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UNIVERSITY OF MUMBAI



**Revised Syllabus for the Master of
Architecture**

Programme : M.Arch.

Course: Project Management

(As per Choice Based Credit Semester and Grading
System with effect from the academic year 2016–
2017)

Master of Architecture Degree in Project Management

Preamble

It is proposed to offer a regular M.Arch. post graduate course in Project Management of four semesters duration open to students with B.Arch. / G.D. Arch/ B.E. (Civil) recognized qualification. This course is designed to enhance the skills of architects, Engineers and others interested or involved in the Project Management. The course will commence from academic year 2016

Main Themes of this course are as follows:-

- Principles of Management with Advanced Research Techniques
- Contract Regulation & Procedure
- Project Monitoring & Scheduling
- Human resources Management

Objectives of M.Arch (Project Management) course are as follows :-

1. To attain the fundamental understating of large –scale projects.
2. To study vital and sustainable Project Management concepts and programme..
3. To develop successful strategies for the implementation of Project Management Techniques.
4. To judge the performance of projects and process.
5. To work successfully with community, public, private institution and individuals.
6. To develop research skills and enhance knowledge in the field in innovative ways.

SEMESTER 1

CORE SUBJECTS (THEORY)	
Th - 01	Management Theories - Principles & Practices
Th - 02	Law - 1 : Legal Frame work for Construction
Th - 03	Project Planning & Scheduling, Monitoring & Control
STUDIO SUBJECTS	
St-01	Construction Materials And its Management
St-02	Computer Application in Construction Management
ELECTIVES SUBJECTS (ANY TWO)	
El -01	Elective - 1
El - 02	Elective - 2

SEMESTER 2 (Exam to be conducted by university)

CORE SUBJECTS (THEORY)	
Th - 04	Project Accounts and Economics
Th - 05	Law 2: Contract Management
Th - 06	Construction Equipment and Personnel Management
STUDIO SUBJECTS	
St-03	Advanced Construction Methods and Techniques
St-04	Research Methods in Construction
ELECTIVES SUBJECTS (ANY TWO)	
El - 03	Elective - 1
El - 04	Elective - 2

SEMESTER 3

CORE SUBJECTS (THEORY)	
Th - 07	Project Appraisal and Finance Management
Th - 08	Construction Marketing Management
Th - 09	Managerial Decision Making
STUDIO SUBJECTS	
St-05	Construction Management Studio
St-06	Dissertation Stage - I
El - 05	Elective - 1
El - 06	Elective - 2

SEMESTER 4 (Exam to be conducted by university)

ELECTIVES SUBJECTS (ANY TWO)	
El - 07	Elective - 1
El - 08	Elective - 2
STUDIO SUBJECTS	

St- 07	Dissertation Stage - II
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Master's Degree in Architecture (Project Management)

SEMESTER - 1								
Sr. no.	Course title	Teaching Scheme			Examination Scheme			Credits
		Lecture	Studio	Total	Continuous sessional Assessment (Internal)	End Examination	Total Marks	
CORE SUBJECTS (THEORY)								
Th - 01	Management Theories - Principles & Practices	4	-	4	50	50	100	4
Th - 02	Law - 1 : Legal Frame work for Construction	4		4	50	50	100	4
Th - 03	Project Planning & Scheduling, Monitoring & Control	4		4	50	50	100	4
STUDIO SUBJECTS								
St-01	Construction Materials And its Management	-	4	4	50	50	100	4
St-02	Computer Application in Construction Management	-	4	4	50	50	100	4
ELECTIVES SUBJECTS (ANY TWO)								
El -01	Elective - 1	-	3	3	50	50	100	3
El - 02	Elective - 2		3	3	50	50	100	3
TOTAL CREDITS							700	26

SEMESTER - 2								
Exam to be conducted by University								
Sr. no.	Course title	Teaching Scheme			Examination Scheme			Credits
		Lecture	Studio	Total	Continuous sessional Assessment (Internal)	End Examination (External)	Total Marks	
CORE SUBJECTS (THEORY)								
Th - 04	Project Accounts and Economics	4	-	4	50	50	100	4
Th - 05	Law 2: Contract Management	4	-	4	50	50	100	4
Th - 06	Construction Equipment and Personnel Management	4	-	4	50	50	100	4
STUDIO SUBJECTS								
St-03	Advanced Construction Methods and Techniques	-	4	4	50	50 (VIVA)	100	4
St-04	Research Methods in Construction	-	4	4	50	50 (VIVA)	100	4
ELECTIVES SUBJECTS (ANY TWO)								
El - 03	Elective - 1	-	3	3	100		100	3
El - 04	Elective - 2	-	3	3	100		100	3
TOTAL CREDITS							700	26

SEMESTER - 3								
Sr. no.	Course title	Teaching Scheme		Examination Scheme				Credits
		Lecture	Studio	Total	Continuous sessional Assessment (Internal)	End Examination	Total Marks	
CORE SUBJECTS (THEORY)								
Th - 07	Project Appraisal and Finance Management	4	-	4	50	50	100	4
Th - 08	Construction Marketing Management	4	-	4	50	50	100	4
Th - 09	Managerial Decision Making	4	-	4	50	50	100	4
STUDIO SUBJECTS								
St-05	Construction Management Studio	-	4	4	50	50	100	4
St-06	Dissertation Stage - I	-	4	4	50	50	100	3
El - 05	Elective - 1	-	3	3	50	50	100	3
El - 06	Elective - 2	-	3	3	50	50	100	3
TOTAL CREDITS							700	26

SEMESTER - 4								
Exam to be conducted by University								
Sr. no.	Course title	Teaching Scheme			Examination Scheme			Credits
		Lecture	Studio	Total	Continuous sessional Assessment (Internal)	End Examination (External)	Total Marks	
ELECTIVES SUBJECTS (ANY TWO)								
El - 07	Elective - 1	3	-	3	100		100	3
El - 08	Elective - 2	3	-	3	100		100	3
STUDIO SUBJECTS								
St- 07	Dissertation Stage - II	0	20	20	500	500(viva)	1000	20
TOTAL CREDITS							1200	26

SEMESTER 1

CORE SUBJECTS (THEORY)

<p>Th - 01</p>	<p>Management Theories - Principles & Practices</p>
	<p>Introduction to Management What is Management? It's Need ,Importance & Purpose, Evolution of Managements thoughts Different Schools/ approaches to Management: Behavioral, Quantitative, Systems, Contingency Approach</p> <p>Construction Management Nature of Construction Industry, Role of Architects and Engineer, Special Characteritics of Construction activity, their Influence on Construction Managements, Development of Construction Management, Scope of Construction Management Project Management, Contracts Managements functions of Construction Managements.</p> <p>Project Manager Managing projects vis-à- via Managing Routine activities, Qualities of Project Manager, Selection of Project Manager, Training for a Project Manager.</p> <p>Management Planning What is planning? Importance of Planning, Types of Planning, levels of Planning, Strategies, Policies, Procedure, Rules etc. in the context of Planning.</p> <p>Organizing Organizing as a Management process, Principles of Organization, Different Structures of organizations such as line, Line & Staff, Functional, Matrix or project Organization: Characteristics, Features, their Merits and Limitation, Ownerships of Organization: Sole Proprietorship, Partnership, Private Ltd., Public Ltd. Introduction to Organizational climate, Decision Making, Group Decision Making, Staffing: What is Staffing? Steps involved in Staffing, Recruitment, Staffing, Performance Appraisal Development.</p> <p>Leading Leadership Characteristics, Entrepreneur, Leader And Manger Distinguished, Motivation, Managing Conflicts, Leadership Traits And Styles, Different Approaches To Leadership.</p> <p>Communication Process Types Of Communication, Communication Model, Feedback, Effective Communication, Listening skills</p> <p>Controlling Controlling as a Management function, Direct and Indirect Control, Elements of Control, Prerequisites for Effective Control.</p>

<p>Th - 02</p>	<p>Law - 1 : Legal Frame work for Construction</p>
	<p>Architects Act 1972 in India – Scope of work, Professional conduct, Scale of fees, etc. Architect's Professional liabilities and responsibilities. Architectural Competitions. Registration and continuation of registration of COA.</p> <p>Regulations, Conditions and requirements of qualification, equivalence etc. for</p> <p>International practice in countries other than India like: USA, UK, Europe, Gulf countries, Asian countries etc. An overview of various Acts relevant to the Architectural profession: Taxation laws like IT, Service Tax, etc</p> <p>An overview of various Acts relevant to the Architectural profession: like Indian Contract Act, Environment related laws, etc</p>

Th - 03	<p>Project Planning & Scheduling, Monitoring & Control</p>
	<p>Planning</p> <p>Necessity of Planning, Types of Planning: Strategic & Tactical Planning , Long Range, Intermediate range, Short Planning, Planning by Management level, level of details, Pre- tender, Intermediate range, Short Planning, Planning by Management level, level of details, Pre- tender, Post- tender pre construction and detailed, construction planning, Planning, Prerequisite of planning, data collection, method statement, And work break down structure.</p> <p>Planning & scheduling Tools</p> <p>Bar charts, mile stone charts, Network Techniques: Brief Historical development, Basic elements of network, Event activity, simple logics of network, AOL& AON network, their construction, probable errors in network, Analysis of network, Critical event, critical activity, critical path and semi critical path, Non critical activity, float, types of floats.</p> <p>Planning & Scheduling Tools</p> <p>Single & Overlapping relationship: Start to start, Finish to start and finish to finish relationship, Practical applications of network, Time Chainage charts, Line of Balance method, Scheduling with resource constraint, time constraint Time cost tradeoff – simple & complex.</p> <p>Preparing project plans, schedules & budgets, master networks</p> <p>Project Monitoring</p> <p>Progress Reporting, Updating Plans, Review Meeting.</p> <p>Schedule Control</p> <p>Common Causes Of Schedule Delays, Concept of Productivity, Work Study Techniques, Methods Study and Work Measurement, Measurement Productivity in Construction, Methods of Enhancing Productivity.</p> <p>Cost Control</p> <p>Cost codification, Earned Value Concepts, Variance Analysis, Alarm Reports, Control Measures, View Points of the Contractor and Client.</p> <p>Quality Managements & Control</p> <p>Definition of Quality, Aspects of Quality, Quality Control and Assurance, Inspection and Audit For Quality, Preparation of Manuals and Checklists.</p> <p>Safety Managements</p> <p>Types of Accidents on Construction Work Sites And Their Common Causes, Direct And Indirect Cost Of Accidents, Occupational Health Hazards, General Precautions to be Followed For Avoiding Accident, Training For Safety.</p> <p>Integrated Approach to Project Control</p> <p>Project Management Information System, Computer Networking</p>

St-01	<p>Construction Materials And its Management</p>
	<p>1. Modern Construction Material</p> <p>Concrete: High Strength And High Performance Concrete, Fiber Reinforced Concrete, Metals: Alloy Steels Aluminum And Its Products Composts: Plastics, Reinforced Polymer, FRP, Cellular Course. Non- Weathering Materials, Flooring And Façade Materials, Construction Chemicals Smart & Intelligent Materials</p> <p>2. Materials Management</p> <p>Necessity And Importance, Objective And Functions Of Materials Management, Organization for Materials Management</p> <p>3. Materials Procurement</p> <p>Classification & Codification Of Construction Materials. ABC Analysis, Economic Order Quality (EOQ), Purchase Function, Vendor Rating, Vendor Analysis, Legal Aspects Of Purchase, Stores Management.</p>

St-02	Computer Application in Construction Management
	1. Office Applications Use of Application Software such as Word Processors, Spreadsheets & Database
	2. Estimating Softwares Use of estimating Softwares
	3. Project Management Softwares Use of project Management Softwares

SEMESTER 2	
CORE SUBJECTS (THEORY)	
Th - 04	Project Accounts and Economics
	Introduction Introduction to Management Accounting, Concept of Control, Status, Role and Scope of the Management Accounting, Relationship Between Management Accounting and Top-Level Managements.
	Accounting Mechanism Accounting Mechanism & Accounting Practices In India. Preparing of Financial Statements, Accounting Policies with Special References to Revenue Recognition Matching Expenses and Revenue & Depreciation Accounting
	Financial Statements And Their Analysis Understanding of Financial Statements and Their Analysis, Like Balance Sheet, Profit & Loss Account , Ratio Analysis, Fund Flow Analysis, Statement of Changes In Financial Position.
	Statutory Requirement Statutory Requirements for Accounting and Auditing.
	Accounting Types Inflation Accounting, Creative Accounting, Social Accounting and Social Audit.
	Corporate Reporting Corporate Reporting Practices in India.
Th - 05	Law 2: Contract Management
	Contract Management Bid Cycle, Contract Conditions Interpretation By Parties To Contract, Obligation And Responsibilities Of The Parties, Protection And Indemnification, Bonds And Insurance
	Contract Administration Inspection Of Work, Change Of Work, Rejected Work And Deficiencies, Deviations Extra Claim And Their Management, Contract Disputes And Their Settlement , Project Closure
	Office Management Proper Record Keeping In Contract Administrating, Establishment Of Standard Procedure, Coordination Between Various Agencies Involve, Providing Data For Interpretation Of Contract Clauses.
Th - 06	Construction Equipment and Personnel Management
	Equipment Management: Mechanization on construction projects, Sizing, and matching of equipment, Selection and Planning for equipment, Estimating out put of an equipment, Owning, hiring, leasing of construction equipment, Equipment maintenance, Cost of use of equipment, Life of equipment, Physical, Economic, & usefulness, Depreciation, Replacement of equipment
	Human Resources Management 1. Importance Of Human Resources: Sources Of Personnel Staffing & Recruitments: Job Analysis, Job Specification, Recruitments Tests, Selection & Placement, Training : Need For Training, Training Objectives, Strategies And Methods Training Assessment, Performance Appraisal, Compensation, Basic Pay , Variable Pay, Merit Rating, Job Evaluation 2. Labour Issues Labour: Definition Of Labour And Labour Welfare, Contract Labour & Temporary Labour, Various Theories, Historical Development, Agencies For Labour Welfare. 3. Industrial Relations Strikes, Lockouts, Lay-Offs, Grievance Functions, Meaning, Grievance Redressal Procedures, Collective Bargaining, Trade Unions, Overview Of Statutory Measures For Labour Welfare.

STUDIO SUBJECTS	
St-03	Advanced Construction Methods and Techniques
	Conceptual Understanding of various large span structures, like Geodesic domes, hyperbolic paraboloids, and free form shapes etc. used for Airports, Stadia, Industrial buildings, public spaces etc. Construction details understanding, Service systems, Structural Systems, Sequence of erection and facilitating maintenance of such structures. Identify specialized equipment required for erection of such structures. Case study/ies of such structures and reporting.
	Study of advance building materials like Special alloys of steel & other metals, glass, polymer, fabric, Various types of finishes & treatments, Construction chemicals, specially manufactured items from manufacturers catalogues, etc. and specialized equipment required for erection used in erection of structures mentioned in Block 1 above. Market survey and collection of information about the materials.
	Conceptual Understanding of High rise buildings in normal and adverse conditions considering topography of the site, for erection of such structures. Case study/ies of such structures and reporting. Water-logging, marine structures, et. Construction details understanding, Service systems, Structural Systems, Sequence of erection and facilitating maintenance of such structures. Identify specialized equipment required
	Conceptual Understanding of Pre-fabrication in building construction. Concept of Modular co-ordination. Construction details understanding, Service systems, Structural Systems, Sequence of erection and facilitating maintenance of such structures. Essential process of manufacturing, handling of pre-fabricated components. Identify specialized equipment required for erection of such structures. Case study/ies of such structures and reporting.

	Research Methods in Construction
St-04	<p>Methods of Research: Interview Techniques: Questionnaires /Face to face Interviews / Internet survey. Designing a Questionnaire / Interview schedule. Visual Techniques: Observations (participant / non-participant / direct), activity mapping, accesion/erosion trace observations, cognitive maps, etc. Content Analysis: Secondary data analysis: Understanding the relative advantages, disadvantages and application of various methods mentioned above and choosing a method appropriate for a research to achieve its objectives.</p>
	<p>Data Documentation and Analysis: Understanding the nature of data collected and methods of analysis suitable for that data (graphical / numerical / descriptive). Converting data into numerical form for data analysis. Introduction to the Statistics Introduction to the simple statistical methods of analyzing numerical data – frequencies / percentages, mean / median / mode, correlation, chi square test – inferring from the data and interpreting the meaning of those inferences. Use of MS Excel for statistical data analysis.</p>
	<p>Presentation & Reporting: Presentation of the Data: Techniques of presenting the numerical data – graphical (pie charts, bar charts, line graphs etc.), tabulations, verbal qualitative data, architectural drawings / maps. Reporting the Research : Different sections of a research report, technical writing and language (tense, voice, etc.), formatting of a report.</p>

SEMESTER 3	
CORE SUBJECTS (THEORY)	
Th - 07	Project Appraisal and Finance Management
	Project Formulation What Is Project? Investment Opportunities Generation And Screening Of Project Ideas, Project Identification, Project Rating, Preliminary Analysis, Market, Technical , Financial, Economic And Ecological – Pre- Feasibility Report, Project Estimates And Techno- Economic Feasibility Report, Detailed Project Report, Different Project Clearances.
	Project Estimation Importance Of Estimation, Method Of Cost Estimating, Parameter Cost Estimating, Cost Capacity Factor, Detailed Cost Estimation, Provision Of Escalation, Inflation Provision And Operation Of Contingency Provisions
	Project Costing Project Cash Flows, Time Value Of Money, Cost Of Capital
	Project Appraisal NPV, BCC,IRR, ARR, Urgency, Pay Back Period, Assessment Of Various Methods Indian Practice of Investment Appraisal As Followed By Institutions For Private Projects & For Government Projects, International Practice Of Appraisal Analysis Of Risk, Different Method , Selection Of Project And Risk, Analysis In Practice.
	Working Capital Management Policy For Working Capital, Estimating Working Capital Needs, Inventory Management, Accounts Receivable, Credit And Cash Management, Managing Payments To Supplies And Outstanding
	Working Capital Needs Sources, Procedures, Practices In Construction Business Capital Investment & Budgeting Capital Investment Decisions, Techniques Of Capital Budgeting, Types Of Budgets, Procedure For Master Budget, Key Factor, Budget Manual, New Approach To Budgeting, Cash Flow Forecasts. Long Term Financing Working Of Financial Institutes In India And Abroad, Self Financing Stock Exchanges Types Of Securities, Borrowings And Debentures Relevant Laws Laws Concerning Income Tax, Sales Tax, Professional Tax Turnover Tax, Etc.

Th - 08	Construction Marketing Management
	Marketing environment: impact of internal and external environment, socio-economic, demographic, political, technological and legal environment, nature and impact of competition, marketing strategy
	Basics of marketing: features of marketing of consumer goods, industrial products and services, product and marketing, marketing organization structures, societal role of marketing
	Marketing projects: characteristics of construction projects, sources of information, pre-qualification documents, bid preparation – estimating, provision for overheads and profit, bidding models, bidding strategy, pre-bid meetings, negotiation, legal aspects, impact of joint ventures, collaborations and alliances, impact of globalization and privatization, strategies for project export
	Marketing real estate: characteristics of real estate, demand and supply relationship, segmentation, product mix, pricing strategies, advertising strategies, legal aspects
Marketing products for construction: characteristics of construction materials and equipment, strategies for marketing of materials and equipment for construction, demand surveys, advertising strategies, communication, exhibitions and product demonstrations, pricing strategies, financing arrangements	

Th - 09	Managerial Decision Making
	1. Management Decision Making Management Problems In Construction, System Approach Concept of Optimization
	2. Decision Making Decision Making Under Uncertainty And Risk, Decision Tables and Decision Tree
	3. Linear Programming Formulation of LP Problems, Solution By Graphical Method, Simplex Method, Transportation Problems, Assignment Problems
	4. Network Model Network Definition, Shortest Route Problem, Maximal Flow Problems
	5. Waiting Lines Basic Structure Of Queuing Models , M/Mi Model
	6. Integer Dynamic And Goal Programming Formulation Of Problems And Application
	7. Simulation Random Number Generation, Monte Carlo Method, Applications

STUDIO SUBJECTS

St-05	<p data-bbox="228 210 620 239">Construction Management Studio</p> <p data-bbox="228 275 1110 304">An in-depth research and analysis of activities below to evaluate the progress of work:</p> <ul data-bbox="228 306 1361 506" style="list-style-type: none">a. Identify a project requiring use of prefabrication, modular coordinated elements.b. Establish need & substantiate use of prefabrication, modular coordinated elementsc. Geography, local conditions and Climatic conditions.d. Special design considerations for the devising a 3 dimensional module – grid.e. Designing for Considerations of manufacture, transport, handling, and specialized equipment and execution.f. Case study/ies to substantiate the design philosophy,g. Evolving Design Brief for the Project. <p data-bbox="228 508 1070 564">The final project work will include Architectural drawings & relevant details, case study/ies, reports for the research/documentation for the project.</p>
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St-06	<p data-bbox="228 712 474 741">Dissertation Stage - I</p> <p data-bbox="228 779 1528 1023">Studio: The student will be guided in their work by their selected / appointed guides throughout the three courses to produce an illustrative, written dissertation. The dissertation calls for a substantial impetus on the quality and quantity of output, besides having a thrust on newer and more relevant areas of research / design and plan intervention / application of planning, design and analytical tools and techniques. The choice of subject, formulation of Programme, Site investigation and selection, and finally culmination in the concrete design demonstration shall depend upon many factors such as student's personal interest, circumstances and abilities. A careful check shall be made to see that access is available to relevant buildings and to appropriate libraries, record offices, laboratories and other technical resources. Students are expected to complete the project, with critical remarks and assessment from the counselor.</p>
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SEMESTER 4

STUDIO SUBJECTS

St- 07	Dissertation Stage - II
	Student should carry out the preliminary literature survey and subsequently, identify the problem in broad terms for Dissertation and finalize/ settle it in consultation with Guide/ Supervisor.
	Pursuant to this, the student shall refer multiple literatures pertaining to the theme of the problem and understand the problem and define the problem in the precise terms.
	Student should attempt solution to the problem by analytical/simulation/experimental methods. The solution shall be validated with proper justification. The students shall compile the report in standard format.
	Student should publish at least one paper based on the work in reputed International / National Conference in which papers are blindly reviewed (desirably in Refereed Journal). More weightage shall be given for the journal publication.
The work to be pursued as a part of the dissertation shall be divided broadly in two parts, namely Dissertation Stage I and Dissertation Stage II.	
The topic of the Dissertation should be such that it is a value addition for the existing knowledge in the field and has some worthwhile research input.	