

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



**SYLLABUS FOR**

**MASTERS IN ARCHITECTURE**

**M.ARCH. (CONSTRUCTION MANAGEMENT)**

**(To be implemented w.e.f. A.Y. 2019-20)**

**BOARD OF STUDIES IN ARCHITECTURE**

**FACULTY OF SCIENCE AND TECHNOLOGY**

## **PREAMBLE**

The course focuses on the fundamentals of construction management giving insight into the management, construction techniques and legal issues related to construction industry with a focus on buildings.

Area of study includes site construction and management, construction documentation, Project management, Safety management and Construction related laws regulations and codes.

With the growing role of the Architect as a coordinator between the design, site and other agencies involved in the construction industry, this course aptly provides opportunity to equip the architect giving specialized knowledge in construction management in contemporary times.

**The aim is to help the student acquire knowledge and skills that can be used to in construction industry and be a versatile leader of a successful construction team.**

## **SALIENT FEATURES:**

Construction management deals with Coordination, Planning and control of a project from setting up to completion. An architect project manager can help to fulfil clients' requirements and to produce a functionally optimized and monetarily viable project. An Architect is a person associated with client from day one and also is in coordination with the entire team, the process becomes more efficient if the construction manager/Project manager is an Architect, i.e. planning, directing and budgeting of a project.

**Therefore there are vast opportunities for an Architect as a Construction manager in public and private sector companies.**

## **PROGRAM EDUCATIONAL OBJECTIVES [PEO]-**

1. Impart **Technical Expertise** on Construction project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success for complex Building Projects.
2. Provide opportunities and develop leadership skills and professional competency to lead multidisciplinary Building Project for end to end Construction management of complex Building Projects.
3. Develop **Professional Behavior** in terms of managing stakeholders and communication skills to manage construction teams for effective implementation of Building Project.
4. Provide opportunities and develop responsible professionals in terms of ethics and value systems.
5. Develop **Strategic Awareness** and knowledge of strategic and operational drivers required to inform decisions and deliver sustained competitive advantage.

## PROGRAM OUTCOMES [PO]

1. Manage a quality construction project from start to completion while maintaining budget, schedule, and safety requirements and delight Stakeholders expectations.
2. Evaluate and select computer applications for successful construction management throughout different phases.
3. Apply professional and ethical standards of behaviour in dealing with all stakeholders in the construction process.
4. Deployment of optimum use of resources in the context of environmental sensitivity, and occupational safety.
5. Develop comprehensive construction management plan, also to enable to examine the legal context for successful construction implementation and closeout process.

Sr.No.	Program Outcomes	Subjects in curriculum
1	Manage a quality construction project from start to completion while maintaining budget, schedule, and safety requirements and delight Stakeholders expectations.	CM I, CM II, CM III, Financial Appraisal and Project Funding, Procurement, Quality and Safety Management systems.
2	Evaluate and select computer applications for successful construction management throughout different phases.	Softlab I, Softlab II, Softlab III
3	Apply professional and ethical standards of behavior in dealing with all stakeholders in the construction process.	Introduction to Construction Management, Practical Training **
4	Deployment of optimum use of resources in the context of environmental sensitivity, and occupational safety.	Real Estate Development & Facilities Management, Procurement, Quality and Safety Management systems.
5	Develop comprehensive construction management plan, also to enable to examine the legal context for successful construction implementation and closeout process.	Managing Large Projects - Construction Management Framework at Sites, Contract management and Building Construction Laws, Financial Appraisal and Project Funding.

Sr.No.	Electives	Tentative Subjects of Electives
01	Elective I (SEM I)	<ul style="list-style-type: none"> <li>• Critical Appraisal of Building Services for Hotels/ Hospitals.</li> <li>• Review of Fire detection and Fire Fighting in High-rise Buildings.</li> <li>• Building Energy Modeling for large building complex.</li> <li>• Building Services design for Large IT PARK.</li> <li>• Design documentation management system for large projects</li> </ul>
02	Elective II (SEM II)	<ul style="list-style-type: none"> <li>• Construction technologies for Affordable Housing Projects.</li> <li>• Integrated Project Management Information System.</li> <li>• Design detailing and Management for Aluform Shuttering in High rise Towers.</li> <li>• Labour laws and compliance system in Construction.</li> <li>• Environmental Clearance for Large Building Projects - critical appraisal.</li> </ul>

03	Elective III (SEM III)	Choice based –Interdisciplinary or any ongoing project based.
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Note- The Institute shall have the freedom to offer listed or any additional subjects based on the availability of experts.

### MATRIX OF PROGRAM EDUCATIONAL OBJECTIVES AND PROGRAM OUTCOMES

	<b>M.Arch (CONSTRUCTION MANAGEMENT)</b>	PO1	PO2	PO3	PO4	PO5
	PEO	from start to completion while maintaining budget, schedule, and safety requirements and delight Stakeholders expectations.	Evaluate and select computer applications for successful construction management throughout different phases.	Apply professional and ethical standards of behaviour in dealing with all stakeholders in the construction process.	Deployment of optimum use of resources in the context of environmental sensitivity, and occupational safety.	management plan, also to enable to examine the legal context for successful construction implementation and closeout process.
1	PEO1 <b>Leadership skills and professional competency</b>	✓			✓	✓
2	PEO2 <b>Technical Expertise</b>	✓	✓	✓	✓	
3	PEO3 <b>Professional Behaviour</b>			✓		✓
4	PEO4 <b>responsible professionals</b>			✓	✓	✓
5	PEO5 <b>Strategic Awareness</b>	✓	✓		✓	



<b>For Semesters I M.ARCH. (CONSTRUCTION MANAGEMENT)</b>											
<b>Course Code</b>	<b>Course Title</b>	<b>Course Type</b>	<b>Contact Periods (60 mins)</b>	<b>Teaching Scheme</b>			<b>Examination Scheme</b>				<b>Marks</b>
				<b>Theory/week</b>	<b>Studio/week</b>	<b>Credits</b>	<b>SS</b>	<b>SV</b>	<b>Th</b>		
									<b>In Sem</b>	<b>End Sem.</b>	
2019CM101	Construction Management - Planning and Scheduling	C1	10	2	8	10	-	400	Nil	Nil	<b>400</b>
2019CM102	Elective I	EL	3	2	1	3	100	Nil	Nil	Nil	<b>100</b>
2019CM103	Introduction to Construction Management	C2	4	2	2	4	200	Nil	Nil	Nil	<b>200</b>
2019CM104	Building Construction Technology and Services	SP1	3	2	1	3	Nil	Nil	30	70	<b>100</b>
2019CM105	Contract management and Building Construction Laws.	SP2	3	2	1	3	Nil	Nil	30	70	<b>100</b>
2019CM106	Softlab I	L	2	1	1	2	100	Nil	Nil	Nil	<b>100</b>
			<b>25</b>	11	14	25	400	400			<b>1000</b>

<b>For Semesters II M.ARCH. (CONSTRUCTION MANAGEMENT)</b>											
<b>Course Code</b>	<b>Course Title</b>	<b>Course Type</b>	<b>Contact Periods (60 mins)</b>	<b>Teaching Scheme</b>			<b>Examination Scheme</b>				<b>Marks</b>
				<b>Theory/week</b>	<b>Studio/week</b>	<b>Credits</b>	<b>SS</b>	<b>SV</b>	<b>Th</b>		
									<b>In Sem</b>	<b>End Sem.</b>	
2019CM201	Construction Management - Risk, Communication and Resource	C1	10	2	8	10	-	400	Nil	Nil	<b>400</b>
2019CM202	Elective II	EL	3	2	1	3	100	Nil	Nil	Nil	<b>100</b>
2019CM203	Real Estate Development & Facilities Management	C2	4	2	2	4	200	Nil	Nil	Nil	<b>200</b>
2019CM204	Advance Building Construction Technology & Services	SP1	3	2	1	3	Nil	Nil	30	70	<b>100</b>
2019CM205	Research I	SP2	3	2	1	3	Nil	Nil	30	70	<b>100</b>
2019CM206	Softlab II	L	2	1	1	2	100	Nil	Nil	Nil	<b>100</b>
			<b>25</b>	<b>11</b>	<b>14</b>	<b>25</b>	<b>400</b>	<b>400</b>	<b>60</b>	<b>140</b>	<b>1000</b>

<b>For Semesters III M.ARCH. (CONSTRUCTION MANAGEMENT)</b>											
<b>Course Code</b>	<b>Course Title</b>	<b>Course Type</b>	<b>Contact Periods (60 mins)</b>	<b>Teaching Scheme</b>			<b>Examination Scheme</b>				<b>Marks</b>
				<b>Theory/week</b>	<b>Studio/week</b>	<b>Credits</b>	<b>SS</b>	<b>SV</b>	<b>Th</b>		
									<b>In Sem</b>	<b>End Sem.</b>	
2019CM301	Construction Management - Integration, Handover, Stakeholder Management, Ethics	C1	10	2	8	10	-	400	Nil	Nil	<b>400</b>
2019CM302	Research II	C2	3	2	1	3	100	Nil	Nil	Nil	<b>100</b>
2019CM303	Managing Large Projects - Construction Management Framework at Sites. <b>Practical Training **</b>	C3	4	2	2	4	-	200	Nil	Nil	<b>200</b>
2019CM304	Financial Appraisal and Project Funding.	SP1	3	2	1	3	Nil	Nil	30	70	<b>100</b>
2019CM305	Procurement, Quality and Safety Management systems.	SP2	3	2	1	3	Nil	Nil	30	70	<b>100</b>
2019CM106	Softlab I	L	2	1	1	2	100	Nil	Nil	Nil	<b>100</b>
			<b>25</b>	<b>11</b>	<b>14</b>	<b>25</b>	<b>200</b>	<b>600</b>	<b>60</b>	<b>140</b>	<b>1000</b>

\*\* - This includes Professional Training (40 full working days) to be undertaken during intermediate time between II & III Semester, details of which are mentioned in the detailed syllabus. The Oral Assessment of the same will be held at the end of Semester III. The subject is included as core subject and will have both sessional and viva assessment.



<b>For Semesters IV M.ARCH. (CONSTRUCTION MANAGEMENT)</b>											
<b>Course Code</b>	<b>Course Title</b>	<b>Course Type</b>	<b>Contact Periods (60 mins)</b>	<b>Teaching Scheme</b>			<b>Examination Scheme</b>				<b>Marks</b>
				<b>Theory/ week</b>	<b>Studio/ week</b>	<b>Credits</b>	<b>SS</b>	<b>SV</b>	<b>Th</b>		
									<b>In Sem</b>	<b>End Sem.</b>	
2019CM401	Project	C1	20	16	4	20	-	800	Nil	Nil	<b>800</b>
2019CM402	Elective III*	EL	5	4	1	5	200	Nil	Nil	Nil	<b>200</b>
			<b>25</b>	20	5	<b>25</b>	200	800			<b>1000</b>

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

# **DETAIL SYLLABUS**

## **SEM - I**

<b>SUBJECT TITLE:</b>				
<b>CONSTRUCTION MANAGEMENT I - Planning and scheduling</b>				
Subject Code : <b>2019CM101</b>				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	
Theory Periods per week	2	Sessional	300	
Studio Periods per week	8	Viva/Oral	100	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>10</b>	In-semester Examination	Nil	
		End-semester Examination	Nil	
<b>Total Credits</b>	<b>10</b>	<b>Total Marks</b>	<b>400</b>	

### **COURSE OBJECTIVES:**

To develop understanding about Project Scope and it's effect on Schedule and cost.

To obtain knowledge of tools for project scheduling, templates for managing a project, and an in-depth knowledge of techniques to control cost and schedule.

The emphasis of module is on the planning processes at the construction phase of a project.

### **COURSE CONTENT :**

**Unit 1-** Scope Management: Key concepts about Project scope versus product specifications

- Processes associated with project-scope management
- Collecting and defining requirements
- Scope management plan
- Change-control and configuration management
- Scope verification and validation
- Best practices to plan and manage scope changes
- Monitor progress and manage issues by ranking them and escalating them. Identifying requirements and producing the scope and specification
- Creating a WBS
- Estimating activity duration

**Unit 2 - -** Project planning and scheduling - Understanding advanced techniques for planning, managing, and controlling the schedule. Study of advanced formal scheduling techniques, such as earned schedule and program evaluation and review technique (PERT).• Creating networks, estimating durations, and analyzing the critical path.

- Estimating, analyzing, and managing the schedule, using the critical path method (CPM), critical chain, and PERT and techniques such as LOB for repetitive projects.
- Optimizing the schedule and assessing the impact on resources and costs—crashing and fast-tracking
- Managing schedule variance using earned-value analyses, and optimizing schedule performance using corrective options and actions
- Estimating schedule contingencies, schedule buffers, and management reserves, and managing risk
- Understanding schedule-management approaches and tactics to keep projects on schedule
- Schedule and cost integration

**Unit 3** - -Time Management: Evolution of time management concepts; Need for time management; Challenges of project management (delays in pre-execution, construction phase)

**Unit 4** —Cost Estimation - Principles and concepts in estimating cost

- The life-cycle stages of project estimating
- Estimating approaches and models
- Managing estimates: continuously refining and improving estimates
- Improving the estimation process
- Understanding project costs: direct and indirect costs, overhead, and other expenses
- Estimating contingency costs and management reserves
- Estimating the impact of cost-estimation changes on project duration and staffing
- Managing changes to time and cost.

**Unit 5** – Earned Value Management (EVM Techniques)

Importance of EVM in reporting project Status. Issues involved and solutions. Case study to demonstrate the importance of EVM for project reporting.

### **SUBMISSION REQUIREMENT FOR 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 on going project for study. Groups are encouraged to have diverse projects so that peculiarities in specific projects are explored by entire class

### **OUTCOME :**

To equipped students with the knowledge of how changes to project scope may affect the project's schedule, cost, and quality.

### **RECOMMENDED READINGS :**

- PMBOK by PMI
- 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.
- Chitakara. Construction Project Management Planning, Scheduling and Controlling. Tata McGraw

<b>SUBJECT TITLE:</b>				
<b>Elective I</b>				
Subject Code : <b>2019CM102</b>				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	
Theory Periods per week	2	Sessional	100	
Studio Periods per week	1	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>3</b>	In-semester Examination	Nil	
		End-semester Examination	Nil	
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>100</b>	

### **COURSE OBJECTIVES:**

Student should be made aware of importance of pre documentation in a project and different practical aspects of project management.

### **COURSE CONTENT :**

Student can choice from the below any one topic for elective

- Critical Appraisal of Building Services for Hotels/ Hospitals.
- Review of Fire detection and Fire Fighting In Highrise Buildings.
- Building Energy Modeling for large building complex.
- Building Services design for Large IT PARK.
- Design documentation management system for large projects

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

Students will work on at least one project taken up in the studio and work on details of the project relating to all the above mentioned topics in the form of report .

### **OUTCOME :**

To acquaint in depth knowledge of the topic in all respect.

### **RECOMMENDED READINGS :**

All books/ Journals/ Magazines/ unpublished thesis related to the topic selected by the individual student.

<b>SUBJECT TITLE:</b>				
<b>INTRODUCTION TO CONSTRUCTION MANAGEMENT</b>				
Subject Code : <b>2019CM103</b>				
Teaching Scheme		Examination Scheme	Marks	
Theory Periods per week	2	Sessional	200	
Studio Periods per week	2	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>4</b>	In-semester Examination	Nil	
		End-semester Examination	Nil	
<b>Total Credits</b>	<b>4</b>	<b>Total Marks</b>	<b>200</b>	

### **COURSE OBJECTIVES:**

Student is fully acquainted with the fundamentals of project management.

### **COURSE CONTENT :**

**Unit 1:** Introduction to Project Management; Principles and Practice of Project Management;

**Unit 2:** Introduction to projects; Project nature, Construction project peculiarities-Characteristics and features; Project appraisal, selection and evaluation;

**Unit 3:** Life cycle stages of construction projects; Project Management definitions; Core components of project management; Review of project management processes (reference to IS 15883, PMBOK, PRINCE2)

**Unit 4:** Describe the typical PM process documentation and PM deliverables that are produced by project managers in each project phase

**Unit 5:** Project Organizations; Construction Project Organisations, Project organization structures and processes.

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

Students are required to submit notes in form of journal.

Class test to be conducted to test the theoretical understanding of the students.

### **OUTCOME :**

To acquaint students with full knowledge of fundamentals and principles of project management.

### **RECOMMENDED READINGS :**

- PMBOK by PMI
- 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.
- Chitakara. Construction Project Management Planning, Scheduling and Controlling. Tata McGraw

SUBJECT TITLE: <b>Building Construction Technology and Services</b>				
Subject Code : <b>2019CM104</b>				
Teaching Scheme		Examination Scheme	Marks	Duration
Theory Periods per week	2	Sessional	Nil	
Studio Periods per week	1	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>3</b>	In-semester Examination	30	
		End-semester Examination	70	150 min
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>100</b>	

### COURSE OBJECTIVES:

To give coverage on aspects of construction technologies related to building projects and sustainable building materials.

To introduce the structural system concepts and design processes & methodology in relation to architectural and structural systems of building projects.

To expose students to Building Services, Design, installation and maintenance of essential services and equipment found in any building.

The importance of building services. Building services are the systems installed in buildings to make them comfortable, functional, efficient and safe.

### COURSE CONTENT:

**Unit: 1-** Geo-technical survey to define strata for building foundations.

Geo-technical aspects of foundations Planning and design considerations of: Foundation systems Fabrication and erection of Steel structure.

**Unit: 2-** Concrete Technology

Concrete Technology, Durability and mix design, production and placement of concrete, including mechanization, Ready Mixed Concrete; Special concrete (High performance concrete, self-compacting concrete, impervious concrete, architectural finishes and aesthetic concrete); Alternative aggregates;

**Unit: 3-** Foundation System

Foundation systems, effect in aggressive soil conditions, special foundation techniques; Planning and design considerations of foundation and superstructure systems for Multistoried, tall and super tall buildings.

**Unit: 4-** Water supply and Drainage- Water and Waste Management Services and Systems Study Of Water and Waste Management Services and Systems ,Water Management, Water quality and quantity assessment, Water supply system components (hot & cold) Cold water supply system ,Hot water supply system ,System Selection & Economics

**Unit: 5-** Fire-fighting and detection

Study of Different types of firefighting system, Active Control, Passive Control, Risk Control measures, Evacuation Map

**Unit: 6-** Operation, Maintenance and Planning for Retrofitting of Services Systems



## **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

Case study (choose any one typology of building) Report which containing Study of individual topics as mentioned in above units with respective to design and design consideration, Technical Adoption during construction, Advance Martial and its installation provision.

Class tests

Presentation reviews

Individual Assignments

Group Assignment

## **OUTCOME:**

Study of Role of Building construction & Services Managers as technically minded and has good team working skills.

## **RECOMMENDED READINGS :**

- Buiding 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.
- Construction Engineering & management of Projects( For Infrastructure & Civil Works) by S. C. Sharma, Khanna Publishers, 2nd Edition, 2011

<b>SUBJECT TITLE:</b> <b>Contract management and Building Construction Laws.</b>				
<b>Subject Code : 2019CM105</b>				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	<b>Duration</b>
Theory Periods per week	2	Sessional	Nil	
Studio Periods per week	1	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>3</b>	In-semester Examination	30	
		End-semester Examination	70	150 min
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>100</b>	

### **COURSE OBJECTIVES:**

The objective of the course is to expose students to project contract management and legalities. To provide an overview of all laws and regulations related to construction projects in the various stages of the project cycle.

### **COURSE CONTENT:**

**Unit 1:** Contract Management, Indian Contract Act, Study of various types of construction contracts, general and special conditions of contract, comparative study of contract conditions;

**Unit 2:** Construction contract as a legal proposal, agreement, consideration, contract Planning, tender documents, tendering process, bid review & evaluation, methods of subcontracting, Contract close-out; Defect liability and performance guarantee etc.

**Unit 3:** Laws related to land development. Land acquisition, lease & easement rights, property acts and Gunthewari acts.

**Unit 4:** Laws and legislations related to construction Industry, labor laws & consumer protection Act, (The building and construction workers (regulation of employment and conditions of Service) Act, 1996, workmen's compensation Act. Payment of wages Act, The employee's Provident fund and miscellaneous provisions Act 1995 Industrial act etc.

**Unit 5:** Environmental laws, MRTP act, National Building code, role of Zilla Parishad & IRDP in rural housing.

**Unit 6:** Permits and approval for construction activities; statutory requirements and clearance related to environmental impact, urban form, fire regulation, completion certificate. Regulatory acts viz. RERA.

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

Assignment will be in the form of notes / journal assignments covering all the topics mentioned above with suitable examples and supportive material.

Students will work on at least one project in details and work for the project related to all the above mentioned topics in the form of report.

**OUTCOME:**

Students will be adept with the knowledge of laws and legalities related to land and building developments and will be aware of contract and bidding process.

**RECOMMENDED READINGS:**

- Sweet & Maxwell 2013 Construction Law: 11th Revised edition. John Uff Publisher
- Malik P.L. Labour and Industrial Laws,
- Labour and Industrial Laws, Universal Law Publishing Co. Pvt. Ltd.

<b>SUBJECT TITLE:</b> <b>Softlab I</b>				
<b>Subject Code : 2019CM106</b>				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	
Theory Periods per week	1	Sessional	100	
Studio Periods per week	1	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>2</b>	In-semester Examination	Nil	
		End-semester Examination	Nil	
<b>Total Credits</b>	<b>2</b>	<b>Total Marks</b>	<b>100</b>	

### **COURSE OBJECTIVES:**

The course is to introduce application software and their usage in different phases of construction and rigorously impart training for using the project management software by ongoing projects

### **COURSE CONTENT :**

Computer Lab - Project Scheduling Software and office documentation system.

#### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

Generating report at different stages of construction using appropriate software taking live project.

### **OUTCOME :**

Evaluate and select computer applications for successful construction management throughout different phases.

### **RECOMMENDED READINGS :**

As suggested by faculty

# **DETAIL SYLLABUS**

## **SEM - II**

SUBJECT TITLE: <b>CONSTRUCTION MANAGEMENT - RISK, COMMUNICATION AND RESOURCE</b>				
Subject Code : <b>2019CM201</b>				
Teaching Scheme		Examination Scheme	Marks	
Theory Periods per week	2	Sessional	300	
Studio Periods per week	8	Viva/Oral	100	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>10</b>	In-semester Examination	Nil	
		End-semester Examination	Nil	
<b>Total Credits</b>	<b>10</b>	<b>Total Marks</b>	<b>400</b>	

### COURSE OBJECTIVES:

- Project risk management, including project risk planning, roles and responsibilities, risk definitions and categories, opportunity and risk identification, risk analysis, risk response or risk treatment, and risk monitoring and control.
- Tools and techniques for qualitative and quantitative risk analysis
- Acquiring and assigning resourcing to projects, and the management of those resources. It addresses establishing and coordinating a project team; estimating and quantifying the required resources; and building, developing, and managing the team.
- It covers resource planning: identifying resources, including subcontracted resources, and querying historical information regarding various types of resources. Finally, organizational policies and procedures are reviewed and the plan is made consistent with them.
- Importance of Project communications amongst Project Stakeholders and Project Teams.
- Project Information Management System – Unified communication for better Project Control.

### COURSE CONTENT :

**Unit 1:** Risk management processes during planning, design and construction (including contract management) stage. It will cover topics such as

- Identifying risks and opportunities, Identifying sources of risk.
- Performing qualitative and quantitative risk analyses
- Creating a risk-management plan
- Executing simulation tools to quantify risks
- Understanding the roles and responsibilities in risk management, including the role of the project manager
- Understanding the organizational structure for risk management
- Establishing a risk-response plan
- Managing the treatment of risks, including addressing secondary or residual risks

**Unit 2:** Resource Management and Resource-based Scheduling Techniques; Resource planning: estimating and balancing.

- Identifying and acquiring the required human resources, including supplier resources
- Documenting team roles and responsibilities
- Identifying and acquiring the required equipment, materials, and resources
- Managing resources, including equipment, materials, and the project team.
- Tools and techniques for resource management, including organizational breakdown structures and responsibility assignment matrices
- Staffing, training, and development of resources
- Global teams and networks

**Unit 3:** Select appropriate communication tools and methods to communicate with identified stakeholders.

Project Information Management System- Unified communication -Importance in construction projects, including commonly used templates for communication activities such as status reporting, issues tracking, change control, and project reviews.

#### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

- 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 on going project for study. Groups are encouraged to have diverse projects so that peculiarities in specific projects are explored by entire class

#### **OUTCOME :**

Understand sources of conflict and, given a specific challenge, apply a problem-solving process that focuses on confronting and resolving the problem.

#### **RECOMMENDED READINGS :**

- PMBOK by PMI
- P S Gahlot & B M Dhir. . Construction Planning & management. New Age International Limited.
- Chitakara. Construction Project Management Planning, Scheduling and Controlling. Tata McGraw
- Biswajeet pattanayak. Human resource management
- Successful construction project management: The practical guide

<b>SUBJECT TITLE:</b> <b>Elective II</b>				
Subject Code : <b>2019CM202</b>				
Teaching Scheme		Examination Scheme	Marks	
Theory Periods per week	2	Sessional	100	
Studio Periods per week	1	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>3</b>	In-semester Examination	Nil	
		End-semester Examination	Nil	
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>100</b>	

### **COURSE OBJECTIVES:**

Student should be made aware of different practical aspects of project management along with new technologies in construction industry.

### **COURSE CONTENT :**

Student can choice from the below any one topic for elective

- Construction technologies for Affordable Housing Projects.
- Integrated Project Management Information System.
- Design detailing and Management for Aluform Shuttering in High rise Towers.
- Labour laws and compliance system in Construction.
- Environmental Clearance for Large Building Projects - critical appraisal.

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

Students will work on at least one project taken up in the studio and work on details of the project relating to all the above mentioned topics in the form of report .

### **OUTCOME :**

To acquaint in depth knowledge of the topic in all respect.

### **RECOMMENDED READINGS :**

All books/ Journals/ Magazines/ unpublished thesis related to the topic selected by the individual student.



<b>SUBJECT TITLE:</b>				
<b>REAL ESTATE DEVELOPMENT &amp; FACILITIES MANAGEMENT</b>				
Subject Code : <b>2019CM203</b>				
Teaching Scheme		Examination Scheme	Marks	
Theory Periods per week	2	Sessional	200	
Studio Periods per week	2	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>4</b>	In-semester Examination	Nil	
		End-semester Examination	Nil	
<b>Total Credits</b>	<b>4</b>	<b>Total Marks</b>	<b>200</b>	

### **COURSE OBJECTIVES:**

- Intent of the course is to impart detailed knowledge of all aspects related to management of Real Estate projects to train the students as Real Estate Project Managers.
- To develop students understanding on Facilities Management for large Projects and it's importance in operations of a operational Building.
- To develop students capability to manage various building services and to increase safe and healthy utilization of buildings and properties with minimal breakdown time.

### **COURSE CONTENT :**

**Unit 1:** Planning norms for various Services & Utilities, Township facilities; Schools, Hospitals, Housing, Commercial Complexes etc. Importance of building services, type of services required to keep the facility usable, planning of services, organization structures of services management.

**Unit 2:** Role and administrative functions of Supervisors. Real estate consultants and their activities, Role and responsibilities of property managers

**Unit 3:** Real Estate Scope; Real Estate appraisal and valuation; Role, scope, working characteristics and principal functions of real estate participant and stakeholders;

**Unit 4:** Real Estate investment, sources and related issues; Code of ethics for Real Estate participants. Environmental issues related to Real Estate transactions.

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

- Assignments to cover the topics listed in content.
- Presentations based on live projects to give the understanding of the related topics.

**OUTCOME :**

To impart detailed knowledge of all aspects related to management of Real Estate projects to train the students as Real Estate Project Managers. Students are expected to comprehend interests of various stakeholders and build understanding to discharge appropriate functions.

**RECOMMENDED READINGS :**

As recommended by subject faculty.

SUBJECT TITLE: <b>Advance building Construction Technology and Services</b>				
Subject Code : <b>2019CM204</b>				
Teaching Scheme		Examination Scheme	Marks	Duration
Theory Periods per week	2	Sessional	Nil	
Studio Periods per week	1	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>3</b>	In-semester Examination	30	
		End-semester Examination	70	150 min
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>100</b>	

### COURSE OBJECTIVES:

- To give coverage on aspects of construction technologies related to building projects and sustainable building materials.
- To introduce the structural system concepts and design processes & methodology in relation to architectural and structural systems of building projects.
- To expose students to Building Services, Design, installation and maintenance of essential services and equipment found in any building.
- The importance of building services. Building services are the systems installed in buildings to make them comfortable, functional, efficient and safe.

### COURSE CONTENT :

#### **Unit: 1-** Pre-cast and pre-stressed concrete Analysis & constructions

- Introduction, Basic concepts, materials-various Pre tensioning and post tensioning systems, concept of losses, and concept of cable profile.

#### **Unit: 2-** Pre-fabricated and off-site technologies

- Introduction ,Element and components of prefabricated system & for offsite system

#### **Unit: 3-** Structural requirement of buildings

- Detailed consideration on strength, stability, stiffness, and ductility requirement of buildings. Durability of structures; planning, design and detailing, construction and maintenance aspects. Structural systems for large span roofs; steel truss system, single and double layered tubular space frames, composite system with steel girders and R. C. C. slabs. The objective of the course is to introduce the structural system concepts and design processes methodology in relation to architectural and services systems of building projects.

#### **Unit: 4-** HVAC: Air conditioning System

- Types Direct Expansion units, Package units Central chilled water systems Ventilation Systems, Selection Criteria, Refrigeration Cycle Heating & cooling system components & installation.

**Unit: 5-** Electrical LV/EV –CCTV, Networking, BMS System

- Electrical System Components, Power Requirement for Buildings, Sub-station installations ,High-tension (HT) switch gear, Transformers, HT & low-tension (LT) panels ,Capacitors & power factor maintenance Types of electrical conductors, LT distribution system, Protection devices Low voltage systems Emergency, Power Supply

**Unit: 6-**Specialized Services

- Solar lighting /water , Automatized Services , Smart & Intelligent services

**SUBMISSION REQUIREMENT FOR SESSIONAL WORK:** Case study (choose any one typology of building) Report which containing Study of individual topics as mentioned in above units with respective to design and design consideration, Technical Adoption during construction, Advance Martial and its installation provision.

- Class tests
- Presentation reviews
- Individual Assignments
- Group Assignment

**OUTCOME:**

Study of Role of Building construction & Services Managers as technically minded and has good team working skills.

**RECOMMENDED READINGS :**

- Buiding 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.
- Construction Engineering & management of Projects( For Infrastructure & Civil Works) by S. C. Sharma, Khanna Publishers, 2nd Edition, 2011

<b>SUBJECT TITLE:</b> <b>Research I</b>				
Subject Code : <b>2019CM205</b>				
Teaching Scheme		Examination Scheme	Marks	Duration
Theory Periods per week	2	Sessional	Nil	
Studio Periods per week	1	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>3</b>	In-semester Examination	30	
		End-semester Examination	70	150 min
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>100</b>	

### **COURSE OBJECTIVES:**

The objective of the course is to impart knowledge about the various processes undertaken in research, through quantitative and qualitative methods and to create an appropriate capability for the students to conduct academic research,

### **COURSE CONTENT:**

**Unit 1:** 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,

**Unit 2:** Developing a Research Proposal: Format of research proposal:

Research area identification; Research aim and objective definition; Hypothesis of research topic;

**Unit 3:** Literature sourcing and search; Literature study; Referencing journal papers

Formulation of methodology; Quantitative and Qualitative research; Field study planning;

**Unit 4:** Data Collection; Planning sample surveys, Sample size determination, Survey data collection, Data types and structures, Population description, Ranking & Scoring; Field application and simulation models;

**Unit 5:** Data Analysis and Results; Approach to analysis of survey data; Validity and Reliability analysis; Analysis and presentation of research results;

**Unit 6:** Inferences and Validation, and derivation of conclusions; Compilation and drawing inferences; Discussion of findings of research; Conclusion of study and formulation of recommendations.

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK:**

Assignment will be in the form of notes / journal assignments covering all the topics mentioned above with suitable examples and supportive material.

Students will work on one project in details in the form of report.

### **OUTCOME:**

Students will be imparted knowledge of research methodology and equipped with the knowledge and skills to articulate the findings of their research in the form of seminar and thesis reports as well as research papers.

## **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.

<b>SUBJECT TITLE:</b> <b>Softlab II</b>				
<b>Subject Code : 2019CM206</b>				
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	<b>Marks</b>	
Theory Periods per week	1	Sessional	100	
Studio Periods per week	1	Viva/Oral	Nil	
<b>Total Contact Periods ( 60 min period) per week</b>	<b>2</b>	In-semester Examination	Nil	
		End-semester Examination	Nil	
<b>Total Credits</b>	<b>2</b>	<b>Total Marks</b>	<b>100</b>	

### **COURSE OBJECTIVES:**

The course is to introduce application software and their usage in different phases of construction and rigorously impart training for using the project management software by ongoing projects

### **COURSE CONTENT :**

Computer Lab - Cost Planning & control and Site information Management

### **SUBMISSION REQUIREMENT FOR SESSIONAL WORK :**

Generating report at different stages of construction using appropriate software taking live project.

### **OUTCOME :**

Evaluate and select computer applications for successful construction management throughout different phases.

### **RECOMMENDED READINGS :**

As suggested by faculty