various case studies/problems.
3. Identifying various managerial decision situations related to different business organization.

SEMESTER-II

Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
PC-201	**Advanced Construction Technology –II**	2	2	4	100	50	--	150	04

Advanced Construction Technology – II

Aim:

The aim of this course is to introduce fundamental concepts of structural systems and design process methodologies in relation to architectural and building services systems in building projects. The course enables learners to understand the integration of structural systems with architectural design and services planning, facilitating informed selection of appropriate structural systems. It also provides a comprehensive understanding of the design process and structural detailing aspects essential for effective design management and construction management practice.

Course Objectives: -

The objectives of this course are to:

1. To introduce fundamental concepts of structural systems and their integration with architectural design and building services.
2. To develop an understanding of various structural forms, materials, construction methods, and their performance requirements, including strength, stability, stiffness, ductility, and durability.
3. To enable students to analyse, select, and evaluate appropriate structural systems for multi-storied and large-span buildings based on functionality, cost-effectiveness, and constructability.
4. To familiarise students with principles of earthquake- and wind-resistant design, relevant code provisions, and the basics of computer-aided structural analysis and design.
5. To expose students to innovative, composite, and low-cost structural systems through case studies, site exposure, and contemporary construction practices.

Course Outcomes (COs)

On successful completion of the course, the student will be able to:

CO1: Classify and analyse building structural forms based on functional utility, materials, construction methods, and performance requirements such as strength, stability, stiffness, ductility, and durability.

CO2: Select and justify appropriate structural systems for multi-storied buildings by considering planning aspects, design requirements, cost economics, and constructability.

CO3: Apply principles of earthquake- and wind-resistant design along with relevant code provisions in structural analysis and detailing.

CO4: Identify, explain, and evaluate large-span, spatial, composite, and innovative structural systems—including steel, reinforced concrete, and tension structures—using case studies.

CO5: Demonstrate basic understanding of computer-aided structural analysis and design tools, and evaluate coordination between structural systems, architectural layouts, building services, and low-cost construction practices.

Course Content:

The course coverage includes the following:

Unit 1: (10%)

Introduction to structures based on functional utility, durability of structures, materials of construction, structural forms and methods of construction. Classification of building structural forms; load bearing structure, framed structures, spatial structures and composite structures.

Unit 2: (10%)

Study of structural requirements of buildings: strength, stability, stiffness, ductility, durability and maintenance of structures.

Unit 3: (10%)

Various structural systems for multi-story reinforced concrete buildings, along with their planning and design considerations, including cost economics.

Unit 4: (10%)

Earthquake- and wind-resistant design and detailing of buildings, including relevant provisions in various codes.

Unit 5: (10%)

Large span structures in general. Steel structural systems for large span roofs: steel truss system, single and double layered tubular space frames. Large span R. C. C. systems: grid floors, Vierendeel girder system, shell roofs and folded plate systems.

Unit 6: (10%)

Basic concept of computer-aided structural analysis and design process. Various computer-aided structural analysis and design.

Unit 7: (10%)

Coordination aspects between structural systems and architectural and building services systems.

Unit 8: (10%)

Spatial structural system: Tension structures and other recent developments in the innovative structural system (case study).

Unit 9: (10%)

Structural systems for low-cost construction and non-engineering constructions.

Unit 10: (10%)

Composite construction, composite system in steel and concrete.

Studio Exercises:

Study of literature on innovative structural systems in buildings and making presentations and reports. Site visits to such building projects and prepare structural system appraisal report with structural system/arrangement drawings.

Exercises on all the above topics.

Reference books: -

1. Improving earthquake and cyclone resistance of structures - guidelines for the Indian subcontinent-Sekhar Chandra Dutta
2. Construction engineering and management -S. Seetharaman
3. Princlples of construction management second ed.- roy pilcher
4. Handbook of heavy construction second ed.a,b.c.-John Havers, frank Stubbs.
5. Alternative building materials and technologies-Jagadish K.S.
6. Prefabricated concrete for industrial and public structures- Laszlo Mokk

Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
PC-202	**Project Management-II**	3	3	6	100	100	100	300	06

Project Management-II:

Aim:

*The intent of this course is to equip students with a comprehensive understanding of the application of project management principles during the **pre-construction phase** of the project life cycle. The course emphasizes systematic management of projects from **initiation and feasibility studies** through **outline scheme design, detailed design development**, and the **bid and award process**, with a focus on integrating architectural decision-making, technical coordination, cost, time, and risk considerations to achieve efficient and sustainable project outcomes.*

Course Objectives: -

1. To understand the construction economics of Construction Project. To prepare the feasibility and detailed feasibility report for any Project.
2. To learn and understand Building design process and design review. To learn & understand Estimation, Valuation for construction projects.
3. To learn and understand construction specification & writing. To understand risk, analysis, evaluation and response to it for construction projects.
4. To learn and understand Contract and Contract Management in detail. To understand the site management of construction project.
5. To learn the basics of Project cost and Value Management.

Course Outcome (COS): -

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

CO1: Explain the role and importance of project management in the pre-construction phase of the project life cycle.

CO2: Apply project initiation and feasibility study techniques to evaluate the technical, financial, environmental, and regulatory viability of construction projects.

CO3: Develop and assess outline scheme designs considering client requirements, site constraints, statutory norms, and sustainability principles.

CO4: Integrate project management tools in the detailed design phase, including scope definition, scheduling, cost planning, and risk identification.

CO5: Analyse and prepare tendering strategies, bid documents, and procurement methods appropriate to different project types. Evaluate the bid evaluation and award process, ensuring transparency, compliance, value engineering, and risk minimization.

Course Content:

Unit 1: (10%)

Construction Economics:

Principles of economic decision-making in construction projects; concept and application of the time value of money; development and interpretation of cash-flow diagrams; evaluation of project alternatives using equivalence methods; impact of taxation on the comparison and selection of alternatives; influence of inflation on project cash flows; economic evaluation of public projects with emphasis on benefit–cost analysis and benefit–cost ratio.

Unit 2: (20%)
Project feasibility & Detailed project report:
Definition of a project; identification of investment opportunities; generation, screening, identification, and rating of project ideas; preliminary project analysis; preparation of pre-feasibility reports covering market, technical, financial, economic, and environmental aspects; project cost estimates and techno-economic feasibility studies; preparation of detailed project reports (DPRs); and overview of statutory and regulatory project clearances.
Unit-3: (10%)
Building design process & design review:
To familiarize students with the systematic stages of the building design process and the principles, methods, and criteria involved in effective design review for quality, safety, functionality, and sustainability.
Unit-4: (10%)
Estimation & Valuation for building projects:
Approximate Methods of Estimation, Types of Estimates, Valuation, Types of Valuation, Purpose of Valuation.
Unit-5: (10%)
Construction Specifications:
Specification its importance, purpose and writing.
Unit-6: (10%)
Risk Management:
Risk identification, risk analysis and evaluation and risk response
Unit-7: (20%)
Contract management:
Indian contract Act 1872, brief introduction, implementation, contract document, types of contracts, classification of contract, bidding process, bidding models, subcontract.
Unit-8: (10%)
Site Management:
Site conditions, site functions, zoning, entire site management.

Studio Exercises:
Construction Economics of any project
Preparation of Project feasibility & Detailed project report
Give the entire design process of any project.
Prepare Estimation & Valuation for building projects
Write Construction Specifications
Report on Risk Analysis of any project.
Prepare a contract document for any project
Give site management of project.

Reference book:
Project Management Reference Books:

1.) Construction project management planning scheduling controlling twelfth ed.- k.k. Chitkara
2.) Project Management - A Problem Based Approach-Bennett
3.) Gething started in project management- Martin paula/ tate Karen
4.) Construction project management- Frederick Gould Nancy joyce
5.) Project management of complex and Embedded Systems Ensuring Product Integrity and Program Quality-Kim H Pries
6.) Project Management Theory and Practices-Gary L Richardson
7.) Principles of construction management second ed.

8.) Site management for construction projects- Vanvari Vinod / Kirty Dave
9.) PERT and CPM principles and applications third ed.- Srinath l.s.
10.) Purchasing and Inventory Control- by K. S. Menon, Wheeler Publication.

Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
PAEC-203	**Business Development & Project Marketing:**	2	-	2	-	50	-	50	02

Business Development & Project Marketing:

Aim:

The purpose of this course is to develop a clear understanding of fundamental marketing concepts and to equip learners with the skills required to formulate effective product, pricing, distribution, and promotion strategies for the successful marketing of products and services.

Course Objectives:

1. To introduce the nature, scope, and role of marketing in the contemporary business environment and its relevance to organizational planning.
2. To develop an understanding of market segmentation, targeting, measurement, and marketing research for effective decision-making.
3. To analyze buyer behavior in consumer and industrial markets and its influence on marketing strategies.
4. To provide knowledge of product, pricing, distribution, and promotion decisions and their role in creating customer value.
5. To familiarize students with global marketing concepts and contemporary marketing issues, including services, rural marketing, and consumer protection.

Course Outcomes (COs)

On successful completion of the course, the student will be able to:

CO1: Explain the nature, role, and concepts of marketing and analyze the marketing environment and planning process.

CO2: Apply market segmentation, targeting, forecasting, and marketing research techniques to identify and evaluate market opportunities.

CO3: Analyze consumer and industrial buyer behavior and assess its impact on marketing decision-making.

CO4: Develop appropriate marketing strategies related to product, pricing, distribution, and promotion decisions.

CO5: Evaluate global marketing practices and contemporary marketing issues such as services marketing, rural marketing, customer service, and consumer protection.

Course Content:

The course coverage includes the following:

Unit -1 (12%)

Introduction: Nature and Role of Marketing, The Marketing Concept, Marketing Environment, Market Mix, Marketing Planning.

Unit -2 (12%)

MARKET SEGMENTATION, TARGETING AND MEASUREMENT: Market Segmentation, Market Targeting, Market Measurement and Forecasting, Marketing Research and Information System.

Unit -3 (12%)

BUYER BEHAVIOUR: Meaning and Importance, Determinants and Consumer Behaviour, Buying Decision Process, Industrial Buyer Behaviour.

Unit -4 (12%)

PRODUCT DECISIONS: Product Life Cycle, Product Mix Strategies, Branding and Packaging Decisions, New product Development, Consumer Adoption Process.

Unit -5 (12%)

PRICING DECISIONS: Pricing Objectives, Price Determinants, Pricing Methods, Pricing Policies and Strategies.

Unit -6 (10%)

MANAGING DISTRIBUTION FUNCTION: Nature and importance of Distribution Channels, Patterns of Distribution Channels, Determinants of Channel Design, Determining Intensity of Distribution, Selecting Motivating and Evaluating Channel Members, Physical Distribution Task and Approaches.

Unit -7 (10%)

PROMOTION DECISIONS: Marketing Communication Process, Promotion Mix and its Determinants Role of Advertising, Sales Promotion and Personal Selling; Promotion Budget.

Unit -8 (10%)

GLOBAL MARKETING: Reasons underlying International Business, Distinction between Global and Domestic Marketing, Institutional and Policy Framework, Procedural Aspects, Regional Economic Groupings.

Unit -9 (10%)

CONTEMPORARY ISSUES: Direct Marketing, Customer Service, Rural Marketing, Marketing of Services, Consumer Protection.

Studio Exercises:

Assignments based on all the above topics.

Reference Books: -

1. Marketing Management by Philip Kotler, Kevin Lanakeller
2. Management Controls in Marketing by Wilson R.M.

Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
PE-204	**Integrated Energy Conservation in Construction**	2	2	4	100	50	-	150	04

Integrated energy Conservation in Construction:

Aim:

To develop an understanding of environmental and energy-related issues in construction projects and to equip students with the skills to plan, evaluate, and manage energy-efficient, resource-conscious, and sustainable practices throughout the construction project lifecycle.

Course Objectives: -

1. To understand the energy scenario, thermodynamics, forms of energy. To learn and understand the energy generation, conventional and non-conventional energy technologies.
2. To learn and understand energy consumption and solar passive architecture. To learn & understand climate & building, energy efficiency
3. To learn and understand thermal performance of the building, introduction to software
4. To understand energy efficient materials. To learn and understand Energy management and audit
5. To understand building envelop design guidelines w. r. t. climatic zone. To learn net zero energy concept and sustainability certification.

Course Outcomes (Cos)

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

CO1: Understand principles of energy conservation and sustainability in the context of building construction and project management.

CO2: Analyse energy demand, consumption patterns, and energy performance of construction projects across the project life cycle.

CO3: Integrate energy-efficient strategies and renewable energy systems during planning, design, execution, and operation phases of construction projects.

CO4: Apply energy codes, standards, and green building rating systems (such as ECBC, GRIHA, LEED) in construction project management.

CO5: Evaluate techno-economic feasibility of energy conservation measures and life-cycle energy costs in construction projects. Develop energy management plans and decision-making strategies for optimizing energy use in construction projects while minimizing environmental impact.

Course Content:

Unit-1: (10%)

Energy, Energy scenario, Thermodynamics and energy, forms of energy, energy and buildings. Assignments on topic

Unit-2: (15%)

Energy generation systems, conventional and non-conventional (renewable) energy technologies and systems, waste heat recovery, energy storage, energy and environment. Assignments on topic

Unit-3: (10%)

Energy consumption in building over all scenario, solar passive architecture and its importance, sustainability and introduction to sustainable architecture w.r.t comfort criteria in buildings viz IAQ, IEQ. Assignments on topic

Unit-4: (10%)
Climate and buildings, Energy conscious buildings, building and energy Assignments on topic.
Unit-5: (05%)
Thermal performance of the buildings, introduction to software for thermal performance analysis, case studies and introduction to software for analysis /performance. Assignments on topic
Unit-6: (05%)
Energy efficient materials. Assignments on topic
Unit-7: (20%)
Energy conservation and its importance, introduction to energy management and energy audit Assignments on topic
Unit-8: (10%)
Building envelope design guidelines w.r.t climatic zones, ECBC, case study and policies. Assignments on topic.
Unit-9: (10%)
Integration of renewable energies in buildings and net zero energy concept. Assignments on topic
Unit-10: (5%)
Sustainability certification, Introduction to GRAHA, IGBC, LEED, BRIM rating systems Assignments on topic.

Studio Exercises:
Study of energy generation system
Enlist green building & study in detail
Study a wind rose diagram
Study Psychrometric chart for comfort
Collect climatic data of your place from trusted sites.
Study of OPEX & CAPEX model
Energy audit of residential Building.
Site visit to solar power generation plant.

Reference Books:
Sustainability through Energy-Efficient Buildings – Amritanshu Shukla & Atul Sharma
Sustainable Technologies for Energy Efficient Buildings – edited by Chandan Swaroop Meena, Ashwani Kumar, Varun Pratap Singh & Aritra Ghosh
Green Structures: Energy Efficient Buildings – Satyajit Ghosh & Abhinav Dhaka
Handbook on Energy Conscious Buildings – by J.K. Nayak & J.A. Prajapati
Solar Energy and Thermal Processes – John A. Duffie & William A. Beckman
Energy Efficient Buildings: Fundamentals of Building Science and Thermal Systems – Zhiqiang John Zhai
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Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
BS & AE-205	**Service Management -II**	2	2	4	100	50	50	200	04

Service Management -II

Aim:

To provide exposure to the management aspects of planning, design, execution, and operation of advanced building and infrastructure services at building, campus, and township levels

Course Objectives: -

1. To understand the complexity and management requirements of specialized services in hospitality, healthcare, and large-scale developments.
2. To develop the ability to plan and coordinate HVAC systems, Building Management Systems & analyze road and circulation infrastructure.
3. To apply project management principles to the execution of services, including scheduling, cost control, procurement, and stakeholder coordination.
4. To evaluate operation, maintenance, and lifecycle performance of services systems in relation to functionality, reliability, and sustainability.

Course Outcomes (COs)

After completion of the course, students will be able to:

CO1: Apply project management tools and techniques to the execution phase of complex services systems in hospitality, healthcare, and large developments.

CO2: Assess operation and maintenance strategies for services systems to optimize performance, reliability, and lifecycle cost.

CO3: Demonstrate informed managerial decision-making that balances technical performance, cost, sustainability, safety, and user comfort.

Course Content:

Unit-1: (40%)

Hotel and hospital services
Laundry
House keeping
Kitchen
Hospital waste
Hospital gases
CSSD

Unit-2: (15%)

HVAC
HVAC equipment and sys components
Heating and cooling load calculations
Effects on planning
Co-ordination with other services

Unit-3: (15%)

Fire safety and fire-fighting
Fire types and extinguishing materials

Firefighting systems and equipment
Fire officer, evacuation and mitigation plan, fire drills, fire preparedness.
Fire audit
Overview of codes and standards applicable to MEP services.
Unit-4: (15%)
Safety and security
Security needs, security systems, integration at construction stage, monitoring
Telecommunication and related information technology based
facilities
Unit-5: (15%)
Roads
Geometry in plan and in section
Effect of climate on terrain and strata
Road construction section details etc.
Materials and equipment
Maintenance
Emerging sustainable practices in road construction.

Studio Exercises:
Students will work on case studies and different site visits to understand the design and integration of the services in building projects and present this in a form of a report.
Market Study of equipment and technologies for each unit.

Reference Books:
Building Services Design Management -Jackie Portman
Building Services and Equipment: Volume 1,2, &3-F Hall
Building Services—S. M. Patil---(ISBN-978-81-7525-980-5), 1-C,102, Saamana Pariwar
Building Maintenance Management, 2ed, ---Chanter, Wiley India
Building Science: Concepts and Applications -Jens Pohl

Category	Course title	Teaching Scheme			Examination Scheme (Marks)				Credits
		Lect.	Stud.	Total	Paper	Sess.	Viva	Total	
PC 206	**Dissertation Stage I**	1	3	4	-	100	-	100	03

Dissertation Stage – I

Aim

The aim of the thesis is to enable students to undertake an independent and original study on a special project of their own choice. It encourages in-depth research, critical thinking, and application of knowledge in a chosen area of interest.

Course Objective: -

1. To enable students to undertake an independent and original study on a special project of their choice related to building design and construction management.
2. To develop the ability to formulate a fresh methodology or approach that is effective, practical, and contributes meaningfully to the chosen area of study.
3. To enhance research, analytical, and presentation skills by preparing a comprehensive thesis report supported with references, sketches, graphs, statistical data, and detailed experimental or survey procedures.

Course Outcomes (Cos)

CO1: Ability to independently identify, research, and execute a specialized project in building design and construction management.

CO2: Skill in formulating innovative methodologies and approaches for practical or conceptual construction management problems.

CO3: Competence in preparing a comprehensive thesis report with proper documentation, data analysis, sketches, graphs, and survey or experimental findings, demonstrating strong research and presentation skills.

Course Content:

Unit 1: (70%)

Synopsis Guidelines and Dissertation Stage I -

Titles of the Synopsis: The synopsis should clearly state the proposed research or study title

Abstract of Research / Study: A summary of the research problem, methodology, and expected outcomes.

Aims, Objectives, and Scope: Clearly define the purpose, objectives, and scope of the research or study.

Literature Study and Basic Information Collection: Should be completed in Dissertation Stage – I, involving an extensive review of existing literature and the collection of foundational information relevant to the study.

Unit 2: (30%)

Seminar on Dissertation Topic:

Preparation of a state-of-the-art report on the chosen topic.

Analysis of specific aspects of the topic in detail.

Identification of areas for further research and development.

A comprehensive seminar report in the prescribed format for publication or submission.

Studio work

- Students should prepare and present the synopsis with a clear title, abstract, aims, objectives, scope, and guide's consent within the prescribed submission period.
- They should conduct literature reviews, collect basic information, and analyze the state-of-the-art on their chosen dissertation topic.
- A comprehensive seminar report should be prepared, highlighting specific aspects, identifying areas for further research, and should be presented for evaluation and feedback

Reference books:

Research Methodology: concepts and cases—Deepak Chawla and Neena Sondhi, Vikas Publishing House Pvt. Ltd. (ISBN 978-81-259-5205-3)
Research Methodology: Methods and Trends', by Dr. C. R. Kothari
Research Methodology: An Introduction' by Wayne Goddard and Stuart Melville
Research Methodology: A Step-by-Step Guide for Beginners', by Ranjit Kumar

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