## as per

# **AICTE Model Curriculum 2018**

Master of Technology (M. Tech.) (Construction Planning & Management)



# IPS Academy Institute of Engineering & Science

(A UGC Autonomous Institute, Affiliated to RGPV)

## **M. Tech. in Construction Planning & Management** Semester-wise schemes for students admitted in 1<sup>st</sup> year in 2020-21 onwards.

- 1. Total number of credits: 70
- 2. Structure of PG program.

S. No.	Category	Suggested breakup of total credits, as per AICTE	Actual Breakup of credits
1	Program Specific Mathematics Course (PSMC)	00	03
2	Program Specific Core Course (PSCC)	12	16
3	Program Specific Elective Course (PSEC)	15	09
4	Open elective courses (OEC)	03	03
5	Mandatory Learning Courses (MLC)	02	04
6	Laboratory Courses (LC)	08	08
7	Liberal Learning Courses (LLC)	00	01
8	Skill Based Courses (SBC)	28	26
9	Audit Course (AUC)	00	00
	Total	68	70

## **CATEGORY OF COURSES**

#### (i) PROFESSIONAL SPECIFIC MATHEMATICS CCOURSES

S.No.	<b>Course Code</b>	<b>Course Title</b>	H	rs./ week	κ.	Credits	Semester
			L	Т	Р		
1	PSMC – MTCP101	Probability & Data Analysis	3	0	0	3	Ι
		3					

#### (ii) PROFESSIONAL SPECIFIC CORE COURSES

S.No.	Course Code	Course Title	Hr	s./ we	ek	Credits	Semester
			L	Т	Р		
1	PSCC – MTCP101	Operation Management	3	1	0	4	Ι
2	PSCC – MTCP102	Project Economics and Financial Management	3	1	0	4	Ι
3	PSCC – MTCP201	Tendering and Contract Management	3	1	0	4	П
4	PSCC – MTCP202	Risk and Safety Management	3	1	0	4	Π
						16	

#### (iii) PROFESSIONAL SPECIFIC ELECTIVE COURSES

S.No.	<b>Course Code</b>	Course Title	Hr	s./ wee	ek	Credits	Semester
			L	Т	Р		
1	PSEC – MTCP101	Elective -I	3	0	0	3	Ι
2	PSEC – MTCP201	Elective -II	3	0	0	3	II
3	PSEC – MTCP301	Elective - III	3	0	0	3	II
		9					

#### (iv) PROFESSIONAL OPEN ELECTIVE COURSES

S.No.	Course Code	Course Title	E	Irs./ weel	X	Credits	Semester
			L	Т	Р		
1	OEC – MTCP201	Operational Analysis	3	0	0	3	II
		3					

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#### (v) MANDATORY LEARNING COURSE COURSES

S.No.	Course Code	Course Title	H	Irs./ wee	k	Credits	Semester
			L	Т	Р		
1	MLC – MTCP101	Construction Planning and Site Management (Bridge Course)	2	0	0	2	Ι
2	MLC – MTCP201	Research Methodology & IPR	2	0	0	2	П
		4					

#### (vi) LAB COURSE

S.No.	Course Code	Course Title	Н	Irs./ wee	k	Credits	Semester
			L	Т	Р		
1	LC – MTCP101	Construction Management Lab - I	0	0	4	2	Ι
2	LC – MTCP102	Design Studio -I	0	0	4	2	Ι
3	LC – MTCP201	Construction Management Laboratory - II	0	0	4	2	П
4	LC – MTCP202	Design Studio -II	0 0 4		2	II	
		redits	8				

#### (vii) LIBERAL LEARNING COURSES

S.No.	Course Code	Course Title	Hrs./ week			Credits	Semester
			L	Т	Р		
1	LLC – MTCP301	Personality Development	1	0	0	1	III
Total credits						1	

#### (viii) SKILL BASED COURSES

S.No.	Course Code	Course Title	Hr	Hrs./ week		Hrs./ week		Credits	Semester
			L	Т	P				
1	SBC – MTCP301	Dissertation Part - I	0	0	20	10	III		
2	SBC – MTCP401	Dissertation Part - II	0	0	32	16	IV		
		edits	26						

#### (ix) AUDIT COURSES

S.No.	<b>Course Code</b>	Course Title	Hr	Hrs./ week		Hrs./ week		Credits	Semester
			L	Т	P				
1	AUD – MTCP101	Disaster Management	2	0	0	0	Ι		
2	AUD – MTCP201	Stress Management	2 0 0		0	Π			
		edits	0						

## Semester-wise Scheme (1st to 4th Semester)

#### **First Semester**

S No	Course Code	Course Title	Hrs	./ We	eek	Credits	
5.110.	Course Coue	Course The	L	Т	P	Creans	
1	PSCC – MTCP101	Operation Management	3	1	0	4	
2	PSCC –MTCP102	Project Economics and Financial Management	3	1	0	4	
3	PSMC – MTCP101	Probability & Data Analysis	3	0	0	3	
4	PSEC – MTCP101	Elective -I	3	0	0	3	
5	LC – MTCP101	Construction Management Lab - I	0	0	4	2	
6	LC – MTCP102	Design Studio -I	0	0	4	2	
7	MLC – MTCP101	Construction Planning and Site Management (Bridge Course)	2	0	0	2	
8	AUD – MTCP101	Disaster Management	2	0	0	0	
Total Credits							

#### Second Semester

S No	Course Code		Hrs	s./ Week		Credits
5.110.	Course Coue	Course Title	L	Т	Р	Creans
1	PSCC – MTCP201	Tendering and Contract Management	3	1	0	4
2	PSCC –MTCP202	Risk and Safety Management		1	0	4
3	PSEC – MTCP201	Elective -II	3	0	0	3
4	OEC – MTCP201	Operational Analysis	3	0	0	3
5	LC – MTCP201	Construction Management Laboratory - II	0	0	4	2
6	LC – MTCP202	Design Studio -II	0	0	4	2
7	MLC – MTCP201	Research Methodology & IPR	2	0	0	2
8	AUD – MTCP201	Stress Management	2	0	0	0
Total Credits						

	Elective-I	Elective-II
	(PSEC - MTCP101)	(PSEC – MTCP201)
А	Urban Planning & Sustainable Construction	Total Quality Management and MIS in Construction
В	Human Resource Development in Construction Industry	Infrastructure Development and Management
С	Marketing in Project Management	Building Information Management

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#### **Third Semester**

S No	Course Code Course Title	Course Title Hrs./ Week				Crodite	
5.110.	Course Coue	e Course Thie	L	Т	Р	Credits	
1	PSEC – MTCP301	Elective - III	3	0	0	3	
2	LLC –MTCP301	Personality Development	1	0	0	1	
3	SBC – MTCP301	Dissertation Part - I	0	0	20	10	
Total Credits					14		

	Elective-III
	(PSEC – MTCP301)
А	Massive Open Online Course - I
В	Project Formulation and Appraisal
С	Energy Conservation Techniques in Building Construction

#### **Fourth Semester**

S No	Course Code	Course Title	Hrs	./ We	Credita	
<b>3.110.</b>	Course Code	Course The		Т	P	Creans
1	SBC – MTCP401	Dissertation Part - II		0	32	16
			Total	Cre	dits	16



# **IPS ACADEMY**

## Institute of Engineering and Science, Indore (M.P.)



A UGC Autonomous Institute, Affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, (M.P.) Masters of Technology (M.Tech.) Civil Engineering Specialization: Construction Planning & Management Semester I [First Year]

First Semester (Autonomy) CE

			Maximum Marks Allotted									
		rse Code Course Title		Theor	у	Practical			Hrs./ week			
S.No.	Course Code		End Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem	Term work Lab Work & Sessional	Total Marks	L	Т	Р	Total Credits
1.	PSCC – MTCP101	Operation Management	70	20	10	-	-	100	3	1	0	4
2.	PSCC – MTCP102	Project Economics and Financial Management	70	20	10	-	-	100	3	1	0	4
3.	PSMC – MTCP101	Probability & Data Analysis	70	20	10	-	-	100	3	0	0	3
4.	PSEC – MTCP101	Elective -I	70	20	10	-	-	100	3	0	0	3
5.	LC – MTCP101	Construction Management Lab - I	-	-	-	60	40	100	0	0	4	2
6.	LC – MTCP102	Design Studio -I	-	-	-	60	40	100	0	0	4	2
7.	MLC – MTCP101	Construction Planning and Site Management (Bridge Course)	70	20	10	_	-	100	2	0	0	2
8.	AUD – MTCP101	Disaster Management	70	20	10	-	-	100	2	0	0	0
		Total	420	120	60	120	80	800	16	2	8	20

#### **Elective-I (PSEC – MTCP101)**

- (A) Urban Planning & Sustainable Construction
- (B) Human Resource Development in Construction Industry
- (C) Marketing in Project Management

**Objectives:** Operations Management is a discipline that deals with designing, managing, and controlling business processes, including acquisition and utilization of resources and distribution of its goods/services. It is essential for all business managers to acquire an understanding and appreciation of operations.

#### Module 1 Introduction

System Productivity, Capital Productivity, Labour Productivity, Personnel Productivity, TrainingDefinition, production functions, Functions & Responsibilities of Productionmanagement and its relations to other management functions, Automation. Difference between services and Manufacturing. Competitiveness Strategy and productivity. Computing productivity.

#### **Module 2 Operations Strategy**

Operations Strategy, Competitive Capabilities and Core Competencies, Operations Strategy as a Competitive Weapon, Linkage Between Corporate, Business, and Operations Strategy, Developing Operations Strategy, Elements or Components of Operations Strategy, Competitive Priorities, Manufacturing Strategies, Service Strategies, Global Strategies and Role of Operations Strategy, Case-lets.

#### **Module 3 Operations Analysis**

Objectives of Layout, Classification of Facilities, Basis for Types of Layouts, Why Layout decisions are important, Nature of layout problems, Redesigning of a layout, Manufacturing facility layouts, Types of Layouts, Layout Planning, Evaluating Plant Layouts, Assembly Line Balancing, Material handling

#### **Module 4 Operations forecasting**

The Strategic Importance of Forecasting, Benefits, Cost implications and Decision making using forecasting, Classification of Forecasting Process, Methods of Forecasting, Forecasting and Product Life Cycle, Selection of the Forecasting Method, Qualitative Methods of Forecasting, Quantitative Methods, Associative Models of Forecasting, Accuracy of Forecasting

#### (10Hrs)

#### (10Hrs)

(10Hrs)

#### (10Hrs)

#### **Module 5 Operational Planning and controlling**

Strategies for adjusting capacity, Aggregate Planning, Material Requirements Planning (MRP), Scheduling, Capacity Requirements Planning (CRP), Enterprise Resource Planning (ERP),Project Management Life Cycle, Project Monitoring and Control, Change Control, Risk Management, Project Closure

#### **Course Outcomes:**

Students will be able to

- CO1. Demonstrate comprehension of the business operations and their role within an organization.
- CO2. Identify important factors in designing, managing, and controlling business processes and how to improve.
- CO3. Illustrate the important facility layout and line balancing during decision processes and how to improve.
- CO4. Perform the mathematical techniques and computer software skills to solve managerial problems.
- CO5. Articulate an appreciation of various fields of operations management and how to adapt the knowledge learned to those issues.

- 1. Crosby, "Let's Talk Quality", McGraw-Hill, 1989
- 2. Heizer, Render, "Principles of Operations Management" 7th Edition, Prentice Hall, 2008.
- 3. Operations Management: "Processes and Supply Chains" 12th Edition 2017.
- 4. Eliyahu M Goldratt "The Goal: A Process of Ongoing Improvement" 30<sup>th</sup> Edition 2014.

DSCC MTCD102	<b>Project Economics and Financial</b>	21.1T.0D (Abra)	1 Credita
PSCC-MITCP102	Management	<b>3L:11:0P</b> (4018)	4 Creans

**Objectives:** To understand the Economics in civil engineering, concept of alternatives for decision making, analyze financial returns, and evaluate the value added tax and the concept financial management, construction costing and financial statement analysis.

#### Module 1 Introduction

Introduction & Basics of Economics & Finance: Meaning & necessity of: Economics, Costing & Finance, History & fundamentals of Economics, Basics of Finance & Accounting, rates of interest, Basics of Financial Statement, Financial Analysis, Inflation, etc

#### **Module 2 Economic Analysis**

Cost implication to different forms of construction and maintenance and replacement lives of material, Installation and running cost of services, Capitalinvestment in project, Cost analysis by traders and by functional element, Cost planningtechniques, Cost control during design and Construction, Depreciation, Various Appraisal Criteria Methods. Break-even analysis, Cash flow analysis, Risk Analysis and Management Practice, Role of Lender's Engineer. Cost pricing method.

#### **Module 3 Financial Planning**

Need and sources of Finance, Long term finance planning, Stock, Borrowings, Debentures, Loan Capital, Public Deposit, Dividend Policies, Bonus Shares, Market value of shares, Reserves. Budget: Budgetary control system. Types of budgets, Procedure for master budgets. Budget manual.

#### Module 4 Corporate Sector

Corporate tax planning, Public policies on ICRA grading of exchange, Worldfinancial market, Role of financing institutes in Construction sector, SEBI regulation., GST, CGST, SGST, Direct Tax Court System.

#### **Module 5 Construction Accounts**

Accounting process, preparation of profit and loss account and balance sheet as per the

#### (10Hrs)

(**10Hrs**)

## (**10Hrs**)

(**10Hrs**)

#### (08Hrs)

companies Act2013, preparation of contract accounts for each project, methods of recording and reporting site accounts between project office and head office, Ratio Analysis. Escrow Account for PPP Project

#### **Course Outcomes:**

Students will be able to

- CO1. To understand concept of alternatives for decision making.
- CO2. To analyze financial impact of maintenance in project, method of cost analysis during design and construction of project
- CO3. To make them aware about impact of financial sourcing and budgeting on project.
- CO4. To understand the tax code system, corporate policies and regulatory
- CO5. To understand the construction accounts and accounting process.

- 1. Mubarak, "Construction project scheduling and control" Wiley India. 2<sup>nd</sup> Edition 2011.
- 2. D Lal, "Construction Management & PWD Accounts" S. K. Kataria & Sons 2012.
- 3. Singh H. "Construction Management and Accounts" Tata McGraw Hill, New Delhi, 1988
- Cormican D., "Construction Management: Planning and finance" Construction press, London, Feb 2002.
- 5. Brealey R.A., "Principles of Corporate Finance" Tata McGraw Hill, New Delhi, 2003.

PSMC - MTCP101	Probability and Data Analysis	3L:0T:0P (4hrs)	3 Credits
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**Objectives:** This mathematical study is related to data analysis, probability and statistical techniques which are significant in the research projects.

#### **Module 1 Data Collection and Presentation**

Data Collection: Primary and Secondary Sources of data, Survey Design, sources of various data in India Data Presentation: Classification of Data, Tabulation of Data, Charting of Data, Choice of Suitable Diagrams, etc.

#### Module 2 Data Analysis

Data Analysis: Measures of Central Tendency: characteristics of a Good Average, Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean, etc. Measures of Variation: Significance of Measuring Variation, Methods of Studying Variation, Average Deviation, Standard Deviation, etc. Skewness, Moments and Kurtosis: Measures of Skewness, Moments, Kurtosis, etc. Probability and Data Sampling

#### **Module 3 Probability**

Probability: Types of Probability, Random Variable, Probability Function, Sampling: Purpose and Principle of Sampling, Methods of Sampling, Size of Sample, Merits and Limitations of sampling, Sampling Distribution, etc.

#### **Module 4 Statistics**

Correlation Analysis: Significance, Correlation & Causation, Types of Correlation, Methods of Studying Correlation, Multiple Correlation, etc.

Regression Analysis: Difference between Correlation and Regression, Linear Bivariate Regression Model, Regression Lines, Equations, Coefficients, etc.

Index Numbers: Use of Index Numbers, Unweighted Index Numbers, Weighted Index Numbers, Quantity Index Numbers, Volume Index Numbers, Test for Perfections, etc

#### **Module 5 Forecasting and Time Series**

Analysis Forecasting: Introduction, Steps in Forecasting, Methods of Forecasting, etc

## (**10Hr**)

#### (10Hr)

(10Hr)

#### (10Hr)

#### (10Hr)

Time Series Analysis: Components of Time Series, Straight Line Trends, NonLinear Trend, etc.

Input-Output Analysis Hypothesis Testing: The Chi ( $\chi 2$ ) Test, The Z-Score Test, The T-Test, Test for Proportion

#### **Course Outcomes:**

Students will be able to

- CO 1. Know about the data collection and survey design.
- CO 2. Learn the data analysis, central tendency Standard Deviation, Skewness, Measures of Skewness, Moments, Kurtosis, Probability and Data Sampling.
- CO 3. Learn probability, Principle and Methods of Sampling.
- CO 4. Apply various statistical techniques to civil engineering projects.
- CO 5.To learns Forecasting and Time Series analysis and Hypothesis Testing.

#### **Text Books / Reference Books:**

- 1. Gupta S. P. and Gupta M. P. "Business Statistics", Sultan Chand & Sons, New Delhi (2005).
- 2. Gupta S. C. and Kapoor V. K. Sultan Chand & Sons, New Delhi (2014).
- 3. Rosenfeld, Zirekel "Understanding Statistics", McGraw Hill, USA (1972).
- Kruckerberg and Silvers, "Urban Planning Analysis: Methods and Models", John Wiley & Sons, New York (1974).
- 5. Mode, "E B Elements of Statistics, Prentice Hall", New Jersey Naiman (1961).
- Wannacott and Wannacott "Introductory Statistics", John Wiley & Sons, New York (1969).
- 7. Yamane, Taro, "Statistics An Introductory Analysis", Harper, New York (1964).

#### **Urban Planning and PSEC-MTCP101(A)** 3L:0T:0P (3Hrs) **3** Credits **Sustainable Construction**

**Objectives:** To study the defects, mistakes and weaknesses in developing towns for attempting to eliminate them gradually and to fulfill a city's most serious needs and removing its problems.

#### Module 1 Introduction to Urban Planning

Meaning of Planning, Urban Planning, Elements of a City, Need for Urban Planning, Outcome of Planning is a Plan, Levels of Urban Planning, Process of Planning, Forms of Planning, Urban Planning Devices.

#### Module 2 Urban Planning in India

Urbanization: Global and Indian Scenario, History and Evolution of Urban Planning, Challenges and Issues of Urban Planning in India.

#### **Module 3 Planning Theories**

Ebenezer Howard's The Three Magnets Theory, Concentric Model Zone Theory, The Sector Model Theory, The Multiple Nuclei Model Theory.

#### **Module 4 Infrastructure Planning**

Definition of Public Works and Infrastructure, Overview of Infrastructure: Electric, Telecom, Transport, Water, Categories of Infrastructure Projects, Infrastructure Planning Steps, Infrastructure Management.

#### **Module 5 Smart Cities and Sustainable Development**

Sustainability, Information and Communication Technology (ITC) Revolution, City Transformation system, Urban Networks, Urban Challenges, Smart City Concept.

#### **Course Outcomes:**

Students will be able to

CO1. To understand the key concept and need for urban planning

CO2. To acquaint with the status of urban planning in India

CO3. To study the various theories involved in urban planning and its implementation

#### (10 Hrs)

(**10Hrs**)

(10Hrs)

#### (10Hrs)

#### (10 Hrs)

CO4. To inculcate the idea about infrastructure planning.

CO5. To incorporate the fundamental concept of smart cities and sustainability.

- 1. Hall, P., Jones, M. T., "Urban and Regional Planning", Taylor and Francis 2010.
- Hall, P., "Cities of Tomorrow, an Intellectual History of Urban Planning and Design since 1880". 4th Edition, Wiley-Blackwell 2014.
- Crane, R., Weber, R., "The Oxford Handbook of Urban Planning". Oxford University Press 2012.
- Bracken, I., "Urban Planning Methods, Research and Policy Analysis", Routledge, Taylor & Francis 2009.
- Dimitriou, H.T., Gakenheimer, R., "Urban Transport in the Developing World, A Handbook of Policy and Practice". Edward Elger, USA 2011,
- Sen, J., "Sustainable Urban Planning, The Energy and Resources Institute", New Delhi, India 2013.
- 7. Lopez, R., "The Built Environment and Public Health". John Wiley & Sons 2012.

Objectives: Study of human resource development in the construction industries, the recruitment process, their training, performance management and their performance appraisal.

#### Module 1Introduction

Need of HRD in the context of globalization, Organization Policies various HRD parameters viz. Elements of the ICDP i.e. integrated construction development paradigm, key elements of HRD such as basic literacy, functional skills, supervisory skills, entrepreneurship skills. Databaseconcept & application in Human Resource Information System

#### **Module 2 Recruitment process**

Recruitment policies, Pre requisites skills- Soft and technical skills. Employee testing & selection. Personal Management – Concept of Personal Management, Responsibilities & authority Roleand Function of Personal Manager, Necessity of Personal Management

#### **Module 3 Training**

Training of multi-skilled workforce, quality, productivity and employee relations inconstruction, contractors & sub-contractors – selection, training & development, performanceappraisal, potential appraisal, training rewards etc. Selection of contractors regionwise & retaining, Upgrading HRD for construction MNC/Multi portfolio project handlingorganization. Formation of joint ventures, privatization and BOT type of systems. CIDC – IGNOUTraining programs

#### **Module 4 Performance Management**

Introduction to the field of people management -basic Individual psychology motivation -job deign and performance management -Managing groups at work - self managing work teams-Intergroup behavior and conflict in organizations –Leadership- Behavioral aspects of decisionmaking; and communication for peoplemanagement

#### Module 5 Performance Appraisal

Compensation- Wages and Salary, Employee Benefits, employee appraisal and assessment-Employee services -Safety and Health -Discipline and discharge -Special Human resource

## (10Hrs)

(10Hrs)

(10Hrs)

#### (10Hrs)

(10Hrs)

problems, Performance appraisal-Employee hand book and personnel manual -Job descriptions and organization structure and human relation.. -Productivity of Human resources.

#### **Course Outcomes:**

Students will be able to

- CO1. Understand the basics of human resource development.
- CO2. Understand the Recruitment policies, Pre requisites skills- Soft and technical skills. Employee testing & selection.
- CO3. Understand Training of multi-skilled workforce, quality, productivity and employee relations in construction.
- CO4. Understand the performance management of employee with different techniques.
- CO5. Understand the Wages and Salary, Employee Benefits, employee appraisal, Safety and Health laws.

- 1. Biswajeet Pattanayak, "Human Resource Management" PHI Learning 2018.
- 2. Monappa A "Personnel Management" Tata McGraw Hill, new delhi. 1997
- 3. Carleton Counter II and Jill Justice Coutler, "The Complete Standard Handbookof Construction Personnel Management" Prentice Hall, Inc., New Jersey, 2009.
- 4. Memoria .C.B "Personnel Management", Himalaya Publishing Co., 2002.
- 5. Josy .J, Familaro, "Handbook of Human Resources Administration", McGraw-HillInternational Edition, 2007.

PSEC-MTCP101(C)	Marketing in Project Management	3L:0T:0P (3Hrs)	3 Credits

**Objectives:** Project marketing focused on customer based approach helps build and maintain long- lasting relationships with key clients and stakeholders avoiding short term opportunism. Project marketing also builds and maintains relationships between two projects with key customers and stakeholders

#### Module 1 Introduction to Marketing concept

Evolution of marketing & Customer orientation, Marketing Environment and Evaluation of Market opportunities, Market research & Marketing Information Systems, Demand forecasting and Market potential analysis, Consumer buying process & Organizational buying behavior ,Pillars of Marketing.

#### Module 2 Market segmentation

Target marketing Positioning & Differentiation, Marketing Mix, Product decisions — Product Life cycle,New Product development process,Distribution decisions- Logistics & Channel decisions, Promotion decisions- Integrated.

#### **Module 3 Marketing communications**

Marketing communications concept, communication tools, Personal Selling & Sales management -, Pricing decisions

#### **Module 4 project Introduction**

Introduction what is a project? Why and how to plan a project, Organizing the project team, the role of the project manager, Time estimating, Planning the budget, Project cost reports

#### Module 5 The Owner's Perspective The project life cycle (**10Hrs**)

The Owner's Perspective The project life cycle-Major Types of Construction-Selection of Professional Services-Construction contractors-Financing of constructed facilities-Legal and regulatory Requirements-The changing Environment of the construction Industry-The Role **Project Managers** 

#### (**10Hrs**)

(10 Hrs)

# (10Hrs)

(10Hrs)

#### **Course Outcomes:**

Students will be able to

- CO1. Understand the marketing concept, Market research & Marketing Information Systems.
- CO2. Know the different segment of marketing.
- CO3. Understand the communication tools and sales management.
- CO4. Understand the project and organizing team of project.
- CO5. Know the role of project manager, financing of constructed facilities, Legal and regulatory Requirements of project

- 1. Barnard Cova, "Project Marketing: Beyond Competitive Bidding" Wiley 2002.
- Scott bercun, "Making Things Happen: Mastering Project Management" O'Reilly Media 2008.
- Michael Kleinaltenkamp, "Business Project Management and Marketing" Springer; 1<sup>st</sup> Edition 2016.

Objectives: To study about the construction project management, site management and improvement labour productivity in construction industries.

#### Module 1Introduction

Traditional Management and modern scientific management, Principles of management, Theories of Taylor, Fayol, Mayo, McGregor, Weber, Gilbreth.

#### **Module 2 Construction Management**

Construction Management -Basic forms of organization. Role of planning department in construction projects.

#### **Module 3 Project Management**

Project life cycle. Construction scheduling using Gantt chart, milestone chart. Network techniques like CPM, PERT, Precedence, updating, time-cost tradeoffs. Resource constrained scheduling and resource leveling.

#### Module 4 Site Administration Site Controlling (10Hrs)

Site layout and mobilization, Site organization, Execution, Monitoring, Material and equipment procurement, completion of work and closing the site.

#### **Module 5 Labor Productivity Improvement**

Fundamental Principles of Workforce Management, Productivity Evaluation, Detailed Analysis.

#### **Course Outcomes:**

Students will be able to

- CO 1. Determine the practical application of construction management.
- CO2. Determine the time duration, manpower requirement of construction project.
- CO 3. Modern project planning and management practices.
- CO4. Monitor project planning and its execution.

#### (08 Hrs)

#### (10 Hrs)

(10 Hrs)

(10Hrs)

CO 5. Site Management ethics, strategies and control.

- 1. Sengupta and Guha, "Construction Management and Planning", Tata McGraw Hill Publication 2003.
- 2. K Nagrajan, "Project Managemen"t, New age International Limited 2017.
- Barrie & Paulson, Professional Construction Management, McGraw Hill Institute Edition. 1992
- 4. Roy, Pilcher" Construction Management" S.S. Sastry, "Introductory methods of numerical analysis", PHI, 4th Edition, 2005.
- "Construction site management and labor productivity improvement", Ellis, Ralph D.; Thomas, H. Randolph 2017.

AUD- MTCP101	Disaster Management	2L:0T:0P (2hrs)	2Credits
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**Objectives:** To understand the conceptual applications of principles of management to mitigate various disasters.

#### Module 1 Understanding Disaster

(08 Hrs)

Understanding Disasters, Disaster Management, Disaster Management Cycle, Key Phases of disaster management, Acceptable risk, Capacity, Capacity development, Contingency planning, Coping capacity, Critical facilities, Disaster risk, Disaster risk reduction, Emergency services, Environmental impact assessment, Hazard, Mitigation, Preparedness, Recovery, Response, Retrofitting, Risk, Sustainable development, Vulnerability.

#### Module 2 Types, Trends, Causes, Consequences and Control of Disaster (10 Hrs)

Geological Disasters (earthquakes, landslides, tsunami, mining), Hydro Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves). Biological Disasters (epidemics, pest attacks, forest fire). Technological Disasters (chemical, industrial, radiological, nuclear) and Man-made Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters) Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters

#### Module 3 Economic and Financial Aspect of Disaster Management (12 Hrs)

Financial Planning and control of disaster mitigation and management implementation programmes. Comparative analysis models for disaster mitigation and management. Budgeting, Identifying sources of funds and provision of funds. Economic consequences of disaster and intangible economic impacts of disaster. Principles of economic recovery and strategies for economic recovery. Financial recovery from disaster- disaster insurance, natural disaster relief arrangements and public disaster appeals.

#### Module 4 Strategic Disaster Management

# Understanding the application of the principles and procedures of strategic management in the domain of disaster mitigation and management. Strategy formulation, understanding strategic intent, vision, mission for better forecasting of disaster threats and their prevention and strategic

#### (12Hrs)

management of disaster. Strategic management principles, methods and tools. planning, organizing, leadership and monitoring and evaluation of all role-players in disaster management.

#### **Course Outcomes:**

Students will be able to

- CO 1. Understand disasters, disaster preparedness and mitigation measures
- CO 2. To gain understand approaches of Disaster Risk Reduction (DRR) and the relationship between vulnerability, disasters, disaster prevention and risk reduction.
- CO 3. Understand the economic and financial aspect of .disaster management.
- CO 4. Understand the different strategies involved in disaster management.

#### **Text/Reference Books and IS Codes:**

- Weihrich, H. and Koontz, H Management, "A Global Perspective", McGraw Hill, New York, 1<sup>st</sup> Edition, 1996.
- Kapur Anu and Neti , "Disasters in India: Studies of Grim Reality", Rawat Publication, 1<sup>st</sup> Edition, 2005
- 3. H. N. Srivastava & G. D. Gupta, "Management of Natural Disasters in developing countries", Daya Publishers, Delhi, 2nd Edition 2006.
- 4. Disaster Management Act 2005, Publisher by Govt. of India.
- 5. National Disaster Management Policy, 2009, Govt. of India.
- World Disasters Report, 2009. International Federation of Red Cross and Red Crescent, Switzerland
- 7. Mrinalini Pandey, "Disaster Management", Wiley India Pvt. Ltd, 1<sup>st</sup> Edition 2012

#### Web Materials:

- 1. www.nidmindia.nic.in
- 2. <u>http://quake.usgs.gov</u>

#### LC – MTCP101 Construction Management Lab-I 0L:0T:4P (Hrs) 2 Credits

**Objectives:** To bring about an understanding of use of computers for solving scheduling and other related problems by applying critical path methods and program evaluation review techniques

Sr. No	Practical Name	Application
1	Study of different software's available in the field of Construction Planning and Management.	To understand the importance of available Software in Construction Industry.
2	To calculate the expected mean time of any network using CPM, PERT and finally comparing results with PRIMAVERA software.	To get the theoretical understanding of basics and hands on practice on PRIMAVERA.
3	To calculate the earliest expected time of any network using CPM, PERT and finally comparing results with PRIMAVERA software.	To get the theoretical understanding of basics and hands on practice on PRIMAVERA.
4	To calculate the latest allowable occurrence time of any network using CPM, PERT and finally comparing results with PRIMAVERA software.	To get the theoretical understanding of basics and hands on practice on PRIMAVERA.
5	To calculate the variance time and standard deviation of any network using CPM, PERT and finally comparing results with PRIMAVERA software.	To get the theoretical understanding of basics and hands on practice on PRIMAVERA.
6	To prepare a project report of any single room for plastering using PRIMAVERA and comparing the results manually.	Application of PRIMAVERA & Validation of results.
7	To prepare a project report of any single room for white washing using PRIMAVERA and comparing the results manually.	Application of PRIMAVERA & Validation of results.

#### **Course Outcomes:**

#### Students will be able to:

- CO1. To identify choice of technology and construction method through construction planning.
- CO2. Understand the principles of CPM and PERT.
- CO3. Develop software skills.
- CO4. Prepare the project reports.

LC-MTCP102 Design Studio-1	0L:0T:4P (Hrs)	2 Credits
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**Objectives:** Practical training for conducting site visits related to construction techniques and planning. Capability to use software's for analysis and planning.

#### **Course Contents:**

- Probability: Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability classical, statistical, and axiomatic,
- Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes' theorem and its applications.
- Random Variables: Definition of discrete and continuous random variables, cumulative distribution function (C.D.F.) and its properties (with proof), probability mass function (P.M.F.) and probability density function (P.D.F.)
- Expectation and Moments, Dispersion, Skewness, Kurtosis, Quantiles. Probability inequalities (Markov's and Chebychev's).
- Preparation of models/charts related to various construction techniques, equipment, organizational structures of existing companies etc.

#### **Course Outcomes:**

Students will be able to

- CO1. Computational thinking development through creative programming
- CO2. Modeling
- CO3. Analyze & Design the project structures and interpret the results
- CO4. Understand the overall activity or of project structure and its design



# **IPS ACADEMY**

## Institute of Engineering and Science, Indore (M.P.)



A UGC Autonomous Institute, Affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, (M.P.)

Masters of Technology (M.Tech.) Civil Engineering Specialization: Construction Planning & Management Semester II [First Year]

#### Second Semester (Autonomy) CE

				Ma	nximum Mark	s Allotte	d					
				Theory Practical		actical	Tatal	Hr	s./W	eek	Tatal	
S.No.	Course Code	Course Title	End Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem	Term work Lab Work & Sessional	Marks	L	Т	P Credi	Credits
1.	PSCC – MTCP201	Tendering and Contract Management	70	20	10	-	-	100	3	1	0	4
2.	PSCC – MTCP202	Risk and Safety Management	70	20	10	-	-	100	3	1	0	4
3.	PSEC – MTCP201	Elective -II	70	20	10	-	-	100	3	0	0	3
4.	OEC – MTCP201	Operational Analysis	70	20	10	-	-	100	3	0	0	3
5.	LC – MTCP201	Construction Management Laboratory - II	-	-	-	60	40	100	0	0	4	2
6.	LC – MTCP202	Design Studio -II	-	-	-	60	40	100	0	0	4	2
7.	MLC – MTCP201	Research Methodology & IPR	70	20	10	-	-	100	2	0	0	2
8.	AUD – MTCP201	Stress Management	70	20	10	-	-	100	2	0	0	0
		Total	420	120	60	120	80	800	16	2	8	20

**Elective-II (PSEC – MTCP201)** 

(A) Total Quality Management and MIS in Construction

(B) Infrastructure Development and Management

(C) Building Information Management

## **PSCC-MTCP201**Tendering and Contract Management**3L:1T:0P (Hrs)4 Credits**

**Objectives:** To study about contract management in construction industries. Tender management and legal frame work of construction labour laws and industrial dispute.

#### Module 1 Contract Management - I

Types of Construction contract, Lump sum, Unit rate, cost plus-fee, Cost Plus percentage-fee, Incentive Contracts, Nature of Contract, Contract Documents and Contracting procedures, contract revisions, Negotiated contracts, contract claims

#### Module 2 Contract Management - II

Technical Specifications, Drawings, Tender Bond, Labour and Material Payment Bonds, Scrutiny of Tenders, acceptance, letter of indent. Important Contract clauses, Terms of Payment, retention acceptance and final payment, maintenance period, Time for Completion, Extension of time, Variation in work and conditions, claims and disputes, liquidated damages, Termination rights and responsibility of client, Architect, Engineer, Contractor, Professional liability. Disputes in contracts, Sub-contracts. Purchase orders as contracts. Insurance Contract and Claims. Arbitration.

#### **Module 3 Tender Management**

Advance Techniques of Estimating. Principles of Analysis of rates and Specification, legal requirement of planning, local government approval.

#### Module 4 Legal Frame Work of Construction

Constitutional provisions relating to Business and industry, Master Plans, Indian Contract Act. Arbitration act and industrial dispute act,

#### Module 5 Labour Laws and Legislation

Contract labour (RRA) ACT 1970, laws relating to wages, Workmanship compensation act, child labour act Maternity benefit Act.

#### (**10Hrs**)

(10 Hrs)

#### (10Hrs)

(10Hrs)

## (10Hrs)

#### **Course Outcomes:**

Students will be able to

- CO1. Understand different types of contracts, contract document and contracting procedure.
- CO2. Understand technical Specifications, Drawings, Tender Bond, Labour and Material Payment Bonds, Scrutiny of Tenders, acceptance, letter of intent and different technical term related to contract management
- CO3. Understand tender management, advance techniques of Estimating. Legal requirement of planning and local government approvals.
- CO4. Know about constitutional provisions related to Business and industry, Master Plans, Indian Contract Act and Industrial disputes.
- CO5. Know about Contract labour (RRA) ACT 1970, laws relating to wages, Workmanship compensation act and different labour Laws and legislation

- 1. Aqua group, "Tenders and Contracts for Building" Wiley-Blackwell 3rd Edition 1999.
- S.R.C Nayar, Justice P.S Narayana, "Law of Contracts with special Reference to Tenders and Construction Agreements" Gogia Law Agency 6<sup>th</sup> Edition 2015.
- Martin Brook, "Estimating and Tendering for Construction" A Butterworth-Heinemann Title 4th Edition 2008
- 4. J P Nayak, G B Deshpande, "Quantity Surveying Contracts and Tenders" Nirali Prakashan

PSCC – MTCP202	<b>Risk and Safety Management</b>	3L:1T:0P (4Hrs)	4 Credits

**Objectives:** The study about risk and safety management in construction Industries, understanding the risk involve in the construction, access and analyze that risk, control or mitigate the risk and understanding safety measures.

#### Module 1 Introduction to Risk Management Definition (10Hrs)

The Development of Risk Management -Principles of Risk Management - The hazard and risk – knowledge of the contents the reasons for managing risk in the public and private sectors – Risk estimation – types of risk and classifications - benefits of having a risk management programme responsibilities of those involved in the risk management - Outline the elements of the various risk management standards

#### Module 2 Risk Assessment, Analysis and Evaluation

Risk Assessment, Analysis and Evaluation, Risk Management Documentation – Risk Culture -Risk Identification - – life cycle risk management – multi dimensional analysis risk ranking event incident scenario – uncertainties and consequences – risk estimation – assessment – quantitative techniques – human factors – decision making under uncertainty

#### **Module 3 Risk Treatment and Control**

Risk Reduction Transfer and Sharing of Risk - Elimination and Retention of Risk - Entrepreneurial risks - Pure risks - Internal risks Retaining insurable risks – Insurance - Selfinsurance - Contractual Transfer of Risk – Captives - Responsibilities of Those Involved in Risk Transfer -- Factors Affecting Insurance as a Financing Tool . Risk Management and Internal How the Internal Audit Function Works - Control Systems - Auditing Risk Management – Setting

#### **Module 4 Construction accidents**

Construction accidents -Accidents and their Causes – Human Factors in Construction Safety -Costs of Construction Injuries – Occupational and Safety Hazard Assessment – Legal Implications .I Contractual obligations- Safety in Construction Contracts – Substance Abuse – Safety Record Keeping

#### (10Hrs)

(**10Hrs**)

#### (10Hrs)

#### **Module 5 Designing for safety**

Designing for safety - Safety Culture – Safe Workers – Safety and First Line Supervisors – Safety and Middle Managers – Top Management Practices, Company Activities and Safety – Safety Personnel – Sub contractual Obligation – Project Coordination and Safety Procedures

#### **Course Outcomes:**

Students will be able to

- CO1. Understand the Principles of Risk Management and Outline the elements of the various risk management standards.
- CO2. Understand the assessment analyze and Evaluation of risk.
- CO3. Understand the treatment and controlling the risk.
- CO4. Know the different construction accident and hazards.
- CO5. Know about the safety measures, Project Coordination and Safety Procedures.

- 1. Bhattacharjee S K, "Safety Management in Construction Principles and Practice"
- **2.** Paul S.V., "Safety Management Systems and Documentation Training Programme Handbook" CBS Publishers & Distributors.
- **3.** Richard Coble Jimmie W. Hinze **Construction Safety and Health Management** Pearson 2000.
- 4. Tim Howarth Paul Watson, "Construction Safety Management" Wiley-Blackwell 2008.

PSEC – MTCP201(A)	Total Quality Management and MIS in Construction	3L:0T:0P (3Hrs)	3 Credits

**Objectives:** To familiarize with quality management and to understand the leadership in construction industry.

#### Module 1 Concept of Quality

Definition of quality as given by Deming, Juran, Crosby, difference between Quality control, Quality Assurance (QA/QC). Total quality control (TQC) and Total Quality Management (TQM), Need for TQM in construction industry. Organization necessary for implementation of quality, Quality manual-Contents, data required, preparation, responsibility matrix, monitoring for quality- PDCA Cycle. Quality aspects in every phase in the life cycle of Construction project

#### Module 2 Control tools and statistical quality Control

Histogram, Pareto diagram, Fishbone diagram, Quality control chart-Testing required for quality control of construction material used in RCC Work- destructive and Non destructive Test (NDT). Statistical Quality Control- Necessity, Benchmarking, Application of dispersion methods in quality control of construction activity

#### Module 3 Study of ISO 9004 Quality System Standards

Development of quality circles, quality inspection team, inspection reports, monitoring and control, 360' feedback for quality. Study of ISO 9004- Quality System Standards. Purpose of ISO Standards. Difference between ISO 9001 and ISO 9004. Certification process for ISO 9001. Certification bodies involved. Eight Principles of ISO-Basic meaning, applying these principles for an effective quality process in the organization.

#### Module 4 Achieving TQM on Construction Projects

Advantages, barriers, principles, steps in implementation, seven types of construction defects. Determining cost of poor quality including hidden cost. Quality functions deployment (QFD). Importance of third party quality audits. CIDCCQRA quality rating systems, customers satisfaction surveys, Non Conformity reports (NCR), remedial strategy for reducing NCR's. Six Sigma: Definition of six sigma, evolution – Historical aspects, probability distribution Six sigma ratings, Six sigma training, six sigma as an effective tool in TQM

#### (10Hrs)

#### (10Hrs)

(10Hrs)

#### (10Hrs)

#### Module 5 Management Information System in Construction

#### (10Hrs)

Information System - Necessity of IT in management, Information flow, Data processing, Flow charting, System analysis and design, Decision – making, IT Project Management and project teams in one or multiple locations, Entrepreneurs Resources Planning (ERP) - Need for ERP concept, ERP system for organization ERP software available in market, Selection and implementation of ERP system.

#### **Course Outcomes:**

Students will be able to

- CO1. Understand the basic concept of total quality management in the construction industries.
- CO2. Know different tools and methods for controlling the quality in construction.
- CO3. Learn the different quality standard in the construction industries and their application.

CO4. Learn how to achieve the total TQM in construction.

CO5. Learn the MIS (management Information system) in construction.

- Pl Jain, "Quality Control & Total Quality Management" Tata Mcgraw Hill Publishing Co Ltd 2007
- 2. Sunil Sharma, "Total Engineering Quality Management" Macmillan India Limited 2003.
- 3. Gordon B Davis, Margrethe H Olson, "Management Information Systems Conceptual Foundations Structure & Development" TMH Co Ltd 2014.

PSEC-MTCP201(B)Infrastructure Development and Management3L:1T:0P (4hrs)4Credits	PSEC-MTCP201(B)	) Infrastructure Development and Management	3L:1T:0P (4hrs)	4	Credits
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**Objectives:** To understand various concepts of infrastructure planning and management. The focus is on imparting knowledge and skills required for planning, management, and effective delivery of large-scale infrastructure projects.

#### **Module 1 Introduction**

An overview of the Urban Infrastructure in India, an overview of the Rural Infrastructure in India, an Introduction to Special Economic Zones, Organizations and Players in the field of Infrastructure, Privatization of Road Transportation Infrastructure in India. Government's initiatives in infrastructure; Initiatives in 5-year plans.

#### Module2 Infrastructure Planning and Implementation

Risks in Infrastructure Projects, Economic and Demand Risks: The Case study for Political Risks, Socio-Environmental Risks, Cultural Risks in International Infrastructure Projects, Legal and Contractual Issues in Infrastructure,

Strategies for Successful Infrastructure Project Implementation: Risk Management Framework for Infrastructure Projects, Designing Sustainable Contracts, Sustainable Development of Infrastructure, Information Technology and Systems for Successful Infrastructure Management, Innovative Design and Maintenance of Infrastructure Facilities.

#### **Module 3 Infrastructure Development Policies**

Infrastructure Policy & Regulation; Land procurement; Project clearances; Appraisal of

techno-legal and regulatory aspects of infrastructure. Infrastructure development models in India: Build-and Transfer, Build-Lease-and-Transfer, Build-Operate-and-Transfer, Build-Own-Operate-and Transfer, Build-Own-and-Operate, Build-Operate-Share-Transfer, Build-Own-Operate-Share Transfer. Legal and Regulatory Framework, Acts, Institutional Reforms.

#### Module 4 Infrastructure Pricing and Financing

Meaning and Scope of infrastructure financing, Concept of SPV, Forms of financing: insurance of bonds, Loans from banks and financial institutions: prospects and limitations. Financing

#### (10Hrs)

(**10Hrs**)

#### (10Hrs)

#### (10Hrs)

market: bonds, credit rating agencies, repayment capacity, borrowing capacity, Cost components of infrastructure development; Socio-economic cost benefit analysis.

Cost recovery and affordability; feasibility of project, Net Present Value (NPV) and Internal Rate of Return (IRR). Subsidy and cross-subsidy of infrastructure project, Case studies of Infrastructure projects and their financing under JNNURM.

#### Module 5 Detail Project Report of Infrastructure Project (10Hrs)

Detailed Project Report (DPR) for any components of city infrastructure as proposed in the Comprehensive City Infrastructure Development Plan prepared in previous planning studio.

The scope of the DPR shall confine to cover all the stages of project preparation includes: Identification of activities, Activity event chart (Network Chart), Cost estimation in detail, Timecost chart (Gantt chart), Cost recovery plan (if required)

The DPR so prepared suitably in form of maps, charts, diagrams, photographs, sketches supported by detailed report for its submission and final evaluation.

#### **Course Outcomes:**

Students will be able to

- CO1. Design integrated framework for infrastructure planning and management.
- CO2. Analyze the strategies for Infrastructure Project implementation
- CO3. Perform Infrastructure modelling and Life Cycle Analysis Techniques
- CO4. Understand the requirement of industries in financial aspect.

CO5. Prepare the detailed project report of infrastructure

- 1. Grigg, Neil, "Infrastructure engineering and management", Wiley, (1988).
- 2. Haas, Hudson, Zaniewski, "Modern Pavement Management", Krieger, Malabar,(1994).
- Hudson, Haas, Uddin, "Infrastructure management: integrating design, construction, maintenance, rehabilitation, and renovation", McGraw Hill, (1997). Principles of Corporate Finance, Brealey R.A. Tata McGraw Hill, New Delhi, 2003.
- JNNRUM (2005). Guidelines Ministry of Urban Development & Poverty Alleviation, Govt.of India, New Delhi.

5. P.Chandra, (2002). Projects Planning, Analysis, Financing, Implementation and Review, Sage Publishers, New Delhi.

# PSEC - MTCP201(C)Building Information<br/>Management3L:0T:0P (3Hrs)3 Credits

**Objectives:** To study building information management, BIM concept environmental aspect and services, architecture BIM modeling and Maintenance and safety of building.

#### Module 1 BIM Concept

What is BIM, BIM development & History, Difference between BIM and Cad, Terms used in BIM, BIM Benefits, Risks and challenges, Present State of BIM Adoption and Road ahead

#### Module 2 Environmental aspect and services

Environmental aspects and services Qualities of enclosure necessary to maintain a specified level of interior environmental quality – weather resistance – Thermal infiltration – Acoustic Control – Transmission reduction – Air quality – Illumination – Relevant systems integration with structural systems, Plumbing – Electricity – Vertical circulation and their interaction

#### Module 3 Architecture BIM modeling

Architectural BIM modeling Building element and Revit element, Revit interface, basic operation, architectural element modeling, views and sheet documentation Structural BIM modelling Modelling structural element, create analytical model, structural analysis, documentation

#### Module 4 MEP BIM Modeling

Modeling for HVAC system, air terminals, mechanical equipment, piping system & plumbing fixture, linking with cross discipline model, create customize families-System families, component families, in place families

#### Module 5 Maintenance and safety

Component longevity in terms of operation performance and resistance to deleterious forces -Planning systems for least maintenance materials and construction – access for maintenance – Feasibility for replacement of damaged components – equal life elemental design – maintenance free exposed and finished surfaces, Ability of systems to protect fire – preventive systems – fire escape system design – planning for pollution free construction environmental – Hazard free Construction execution.

## (10Hrs)

#### (10Hrs)

(**10Hrs**)

(10Hrs)

#### (10Hrs)

#### **Course Outcomes:**

Students will be able to

- CO1. Understand the basic concept of BIM.
- CO2. Learn the different Environmental aspect and services of buildings.
- CO3. Learn Architecture modeling of BIM.
- CO4. Learn MEP system in BIM.
- CO5 Know the various maintenance and safety factors of Buildings.

- Chuck Eastman, Paul Teicholz, "BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors" John Wiley & Sons 2011.
- 2. Nawari Nawari O., "Building Information Modeling" Taylor & Francis Inc
- 3. Portman J BUILDING SERVICES DESIGN MANAGEMENT Wiley-Blackwell 2014
- 4. Finith E Jernigan Aia, "Big Bim Little Bim: The Practical Approach to Building Information Modeling Integrated Practice Done the Right Way" 4site press 2007

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**Objectives:** To determine the maximum (of profit, performance, or yield) or minimum (of loss, risk, or cost).

#### Module 1 Linear Programming:

OR Models, Convex Sets, Graphical Method, Simplex Method, Big M Method, Two Phase Method., Revised Simplex algorithm, Simplex algorithm for Bounded Variables, Primal – Dual construction, Symmetric and Asymmetric Dual, Weak Duality Theorem, Complimentary Slackness Theorem, Main Duality Theorem, Dual Simplex Method, Sensitivity Analysis. Column Generation and Cutting Stock Problems, Decomposition Algorithm, Primal Duel Algorithm, Goodness of the Simplex Algorithm, Goal Programming, Some aspects of polynomial algorithm Integer

#### Module 2 Programming Formulations,

Zero-One Problem- additive algorithm, Gomory's cutting plane algorithm, Branch and bound algorithm, all integer primal-duel algorithms Transportation and Assignment Formulation of Transportation Problem, Initial Feasible Solution Methods, Optimality Test, Degeneracy in TP; Assignment Problem, Hungarian Method, Traveling Salesman Problem.

#### Module 3 Game Theory and Sequencing

Two Person Zero Sum Game, Pure and Mixed Strategies, Algebraic Solution Procedure, Graphical Solution, Solving by Linear Programming; Sequencing Problem, Processing of n Jobs Through Two Machines and m Machines, Graphical Method of Two Jobs m Machines Problem. Games theory simulations applied to construction, Modifications and improvement on CPM/PERT techniques.

#### Module 4 Inventory and Queuing Models

Classical EOQ Models, EOQ Model with Price Breaks, EOQ with Shortage, Probabilistic EOQ Model, Newsboy Problem. Elements of Queuing Model, Pure Birth Death Model, Single Server and Multi-Server Markovian Models with Infinite and Finite Capacity, Machine Repair Model, Networks of Queues

#### (10 Hrs)

(10Hrs)

(10 Hrs)

#### (10 Hrs)

#### Module 5 Decision Theory & Project Management

Introduction, Decision under certainty, Decision under risk, Decision under uncertainty, MaxiMin criterion, MinMax criterion, savage Minimax regret criterion, Decision Tree.

Introduction to PERT and CPM, critical Path calculation, Float calculation and its importance, cost reduction by Crashing of activity.

#### **Course Outcomes:**

Students will be able to

- CO 1. Select appropriate optimization technique
- CO 2. Apply optimization techniques in civil engineering problems.
- CO 3. Analyze practical application of operational analysis in construction projects.
- CO 4. Understand the Inventory and Queuing Models application.
- CO 5. Understand decision theory under certainty and uncertainty condition and project management techniques.

- 1. Mohan, C. and Deep, Kusum, "Optimization Techniques", New Age, 2009.
- Mittal, K. V. and Mohan, C., "Optimization Methods in Operations Research and Systems Analysis", New Age, 2003.
- 3. Taha, H.A., Operations Research An Introduction, Prentice Hall, (7th Edition), 2002.
- 4. Ravindran, A., Phillips, D. T and Solberg, J. J., "Operations Research: Principles and Practice", John Willey and Sons, 2nd Edition, 2009
- Hiller, F. S. and Liebermann, G. J., "Introduction to Operations Research", Tata McGraw Hill, 2002
- 6. Chandra, Suresh, Jayadeva and Mehra, Aparna, Numerical Optimization with Applications, Narosa, 2009

LC –MTCP201	<b>Construction Management Lab-II</b>	0L:0T:4P (Hrs)	2 Credits
	8		

**Objectives:** This course gives an exposure to students in utilizing the sophisticated spread sheets programs, estimation software.

Sr. No	Practical Name		Application
	All the students will be divided into		
	different groups, every group has to choose		
	the individual running projects government		
	or private. All the students need to go to	•	To train the students in the field
	their respective site 2hrs/Week minimum		work so as to have a firsthand
	and study the ongoing progress. Also each		knowledge of practical problems
	group has to give information regarding		related to Construction
1	progress of work every week in the form of		Management in carrying out
	presentation.		engineering tasks using software's.
	Finally each group has to model the project	•	To develop skills in facing and
	in primavera and find out the duration and		solving the problems experiencing
	cost of complete project. Also they need to		in the field.
	check the results manually using CPM &		
	PERT method. Finally project report along		
	with validation report need to submit.		

#### **Course Outcomes:**

Students will be able to

- CO1. Do the Scheduling of a construction project using Primavera scheduling systems including reports and tracking
- CO2. Understand the working of field.
- CO3 Develop software skills and will be able to do the analysis of ongoing project.

LC - MTCP202Design Studio-I10L:0T:4P (Hrs)2 Credits	LC - MTCP202
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**Objectives:** Practical training for conducting site visits related to construction techniques and planning. Capability to use software's for analysis and planning.

#### Module 1

Minimum two site visits to study the feasibility aspects, tendering procedures, accounting systems, funds raising and other financial management aspects, billing procedures etc. associated with on-going major construction work-visit report to be submitted

#### Module 2

Use of spread sheet and data base application software for performing various functions of civil engineers as mentioned is to be demonstrated, Quantity Estimation, Rate Analysis, Bid preparation, Material and supplier information, Employee / equipment information etc.

#### Module 3

Collection and study of tender notices, tender documents of contract document associated with Civil Engineering works.

#### Module 4

Exercise on contract document associated with Civil Engineering works.

#### Module 5

Exercise on Valuation: Valuation of land and building using various methods report to be submitted on prescribed format.

#### Module 6

Web based project management.

#### **Course Outcomes:**

Students will be able to

- CO1. Computational thinking development through creative programming
- CO2. IS Code based modeling
- CO3. Analyze and interpret the results
- CO4. Design the framed structures

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AUD-MTCP201	Stress Management	2L:0T:0P	0 Credit

#### **Course Objectives**

The objective of this course is to enable students to consider the management of work place stress at an individual and organizational level and will help to develop and implement effective strategies to prevent and manage stress.

#### Module-I

#### **Introduction to Stress**

Introduction to stress: Meaning, Definition, Eustress and Distress, Types of stress: Acute stress, Episodic Acute stress and chronic stress, signs and Symptoms

#### **Module -II**

#### Sources of stress

Psychological, Social, Environmental, Academic, Family and Work stress

#### Module - III

#### Impact of stress

Physiological Impact of stress -Autonomic Nervous System Changes, Changes in Brain, General adaptive syndrome (GAD), Quality of sleep, Diet and Health effects (ii) Psychological Impact of stress - Impaired Mental functions, Poor memory (iii) Social Impact of stress - Stressful Life Events, Social support and health

#### Module - IV

#### **Stress and Coping**

Coping Mechanisms: - Coping Mechanisms: Appraisal focused, Emotional focused and Problem focused

#### Module –V

#### **Stress Reduction Techniques**

Use of Audio and Video Aids, Cultural Activities, Autogenic Training, Biofeedback, Relaxation, Yoga and Meditation

#### **Course Outcomes:**

Students will be able to

- CO1. Module -1 makes students acquainted with fundamentals of Stress management for the purpose of improving everyday functioning.
- CO2. Students will learn various sources of stress like psychological, Social, Environmental, Academic family and work for the smooth functioning of day to day life.
- CO3. To enable study of stress as a subjective experience and to enable practical approach with measurable levels of stress, using various physiological tests.
- CO4. To describe a number of self-help approaches to stress-prevention and resiliencebuilding through cognitive-behavioral therapy and understanding of stress whether it can be positiveor negative and ways to deal with it.
- CO 5. Students will learn to prepare a report that promotes healthy and low-stress environment.

#### **Text Books:**

- Greenberg, J. S. (2017). Comprehensive Stress Management (14th edition). New York: McGraw Hill.
- 2. Roy, Sumita. (2005) Managing Stress: Handle, Control, Prevent Sterling Publisher
- 3. Davis M. (2000) The Relaxation and Stress Reduction Work Book, New Harbinger inc.
- Simmons M., Daw W. (1994) Stress, Anxiety, Depression: a Practical Workbook, Winslow Press.
- Tyler M. (1999) Stress Management Training for Trainers Handbook, Living with Stress Ltd
- 6. Udai, Y. (2015). Yogasan aur pranayam. New Delhi: N.S. Publications

#### **Reference Books:**

- 1. Cooper K. (1991) Overcoming Hypertension, Bantam Books.
- 2. Hambly K., Muir A. (1997) Stress Management in Primary Care, Butterworth Heinemann.
- 3. Jones H. (1997) I'm too Busy to be Stressed, Hodder and Stoughton
- 4. Payne R. (1995) Relaxation Techniques: a Practical Handbook for Healthcare Professionals, Churchill Livingstone.
- 5. Steinmetz J. (1980) Managing Stress Before it Manages You, Bull Publishing.

MLC-MTSE201	Research Methodology & IPR	2L:0T:0P	02 Credits

#### **Course Objective:**

Understand some basic concepts of research and its methodologies, identify appropriate research topics and select and define appropriate research problem and parameters

#### Module 1

Research Formulation and Design: L-9 Motivation and objectives – Research methods vs. Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, concept of applied and basic research process, criteria of good research. Defining and formulating the research problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review-primary and secondary sources, reviews, monograph, patents, research databases, identifying gap areas from literature and research database.

#### Module 2

**Data Collection And Analysis:** Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT,SPSS for student t-test, ANOVA, etc.), hypothesis testing.

#### Module 3

**Soft Computing:** L-9 Computer and its role in research, Use of statistical software SPSS, GRETL etc. in research. Introduction to evolutionary algorithms - Fundamentals of Genetic algorithms, Simulated Annealing, Neural Network based optimization, Optimization of fuzzy systems.

#### Module 4

**Research Ethics, IPR And Scholarly Publishing**: Ethics-ethical issues, ethical committees (human & animal); IPR- intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS); scholarly publishing-IMRAD concept and design of research paper, citation and acknowledgement, plagiarism, reproducibility and accountability.

# (08 hrs)

(10 hrs)

#### (10 hrs)

#### (08 hrs)

#### Module 5

**Interpretation and Report Writing:** Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Conclusions.

#### **Course Outcomes:**

After completion of this course, the students are able to:

- CO1: Develop understanding on various kinds of research, objectives of doing research, researchprocess, research designs and sampling.
- CO2: Have basic knowledge on qualitative research techniques
- CO3: Have adequate knowledge on measurement & scaling techniques as well as the quantitativedata analysis.
- CO4: Understand the ethics used in research approach.
- CO5: Apply the knowledge of research methodology for report writing.

#### List of Text Book:

- 1. Anthony, M., Graziano, A.M. and Raulin, M.L., 2009. Research Methods: A Process of Inquiry, Allyn and Bacon.
- Carlos, C.M., 2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options. Zed Books, New York.
- 3. Coley, S.M. and Scheinberg, C. A., 1990, "Proposal Writing", Sage Publications.
- 4. Day, R.A., 1992. How to Write and Publish a Scientific Paper, Cambridge University Press.
- Fink, A., 2009. Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications.
- 6. Leedy, P.D. and Ormrod, J.E., 2004 Practical Research: Planning and Design, Prentice Hall.
- 7. Satarkar, S.V., 2000. Intellectual property rights and Copy right. Ess Publications.

#### List of Reference Book:

- Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
- 2. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International.
- 3. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Publications. 2 volumes.
- Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing.
- 5. Wadehra, B.L. 2000. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing.

# **IPS ACADEMY**



## Institute of Engineering and Science, Indore (M.P.)

A UGC Autonomous Institute, Affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, (M.P.) Masters of Technology (M.Tech.) Civil Engineering Specialization: Construction Planning & Management Semester III [Second Year]

Third Semester (Autonomy) CE

	Maxii			ximum Marks Allotted			_	Hrs /Wook				
			Theory		Pı	Practical		nrs./ week			<b>T</b> ( )	
S.No.	Course Code	Course Title	End Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem	Term work Lab Work & Sessional	Total Marks	L	Т	Р	Credits
1.	PSEC –MTCP301	Elective - III	70	20	10	-	-	100	3	0	0	3
2.	LLC –MTCP301	Personality Development	70	20	10	-	-	100	1	0	0	1
3.	SBC – MTCP301	Dissertation Part - I	-	-	-	120	80	200	0	0	20	10
		Total	140	40	20	120	80	400	4	0	20	14

#### Elective-IV (PSEC – MTSE301)

(A) Massive Open Online Course - I

(B) Project Formulation and Appraisal

(C) Energy Conservation Techniques in Building Construction



PSEC-MTCP301(A)	Massive Open Online Course - I	3L:0T:0P (Hrs)	3 Credits

**Objective**: Student use MOOCs to learn for a variety of reasons, including: career development, changing careers, college preparations, supplemental learning, lifelong learning, corporate eLearning & training, and more.

#### **Course Content:**

Massive Open Online Courses (MOOCs) are free online courses available for anyone to enroll. MOOCs provide an affordable and flexible way to learn new skills, advance your career and deliver quality educational experiences at scale.

#### **Course Outcomes:**

Students will be able to learn new skills, advance your career and deliver quality educational experiences at scale.

#### PSEC – MTCP301(B) Project Formulation and Appraisal 3L:0T:0P (3Hrs) 3 Credits

**Objectives:** To assess and plan various project ideas ,financial and social risk with project implementation and to understand various aspects of project management.

#### **Module 1 Introduction**

The concept of projects, Importance of project formulation, appraisal and management; reasons for shortfall in its performance; scientific management, life cycle of project; detailed project report, and feasibility studies; techniques of financial appraisal, payback period, IRR, DCF, NPV,CBR.

#### **Module 2 Project Formulation**

Project formulation: definition, objectives; Stages of project formulation and their significance; Methodology for project identification and formulation; Feasibility studies, input analysis, financial cost - benefit analysis, social-cost benefit analysis; Project appraisal and report.

#### **Module 3 Project Appraisal**

Project formulation: definition, objectives; Need for project appraisal; Project formulation: definition, objectives; Stages of project form Network analysis; CPM, PERT, resource levelling and allocation, time-cost trade off aspects; Bar charts, Milestones, Standard oriented cost control techniques; Techno-economic analysis of projects.

#### Module 4 Project Implementation and Monitoring

Project implementation, stages of implementation, Teamwork, actors in project implementation; Project monitoring: meaning objectives and significance; Monitoring techniques: integrated reporting, Milestones, time and cost overrun and under runs, unit index techniques.

#### **Module 5 Project Evaluation**

Project evaluation: meaning, objectives, scope, stages, approach and steps, Life of a project; Techniques of project evaluation: input analysis, financial cost-benefit analysis, social-cost benefit analysis; case studies in urban and regional development projects.

#### (10Hrs)

(10Hrs)

#### (8Hrs)

(**10Hrs**)

#### (10Hrs)

#### **Course Outcomes:**

Students will be able to

- CO1. Learn about different term included in the project formulation.
- CO2. Know about project cash flows-Time value of Money-Cost of Capital
- CO3. Understand the project appraisal.
- CO4. Learn about project financing, means of finance and Financial Institutions
- CO5. Know about private sector participation.

- 1. Ambrishgupta, "Project Appraisal and Financing" PHI 2017.
- 2. Pradip K. Lath, Sat P Parasar "Project Appraisal and Financing" HPH 2018

## PSEC - MTCP301(C)Energy Conservation Techniques<br/>in Building Construction3L:0T:0P (3Hrs)3 Credits

**Objectives:** Study of different sources and production systems of energy and their effective management adopting appropriate design methodology in construction.

#### **Module 1 Fundamentals of Energy**

Fundamentals of energy - Energy Production Systems -Heating. Ventilating and Air. conditioning -Solar Energy and Conservation -Energy Economic Analysis -Energy conservation and audits -Domestic energy consumption –savings- challenges – primary energy use In buildings -Residential. Commercial -Institutional and public.

#### Module 2 Energy and Resource Conservation

Energy and resource conservation. Design of green buildings -Evaluation tools for building energy -Embodied and operating energy .Peak demand-Comfort and indoor air quality -Visual and acoustical quality -Land, water and materials – Airborne emissions and waste management

#### **Module 3 Design Consideration**

Natural building design consideration. Energy efficient design strategies -Contextual factor -Longevity and process Assessment -Renewable Energy Sources and design - advanced building Technologies. Smart buildings –Economics and cost analysis.

#### Module 4 Energy in Building Design

Energy in building design - Energy efficient and environment friendly building -Thermal phenomena.-thermal comfort- Indoor Air quality -Climate, sun and solar radiation. Psychometrics -passive heating and cooling systems- Energy Analysis. Active HVAC systems - Preliminary Investigation -Goals and policies -Energy audit -Types of Energy audit -Analysis of results –Energy flow diagram -Energy consumption /Unit Production- identification of wastage - Priority of conservative measures.

#### **Module 5 Energy Management**

Energy management of electrical equipment- Improvement of power factor - Management of maximum demand -Energy savings in pumps -Fans.-compressed air systems -Energy savings In Lighting systems- Air conditioning systems- Applications- Facility operation and maintenance-

#### (8Hrs)

(10Hrs)

#### (10Hrs)

#### (**12Hrs**)

#### (12Hrs)

Facility modifications- Energy recovery dehumidifier- Waste heat recovery. Steam plants and distribution systems Improvement of boiler efficiencies-Frequency of blow down -Steam leakage-steam Flash and condensation.

#### **Course Outcomes:**

Students will be able to

- CO1. Know fundamentals of energy-Energy Production Systems, Energy Economic Analysis and Energy conservation and audits.
- CO2. Understand the design concept of green building, Evaluation tools for building energy, airborne emissions and waste management.
- CO3. Energy efficient design strategies, Renewable Energy Sources and design, advanced building Technologies. Smart buildings Economics and cost analysis.
- CO4. Learn Energy efficient and environment friendly building, Energy Analysis. Active HVAC systems, Preliminary Investigation, Goals and policies & Energy flow diagram.
- CO5. Learn energy management of electrical equipment, Improvement of power factor Management of maximum demand, Energy savings in pumps, Fans and compressed air systems.

- 1. Moore F., "Environmental Control system", Mc Graw Hill, Inc. 2004
- 2. Brown, GZ Sun, "Wind and Light: Architectural design strategies", John Wiley 2005.
- 3. Cook. J Award "Winning passive Solar Design", Mc-Graw Hill- 2004
- **4.** Waters J.R, "Energy Conversation in Building: A Guide to part of the building regulations", Black well publishing, 2003.

LLC-MTCP301

#### **Course Objectives:**

The course will help students to learn effective communication skills, group and team building skills. It will help them to learn the goal setting process and thus become more effective in achieving it.

#### **Course Outcomes:**

The outcome of this course will be to make students aware about the different facets of self. It will also help them learn skills to strengthen their inner capacities so that they are able to understand themselves, think and act effectively to lead.

#### Module-I Introduction to Soft Skills

Importance of Soft Skills, Effective Communication Skills, Verbal: Oral and Written, Merits and Demerits. Non Verbal: Kinesics, Proxemics, Haptics, Chronemics, Paralanguage, Sign/Symbol, Meta Communication, and Cultural differences in Non-Verbal Communication

#### **Module-II Aspects of Communication**

Process of Listening, Types of Listening, Barriers to Listening, Strategies to Develop Listening Skills, Listening Comprehension, Culture as Communication, Communicating across Cultures, Communication Breakdown and ways to overcome

#### Module-III Interpersonal Skills

Introduction and Importance to Interpersonal Skills, Personal Attributes, Interpersonal Attributes, Decision making, Creative Problem Solving, Dealing with Glossophobia, , Logical Reasoning Tony Buzan's Mind Mapping Techniques: Argumentation, Inductive, Deductive reasoning, Persuasion

#### Module-IV Group Behavior

Leadership skills, Team Management, Group Dynamics, Negotiation, Assertiveness, Emotional Intelligence

#### Module-V Practical Approach to Soft Skills and Interpersonal Skills

Case Studies, SWOC Analysis and Goal Setting, Mindfulness Training, Brain Storming, Group Discussion, Team Building Activities.

#### IPS Academy, Institute of Engineering & Science (A UGC Autonomous Institute, Affiliated to RGPV)

#### **Course Outcomes:**

Students will be able to

- CO1. Students will able to develop knowledge, skills and interpret their soft skills and practice correct body language.
- CO2. The students will analyze necessary listening skills in order to follow and comprehend discourse such as presentations, conversations, interviews, discussions and will able to distinguish among multicultural communication
- CO3. The student will be able to demonstrate effective interpersonal communication in a variety of settings and solve a problem by applying appropriate problem-solving techniques.
- CO4. Students will develop an understanding of change processes and be able to think critically about obstacles to change.
- CO5. The students will be able to practice effective communication skills and presentation skills

#### **Text Books:**

- 1. Soft Skills by G.S. Chouhan and Sangeeta Sharma, Wiley, New Delhi, 2016 Communication Skills by Sanjay Kumar and Pushplata, OUP, New Delhi, 2011
- Communication Skill for Engineers and Scientist by Sangeeta Sharma and Vinod Mishra, PHI Learning, New Delhi, 2015
- Developing Communication Skill by Krishna Mohan, Meera Banerji, McMillan India Limited,2018
- 4. Effective Listening Skills by Kratz, Abby Robinson. Toronto: ON: Irwin Professional Publishing, 1995.
- 5. Soft Skill for Everyone by Jeff Butterfield, Cengage Leaning, New Delhi, 2010

#### **Reference Books:**

- 1. Theories of Personality by Hall, Calvin S. et al. . New Delhi: Wiley. rpt. 2011.
- 2. Corporate Conversations by Holtz, Shel. New Delhi: PHI. 2007.
- The Art of Public Speaking by Lucas, Stephen E. McGraw-Hill Book Co. International Edition, 11th Ed. 2014.
- 4. Winning at Interviews by Thorpe, Edgar and Showick Thorpe. Pearson IPS Academy, Institute of Engineering & Science (A UGC Autonomous Institute, Affiliated to RGPV)

Education. 2004.

 Business Communication for Managers by Penrose, John M., et al. New Delhi: Thomson South Western. 2007

SBC-MTCP301	<b>Dissertation Part - I</b>	0L:0T:20P (Hrs)	10 Credits
			It citates

#### Course Objective: To impart knowledge on

- **1.** Developing analytical skills of the students to address any specific Construction Management related problems.
- 2. Select suitable experimental method to solve Construction Management related problems.

#### **Project work Guidelines:**

Each student should take up the project individually based on their area of interest

There will a project review committee and reviews will be conducted

At the end of the Phase I, he/she should be able to come with clear idea of the how to execute their project.

#### **Course Outcome:**

At the end of the course, the students will be able to

- CO1. Use state of art technology for solving Construction Management problems.
- CO2. Carry out literature survey and narrow down the problem to solve it by

Experimental methods or using software.

## **IPS ACADEMY**



## Institute of Engineering and Science, Indore (M.P.)

A UGC Autonomous Institute, Affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, (M.P.) Masters of Technology (M.Tech.) Civil Engineering Specialization: Construction Planning & Management Semester IV [Second Year]



	. Course Code		Maximum Marks Allotted Theory Practical			Hrs./Week						
S.No.		Course Title	End N Sem. S E	Mid Quiz	Quiz/	Quiz/ End Assignment Sem	Term Tota work Mar	Total Marks	т	Т	Р	Total Credits
				Sem. Exam.	bem. Assignment		Lab Work & Sessional		L			
1.	SBC – MTCP401	Dissertation Part - II	-	-	-	300	200	500	0	0	32	16
		Total	-	-	-	300	200	500	0	0	32	16



SBC-MTCP401Dissertation Part - II0L:0T:32P (Hrs)16 Credits	lits
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#### Course Objective: To impart knowledge on

- 1. Developing analytical skills of the students to address any specific Construction Planning and Management related problems.
- 2. Select suitable method or simulation models to solve Construction Management problems.
- 3. Execution of the project using suitable techniques.

#### **Project work Guidelines:**

- 1. This is the continuation of the Phase I project
- Students will be evaluated by the review committee and suggestions will be offered by members.
- 3. Three reviews will be conducted.
- 4. Thesis finding should be published in International/National journals.
- 5. Students should submit a project report as per the format prescribed by the college.

#### **Course Outcome:**

At the end of the course, the students will be able to

- CO1. Identify the problem by analyzing the gap through literature survey.
- CO2. Conduct the experimental or Simulation work to solve Construction Management problems.
- CO3. Validate the experimental results or simulation results.