

COEP Technological University Pune

(A Unitary Public University of Govt. of Maharashtra)

NEP 2020 Compliant

Curriculum Structure

M. Tech. (Project Management)

(Effective from: A.Y. 2026-27)

PG Program [M. Tech. (Project Management)]
Curriculum Structure
W. e. f. AY 2026-27

List of Abbreviations

Abbreviation	Title	No of courses	Credits	% of Credits
PSMC	Program Specific Mathematics Course	1	4	5.00 %
PSBC	Program Specific Bridge Course	1	3	3.75 %
PCC	Program Core Course	7	21	26.25 %
PEC	Program Specific Elective Course	3	9	11.25 %
LC	Laboratory Course	3	3	3.75 %
VSEC	Vocational and Skill Enhancement Course	3	25	31.25 %
OE	Open Elective	1	3	3.75 %
SLC	Self-Learning Course	2	6	7.5 %
AEC	Ability Enhancement Course	1	2	2.50 %
MLC	Mandatory Learning Course	1	3	3.75%
CCA	Co-curricular & Extracurricular Activities	1	1	1.25 %
Total		22	80	100.0%

Curriculum Structure for M. Tech. Project Management

NEP Effective from 2025-26

Semester I

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightages in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
1.	PSMC	PPM-25001	Applied Statistics	3	1	-	1	4	30	20	50	-	-
2.	PSBC	PPM-25002	Enterprise Resource Planning	2	-	2	1	3	30	20	50	50	50
3.	PCC	PPM-25003	Principles of Project Management	3	-		1	3	30	20	50		
4.	PCC	PPM-25004	Production and Operations Management	3	-	-	1	3	30	20	50		
5.	PCC	PPM-25005	Financial Planning & Management	3	-	-	1	3	30	20	50		
6.	PCC	PPM-25006	Business Environment & Corporate Strategies	2	-	-	1	2	30	20	50		
7.	PCC	PPM-25007	Software Laboratory	-	-	2	-	1				50	50
8.	PEC-1	PPM(PE)-25001	Modelling of Production Systems	3	-	-	1	3	30	20	50	-	-
		PPM(PE)-25002	System Engineering and Maintenance Management										
		PPM(PE)-25003	Project Risk Management										
		PPM(PE)-25004	Ethics and Value Based Leadership										
9	AEC	SET-25001	Technical Communication Skills	1	-	2	1	2	50	50	-	-	-
Total Credits				25									

Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits,

ISE: In-Semester-Evaluation, ESE: End-Semester-Evaluation, MSE: Mid-Semester Evaluation, TA: Teacher's Assessment, CIE: Continuous-Internal-Evaluation

Semester II

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightages in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
1.	OE	<td>	Open elective	3	-	-	1	3	30	20	50	-	-
2.	PCC	PPM-25008	Decision Making and Optimization	3	-	2	1	4	30	20	50	50	50
3.	PCC	PPM-25009	Agile Project Management	3	-	-	1	3	30	20	50		
4.	PCC	PPM-25010	Human Resource Management	3	-	-	1	3	30	20	50		
5.	PEC-2	PPM(P E)-25005	Supply Chain and Logistics Management	3	-	-	1	3	30	20	50	-	-
		PPM(P E)-25006	Reliability Engineering										
		PPM(P E)-25007	Management Information System										
		PPM(P E)-25008	Business and Commercial Laws										
6.	PEC-3	PPM(P E)-25009	Quantitative Techniques in Project Management	3	-	-	1	3	30	20	50	-	-
		PPM(P E)-25010	Ergonomics in Design and Manufacturing										
		PPM(P E)-25011	Materials Management										
		PPM(P E)-25012	Entrepreneurship Essentials										
7.	PCC	PPM-25011	Creative Problem-Solving Laboratory	-	-	2	-	1				50	50
8	PCC	PPM-25012	Simulation Laboratory			2	-	1				50	50
9.	RM	SET-25002	Research Methodology	3	-	-	1	3	30	20	50	-	-
10.	LLC	<td>	Liberal Learning Course	-	-	2	2	1	-	-	-	100	-
Total Credits				24									

Semester III

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightages in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
1	SLC	<td>	Massive Open Online Course –I	3	-	-	1	3	-	-	100	-	-
2	SLC	<td>	Massive Open Online Course –II	3	-	-	1	3	-	-	100	-	-
3	OJT	PPM-26001	Internship	-	-	-	-	3	-	-	100	-	-
4	Project	PPM-26002	Dissertation Phase – I	-	-	22	12	11	-	-	-	70	30
Total Credits				20									

Semester IV

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightages in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
1	Project	PPM-26003	Dissertation Phase – II	-	-	22	12	11	-	-	-	70	30
Total Credits				11									

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightages in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
1	OE	OEC-25032	Project Planning & Control	3	-	-	-	3	30	20	50	-	-

*OE- Dept offers 'Project Planning & Control' course for the students of another program.

- Exit option to qualify for **PG Diploma in Project Management**:
 - Eight weeks domain specific industrial internship in the month of June-July after successfully completing first year of the program.
- **MOOC Courses**:
 - ✓ The MOOC Course must be from NPTEL of minimum 12 weeks duration.
 - ✓ Generally the selected course should be in line with specializations or project needs.

Program Educational Objectives (PEO's)

PEO1 Core Competence: To provide students with fundamental and technical knowledge and skills in Project Management and to enable and empower them to solve problems of the modern industrial world.

PEO2 Depth (Research culture): To imbibe a scientific perspective in the students to make a decision of products/systems using Statistical, Engineering/Technical and Simulation tools.

PEO3 Professionalism: To acquaint students with technical, managerial and human skills and familiarize them with professional issues like ethics and morality, Intellectual property Rights, Constitution of India and Environmental responsibility

PEO4 Learning Environment: To motivate students for entrepreneurship and inculcate a spirit of continuous lifelong learning for a successful professional career.

Program Outcomes (PO's)

PO1 An ability to independently carry out research /investigation and development work to solve practical problems.

PO2 An ability to write and present a substantial technical report/document.

PO3 The graduates will be able to demonstrate a degree of mastery over the Project Management areas of the program

PO4 The graduates will develop capacity to understand multidisciplinary engineering and management areas and display skills for project planning, deployment and execution in the most cost effective and environment friendly manner.

PO5 The graduates will exhibit effective communication skills with equal expertise to communicate with engineers and with the community at large.

PO6 The graduates will have a sound foundation of business ethics, professional integrity and social responsibility along with introspection skills and positive outlook for taking corrective measures based on external feedback.

Correlation between the PEOs and the POs

PO1 PEO	PO1	PO2	PO3	PO4	PO5	PO6
PEO1	√	√	√	√		√
PEO2	√	√	√	√	√	
PEO3			√	√	√	√
PEO4					√	√

SEMESTER-I
Program Specific Mathematics Course (PSMC)

(PPM-25001) Applied Statistics

Teaching Scheme

Lectures: 3 Hrs/week

Tutorial: 1Hr/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,

End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Understand basic concepts of probability & statistics and apply as per the characteristics in data analysis
- Apply the concept of Hypothesis testing to carry out Regression analysis
- Perform ANOVA and plan Design of Experiments
- Apply statistical quality control tools for various applications

Course Contents:

Probability Theory and Sampling Distributions. Basic probability theory along with examples.

Standard discrete and continuous distributions like Binomial, Poisson, Normal, Exponential etc. Central Limit Theorem and its significance.

Inferences on Means and Standard Deviations , Inferences on a Population or Process Mean, Confidence Intervals, Hypothesis Tests, Choice of a Confidence Interval or a Test, Sample Size, Inferences on a Population or Process Standard Deviation Confidence Intervals, Inferences on Two Populations or Processes Using Independent Pairs of Correlated Data Values, Inferences on Two Populations or Processes Using Data from Independent Samples, Comparing Standard Deviations from Several Populations, estimating the difference between two means and ratio of two variances. Some sampling tests like χ^2 , t, F.

Statistical Hypotheses: General Concepts , Testing a Statistical Hypothesis , The Use of *P*-Values for Decision Making in Testing Hypotheses, Single Sample: Tests Concerning a Single Mean , Two Samples: Tests on Two Means , Choice of Sample Size for Testing Means, One Sample: Test on a Single Proportion, Two Samples: Tests on Two Proportions One- and Two-Sample Tests Concerning Variances, Goodness-of-Fit Test
ANOVA: One – way, Two – way with/without interactions, Latin Squares ANOVA technique,

Principles of Design Of Experiments, some standard designs such as CRD, RBD, LSD.

Statistical Quality Control, Introduction, nature of control limits, purpose of control charts, control charts for variables, control charts for attributes.

Statistical analysis with R, Statistical models in R, Formulae, Generic functions, Packages, Linear models, Analysis of variance, Updating generalised linear models, families, Nonlinear least squares and maximum likelihood models.

References:

1. Ronald E. Walpole, Sharon L. Myers, Keying Ye, Probability and Statistics for Engineers and Scientists (9th Edition), Pearson Prentice Hall, 2012
2. Douglas C. Montgomery, "Design and Analysis of Experiments" (7th Edition), Wiley Student Edition, 2009.
3. S. P. Gupta, "Statistical Methods", S. Chand & Sons, 37th revised edition, 2008
4. William W. Hines, Douglas C. Montgomery, David M. Goldsman, "Probability and Statistics for Engineering", (4th Edition), Wiley Student edition, 2006
5. Douglas C. Montgomery, George C. Runger, Applied Statistics and Probability for Engineers, 3rd Edition, *John Wiley & Sons, Inc.*, 2003.

Program Specific Bridge Course (PSBC)

(PPM- 25002) Enterprise Resource Planning

Teaching Scheme

Lectures: 2 hrs/week Practical: 2 hrs/Week

Examination Scheme

TA – 20 marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Classify different business processes of the organization and relationship among all processes.
- Understand and analyse the concept of organizational structure, master data and business transactions.
- Understand and demonstrate key integration points between the different SAP modules supporting each business process cycle

Course Contents:

Evolution of ERP system: Production planning and control, aggregate planning, master production schedule, MRP, Computer Integrated Production Management System, MRP II, Introduction to ERP

Basic Concepts of ERP: Major features of ERP, Benefits of ERP, Seller-Buyer Concept of ERP System, ERP Information Pyramid, Evolution of Information Systems, Evolution of System Architecture, Modules of ERP system, different vendors of ERP, Database Management System.

Materials Management: Basic Features of MM module, Terms used in MM module, MM Organizational Structure, Material master data, MM vendor master data, Purchase information record, MM Processes: Procure-to-Pay Process, Generation of reports and its analysis

Sales and Distribution: Basic features of SD module, Sales order cycle, Sales documents, Organisational structure of SD module, Material Master Data, SD Customer Master Data, Customer Information record, SD Processes: Order-to-Cash Process, Generation of reports and its analysis

Production Planning: Types of Manufacturing in PP, Organizational Structure, Material Master Data, Bill of Material, Routing, Capacity Planning, Sales & Operation planning, Demand management, Material Resource Planning, Production Processing Cycle, Generation of reports and its analysis

Human Capital Management: HCM Organizational Structure, HCM Master Data, HCM Processes: Organizational Management, Personnel Administration, Recruitment

References:

1. Simha R. Magal, Jeffrey Word, Integrated Business Processes with ERP Systems, Wiley
2. Gopal Krishnan .P, Materials Mgmt: An Integrated approach, Phi Learning
3. Glynn C.Williams, Implementing SAP ERP Sales and Distribution, Tata McGraw Hill
4. R.Panneerselvam, Production and Operation Management, PHI Learning
5. Barry Gerhart , Raymond Noe, John Hollenbeck,Patrick Wright, Human Resource Mnagement, Tata Mcgraw Hill
6. Khan & Jain, Basic Financial Management, Tata McGraw Hill

(PPM -25002) Enterprise Resource Planning Laboratory

Teaching Scheme

Practical: 2 hrs/week

Examination Scheme

CIE-100 Marks

Course Outcomes:

By the end of the ERP Laboratory course, students will be able to:

- Navigate and operate generic ERP systems
- Comprehend enterprise-wide integration of business processes
- Execute core ERP business cycles (P2P, O2C, Manufacturing)
- Apply ERP concepts independent of any specific software platform

List of Experiments (Any SIX):

1. ERP System Navigation and User Interface Familiarization:

Introduction to ERP system architecture and modules, understanding user roles, authorization concepts, and access rights, Navigating menus, dashboards, transaction screens, and reports, Use of master data, transaction data, and configuration views, Customization of user preferences and layouts.

2. Case Study on Procurement Organizational Structure:

Understanding procurement-related organizational elements such as: Enterprise/Company; Purchasing organization, purchasing group; Plant and storage locations, Mapping organizational structure to business processes, Case-based analysis of a real manufacturing organization.

3. Execution of Procure-to-Pay (P2P) Cycle:

Creation and management of master data (vendors, materials/services), Execution of end-to-end procurement process: Purchase requisition; Purchase order; Goods receipt / service entry; Invoice verification; Payment processing (conceptual), Generation of procurement-related reports, Interpretation and analysis of procurement data.

4. Case Study on Sales and Distribution Organizational Structure:

Understanding sales-related organizational elements such as Sales organization; Distribution channel; Division; Sales office and sales group, Alignment of sales structure with customer order management, Case-based analysis of a consumer or industrial enterprise.

5. Execution of Order-to-Cash (O2C) Process:

Customer and product master data creation, Execution of end-to-end sales cycle: Sales order creation; Availability check and pricing; Delivery and dispatch; Billing/invoicing; Receipt of payment (conceptual), Generation and analysis of sales and revenue reports.

6. Review of Production and Manufacturing Organizational Structure:

Understanding production-related organizational elements such as: Plant; Work centers; Production lines; Bills of materials (BOM); Routing and capacity structures, Relationship

between production planning, inventory, and sales, Analysis of how manufacturing structures support operational efficiency.

7. Theory Assignment on Material Requirements Planning (MRP):

Concepts of dependent and independent demand, MRP inputs: BOM, inventory levels, lead times, demand forecasts, MRP logic and calculation principles, Outputs of MRP: planned orders, purchase requisitions, production orders, Benefits and limitations of MRP.

8. Execution of Manufacturing Process Cycle:

Creation and management of production master data, Execution of manufacturing cycle: Production planning; Production order creation; Material issue; Production confirmation; Goods receipt of finished goods, Generation and analysis of production and inventory reports.

(PPM- 25003) Principles of Project Management

Teaching Scheme

Lectures:3 hr/week

Examination Scheme

TA – 20 marks, MSE: 30 Marks, End-Sem Exam - 50

Course Outcomes:

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

- Understand Comprehensive fundamental and technical knowledge of Project Planning.
- Apply leadership and decision-making capabilities
- Apply the concept of project through project planning steps.

Analyze the projects through network techniques and handle financial aspects of project

Course Contents:

An Overview of Project Management , The Role of the Project Manager ,Planning the Project, Developing a Mission, Vision, Goals, and Objectives for the Project, Creating the Project Risk Plan,Using the Work Breakdown Structure to Plan a Project ,Scheduling Project Work ,Producing a Workable Schedule, Project Control and Evaluation ,The Change Control Process ,Project Control Using Earned Value Analysis ,Managing the Project Team ,The Project Manager as Leader

Function of Project Planning –Inter dependency relationship, Generation and screening of project ideas, project rating index, Characterization of the market, demand forecasting, market planning. Basic principles of measurement of cash flows, components of the cash flow streams – viewing a project from different points of view, definition of cash flows by financial institutions and planning commission,

Forms of project organization, project planning, project control, human aspects of project management, prerequisites for successful project implementation.

Project review and administrative aspects: Initial review, performance evaluation, abandonment analysis, administrative aspects of capital budgeting, evaluating the capital budgeting system of an organization.

Network techniques for project management, development of project network, time estimation, determination of critical path, scheduling when resources are limit, PERT and CPM models.

References:

1. Prasanna Chandra, Project Planning: Analysis, Selection, Implementation and Review, Tata McGraw Hill. 7th Edition, 2009
2. Narendra Singh, Project Management and Control, HPH, 2003
3. John M. Nicholas and Herman Steyn, Project Management for Business and Technology: Principles and Practice, Prentice Hall India
4. Clifford F. Gray & Eric W. Larson, Project Management: The Managerial Process, Tata McGraw Hill, 2010
5. Harold Kerzner, 'Project Management, A systems approach to Planning, Scheduling & controlling', Wiley India (P) Ltd., 10th Edition, 2013

(PPM - 25004) Production and Operations Management

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks, End-Sem Exam - 50

Course Outcomes:

At the end of course students will be able to

- Understand the organization and Production Systems and functional units of organization
- Identify best location of production and service facilities & layout planning
- Implement different approaches like JIT, TQM, Value Analysis

Course Contents:

Organization structure, Production Systems

Operations and Productivity, Operations Functions and Evolution of POM; Framework for Managing Operations; Operations Strategy; Trends in Operations Management

Product and Process Design, Product Development; Product Design Tools; Design of Services; Flexible Manufacturing; Systems; Process Design: Types of Process, Modern Production Technologies; Process Reengineering

Capacity Design, Capacity Management; Economies and Diseconomies of Scale and Learning Curve; Capacity Strategies; Decision Trees

Facility Location, Location Strategy and its Importance; Factors influencing Plant Location; Globalization; Location Selection Models, Layout Design, Layout Planning; Layout Types; Design of Product and Process Layouts; Job Design; Work Measurement

Inventory Management, Basic Economic Order Quantity (EOQ) Model; Quantity Discount Models; Spare Parts Inventory; Material Resources Planning; Manufacturing Resource Planning; Purchasing Objectives

Operations Planning and Scheduling, Systems Aggregate Planning and its Process; Master Scheduling; Aggregate Planning for Service Organizations; Operating Schedules; Sequencing Rules; Optimized Production Technology and Synchronous Manufacturing; Just in Time (JIT) Manufacturing System; TQM, Value Analysis

References:

1. J.S. Martinich, "Production & Operations Management", Wiley International, 1997
2. Ram Naresh Roy, "A Modern Approach to Operations Management", New age International Publishers, New Delhi, 2004

3. Buffa, R.K. Sarin, "Modern Production/ Operations Management", John Willey and sons, 8th edition, 2009
4. Everett E Adam, Ronald J Ebert, "Production and Operation Management", PHI,2010

(PPM - 25005) Financial Planning and Management

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks, End-Sem
Exam - 50

Course Outcomes:

At the end of course students will be able to

- Understand the concept of Financial Management
- Apply the knowledge of financial accounting in Balance sheet preparation and there by determine Ratio Analysis
- Apply knowledge of Financial Management in determining Marginal costing, Standard costing & Job costing
- Use appraisal criteria and risk assessment in financial planning

Course Contents:

Financial Management, objectives and goals, Fixed Capital, Floating Capital, Fund flow analysis and Fund flow statements. Ratio analysis: Classification, structural group, standards for comparison and limitations

Profit planning and Break-even analysis, margin of safety. Financial Budgets, control measures, Authorized capital, working capital, reserve, capital Management, floating of shares, share capitals & fund raising methods and their appraisal.

Control measures– Payback approach, Standard costing, Actual costing, Operating ratio, techniques of cost control, Marginal cost.

Elements of Costs: Material, Labour, Expenses, Overheads, Direct and Indirect Cost, Fixed and Variable Cost, other classifications. Allocation of overheads Methods for Depreciation calculation, Budgetary control and Variance analysis, Activity based costing (ABC). Biases in cash flow estimation.

Appraisal criteria: Net Present Value, benefit cost ratio, internal rate of returns urgency, payback period, accounting rate of returns, investment appraisal in practice

Analysis of Risk, Types and measure of risk , simple estimation of risk, sensitivity analysis, scenario analysis, Special decision situations: Choice between mutually exclusive projects of unequal life, optimal timing decision, determination of economic life, inter-relationships between investment and financing aspects, inflation and capital budgeting. Analysis of firm and market risk:

Portfolio theory and capital budgeting, Capital Asset Pricing Model.

References:

1. J Pandey I M., Financial Management, Vikas Publication, 10th Edition 2013
2. Henry M. Stenier, "Engineering economics Principles", McGraw Hill Publication.
3. C. B. Gupta, "Fundamentals of Business", Sultan Chand & Company.
4. S. K. Basu, K.C. Sahu and Rajiv B, "Industrial Organisation and Management", PHI New Delhi, Nov 2012.
5. Larry M Walther, Christopher J. Skousen, Managerial and Cost Accounting, Ventus Publishing 2009

(PPM 25006) Business Environment and Corporate Strategies

Teaching Scheme

Lectures: 2 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,

End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Understand the concept of Business Planning
- Apply the strategic plans
- Apply knowledge of Performance Indicators and e business models

Course Content:

Importance of Business Planning, Achieving business stability and growth, Business goals, Structure of a business plan, Global and transnational business, The global and transnational strategic management process, issues with global and transnational strategies and management.

Strategic analysis- overview, Environmental Mapping, Industry Mapping, SWOT analysis, From To analysis, Root cause analysis, Market analysis, Market mapping, Strategic Business Unit (SBU) analysis, Benefits of SBU analysis, Competitor profiling, Directional policy matrix, Competitive positioning: generic strategies and differentiation, Differentiation and price.

Contribution Approach, Product and service pricing, Cost profiling, Organizational analysis, McKinsey '7S' model. Option Appraisal, Force-field analysis, Stakeholder analysis, Financial sensitivity, risk exposure evaluation, Evaluating business development options, 'AID' analysis.

Performance measurement, Strategic Key Performance Indicators (SKPIs), Financial Key Performance Indicators (FKPIs), Operational Key Performance Indicators (OKPIs), City Key Performance Indicators (CKPIs), Value added.

E-Business -Concepts and Trends, Competitive Strategy, E-Business Models, Determining Appropriate Models, Infrastructure Capabilities, Strategic Agility, Strategic Planning, The Y Model for Strategy Work, Resource-Based Strategy, Activity-Based Strategy.

Reference Books:

1. Tim Berry, *HURDLE: The Book On Business Planning*- Millennium Edition.
2. George Stonehouse, *Global and Transnational Business: Strategy and Management*- 2nd Edition.
3. Paul Elkins, *Mastering Business Planning and Strategy*-2nd Edition.
4. Michael George, *Conquering Complexity in your Business*- McGraw Hill

(PPM - 25007) Software Laboratory

Teaching Scheme

Practical: 2 hrs/week

Examination Scheme

CIE -100 Marks

Course Outcomes:

At the end of course students will be able to

- Perform regression, ANOVA, F, t, and Chi Square tests
- Use Design of experiments and statistical quality control tools
- Use of MS Project to perform CPM /PERT analysis

Course Contents:

- Sampling tests like χ^2 , t, F.
- One - and Two - Sample estimation problems estimating the mean and variance
- ANOVA technique,
- Design of Experiments,
- Control Charts
- MS Project Assignments
- CPM /PERT analysis using MS Project
- Mini project using above tools & Techniques

Program Elective Course (PEC) - I

(PPM-PE -25001) Modelling of Production Systems

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Identify the type of Production system and its modelling.
- Perform line balancing and buffer stock simulation
- Analyse the production system using Markov chain & Petri Net

Course Contents:

Dedicated manufacture versus Flexible manufacture, mechanization versus automation, semi-automatic versus automatic systems using 'in-line' transfer, rotary transfer, material Handling systems

Balancing of assembly line, Transfer line-monitoring system (TLMS) using Line Status, Line efficiency. Buffer stock Simulation. Monte carlo simulation

Modelling and Analysis of FMS, Cellular Manufacturing Systems Markov chain analysis for production systems with discrete time and continuous time analysis. Markov chain analysis with zero or with one or more repair facility, Reversible markov chains in manufacturing,

Uses of Petri Nets. Generalized timed Petri Nets, Extended stochastic Petri Nets and their applications in Production systems.

References:

1. N. Viswanadhan & Y. Narahari, "Performance Modelling of Automated Manufacturing Systems", Prentice Hall of India (Eastern Economy Edition) 1992.
2. Mikell P. Groover, "Automation, Production Systems & Computer Integrated Manufacturing", Prentice Hall India Learning Pvt. Ltd. 3rd Edition. 2008
3. Benjamin S. Blanchard, "Logistics Engineering and Management (5th Edn.) - Pearson Education Asia - Indian Reprint 2001

(PPM PE- 25002) System Engineering and Maintenance Management

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

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

- Understand the System and apply System Engineering approach
- Apply system engineering analysis methods
- Apply effective maintenance policies to system
- Apply Reliability Centered Maintenance principles

Course Contents:

Introduction to Systems Engineering, Systems Engineering Viewpoint, Perspectives of Systems Engineering, Systems Domains, Systems Engineering Fields, Systems Engineering Approaches, Systems Engineering Activities and Products, Evolutionary Characteristics of the Development Process, Systems Engineering Method, System development phases and cycles system development life cycle approach. Overview of the systems engineering, system life cycle, and the product development life cycle. Phase gate approach to product development enabled by application of systems engineering principles, Dual nature of validation, and its differences from verification. Requirement analysis, requirements development, Functional analysis, interface analysis, requirement allocation, traceability,

System Concept, Exploration and the types of systems, requirements. System representation, System reliability assessment through Series, parallel, hybrid, conditional configuration,

Types of Maintenance, maintenance activities, emergency work, service work, Industrial Maintenance, Total Production maintenance, Maintenance problems occurring in product and process type industries and Power plants and their management

Elements of Effective Maintenance Management, Maintenance Policy, Material Control, Work Order System, Equipment Records, Preventive and Corrective Maintenance, Backlog Control and Priority System, Performance Measurement, Maintenance Management Control Indices

Preventive Maintenance Elements, Plant Characteristics in Need of a PM Program, and a Principle for Selecting Items for PM, Important Steps for Establishing a PM Program, PM Measures, Corrective Maintenance Types, Corrective Maintenance Steps, Downtime Components, and Time Reduction Strategies at System Level, Corrective Maintenance Measures

Reliability Centered Maintenance, RCM Goals and Principles, RCM Process, RCM Components, Reactive Maintenance, Preventive Maintenance, Predictive Testing and Inspection, Proactive Maintenance, Predictive Testing and Inspection Technologies. On-line / off-line Condition based Maintenance through ferrography, Vibration Signature, SOAP and other programme

References:

1. Alexander Kossiakoff, William N. Sweet, Samuel J. Seymour, Steven M. Biemer, Systems
2. Engineering Principles and Practice, Wiley Publication.
3. B.S.Dhillon, Engineering Maintenance, A Modern Approach, CRC Press.
4. L.S.Srinath Concepts in Reliability Engineering- Affiliated East West Press.
5. C. Singh and C.S.Dhillon, Engineering Reliability-New Techniques and Applications –John Wiley and Sons
6. K.C.Kapoor and L.R.Lubersome Reliability in Engineering Design, Willey Publication.
7. E.J. Henley and H. Kumamoto, Reliability Engineering and Risk Assessment, Prentice Hall.

(PPM (PE)- 25003) Project Risk Management

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

- Apply the concept of risk identification - across a variety of project categories and industry segments
- Apply qualitative and quantitative methods of risk assessment in project management scenarios
- Plan and pre-empt risks & apply risk mitigation strategies appropriately

Course Contents:

Project Risk Management, Role of Project Risk Management in Project Management, Good Risk Management Practice, Critical Success Factors for Project Risk Management

Principles and concepts of Project Risk, Individual Risks and Overall Project Risk, Stakeholder Risk Attitudes, Iterative Process, Communication, Responsibility for Project Risk Management, Project Manager's Role for Project Risk Management, Project Risk Management Processes

The project risk management approach, Establish the context, Risk identification, Qualitative risk assessment, Semi-quantitative risk assessment, Risk treatment, Monitoring and review, Communication and reporting, Project processes and plans, Simplifying the process, Managing opportunities

Planning and pre-empting risks- for unknown variables affecting a project/program/organization: Understanding Risk Mitigation & Stakeholder Management – techniques and methods

Introduction to developing a culture of planned risk taking and provisioning for financial and non- financial impact of such risks

References:

1. Dale F. Cooper, Stephen Grey, Geoffrey Raymond and Phil Walker, Project Risk Management Guidelines, Managing Risk in Large Projects and Complex Procurements, John Wiley & Sons, 2005
2. Practice Standard. For Project Risk Management, Project Management Institute, Inc, 2009

(PPM PE 25004) Ethics and Value based Leadership

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

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

- 1. Use Moral and Ethics in individual behavior
- 2. Demonstrate and Apply leadership qualities
- 3. Handle Corporate responsibility

Course Contents:

Moral concepts – values; Personal values, Moral concepts – relationships, community Stakeholders versus stockholders, Social responsibility, Corporate citizenship

Ethical decision-making models: Ethical problems that arise in business, Moral concepts – honesty, fairness, equality, unethical dual relationships, Corporate responsibility – ethical and legal issues, Construct an ethical argument

Ethical problems that arise in business, Ethics versus law, Sarbanes-Oxley, Whistle blowing

Federal Sentencing Guidelines for Organizations, Moral concepts including instrumental and intrinsic goodness, values, justice, and vision, Moral philosophies including consequentialist, non-consequentialist, virtue ethics and justice ethics, Relativism Ethical and decision-making models and frameworks, Ethical issue intensity, Moral intensity,

Economic value orientation, Kohlberg's theory of moral development, Ethical spheres of influence, Personal values and vision and their role in a business environment, Qualities of ethical leadership, Roles and habits of leaders, Transitional leader, Transformational leader, The role of organizational culture and corporate governance in business ethics. Power – reward, coercive, legitimate, expert, referent, Motivation, Group norms – formal and informal

Corporate responsibility and the role of ethics audits, environmental audits and social audits
Ethical problems that arise in business

References:

1. Kouzes and Posner, The Leadership Challenge
2. Robert Lorber, "Organizational behavior, An Experiential Approach."

(SET-25002) Technical Communication skills

Teaching Scheme:

Lectures: 1hr / week Practical: 2Hrs/week

Evaluation Scheme:

ISE – 100 Marks

Course Outcomes (COs):

At the end of course Students will be able to

- Produce effective dialogue for business related situations
- Use listening, speaking, reading and writing skills for communication purposes and attempt tasks by using functional grammar and vocabulary effectively
- Analyze critically different concepts / principles of communication skills
- Demonstrate productive skills and have a knack for structured conversations
- Appreciate, analyze, evaluate business reports and research papers

Unit 1: Fundamentals of Communication

7 Cs of communication, common errors in English, enriching vocabulary, styles and registers

Unit 2: Aural-Oral Communication

The art of listening, stress and intonation, group discussion, oral presentation skills

Unit 3: Reading and Writing

Types of reading, effective writing, business correspondence, interpretation of technical reports and research papers

References:

1. Raman Sharma, "Technical Communication", Oxford University Press.
2. Raymond Murphy "Essential English Grammar" (Elementary & Intermediate) Cambridge University Press.
3. Mark Hancock "English Pronunciation in Use" Cambridge University Press.
4. Shirley Taylor, "Model Business Letters, Emails and Other Business Documents" (seventh edition), Prentise Hall
5. Thomas Huckin, Leslie Olsen "Technical writing and Professional Communications for Non-native speakers of English", McGraw Hill.

SEMESTER-II

**(OEC) Open Elective Course -SEM II
(To be floated for other programmers)**

(OEC-25032) Project Planning and Control

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA- 20 Marks, MSE: 30 Marks, ESE: 50 Marks

Course Outcomes:

At the end of course students will be able to:

- Apply fundamental and technical knowledge of Project Planning.
- Demonstrate leadership and decision-making capabilities
- Handle the project through project planning steps.
- Analyze the projects through network techniques and handle financial aspects of project

Course Contents:

Function of Project Planning –Inter dependency relationship, Generation and screening of project ideas, project rating index, characterization of the market, demand forecasting, market planning.

Financial Analysis: Estimation of cost of project and means of financing, estimates of sales and production, cost of production, working capital requirement and its financing, estimates of working results, breakeven points – projected cash flow statement, projected balance sheet.

Project cash flows: Basic principles of measurement of cash flows, components of the cash flow stream – viewing a project from different points of view, definition of cash flows by financial institutions and planning commission,

Forms of project organization, project planning, project control, human aspects of project management, prerequisites for successful project implementation. Project review and administrative aspects: Initial review, performance evaluation, abandonment analysis, administrative aspects of capital budgeting, evaluating the capital budgeting system of an organization.

Network techniques for project management, development of project network, time estimation, determination of critical path, scheduling when resources are limited, PERT and CPM models.

References:

1. Prasanna Chandra Project Planning: Analysis, Selection, Implementation and Review, Mc Graw Hill Education, 7th Edition 2009.
2. Narendra Singh, Project Management and Control, HPH, 2003
3. John M. Nicholas and Herman Steyn, Project Management for Business and Technology: Principles and Practice, Prentice Hall India, 2012
4. Clifford F. Gray & Eric W. Larson, Project Management: The Managerial Process, Tata Mc Graw Hill, 4th edition, 2010
5. Chitkara K K, Construction Project Management, Planning, Scheduling and Control, Tata McGraw-Hill, 2nd Edition, 2010.
6. Merdith Jack R & Gopalan M.R, Project Management, Wiley India (P) Ltd. 2006
7. Harold Kerzner, Project Management A systems approach to Planning, Scheduling and Controlling, Wiley India, 10th Edition, 2009

(PPM- 25008) Decision Making and Optimization

Teaching Scheme

Lectures: 3 hrs/week Practical: 2 Hr/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks, End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Apply Multi Attribute Decision Making (MADM) criteria for real life cases.
- Use Analytical decision-making tools for ranking
- Apply optimization algorithms such as GA & PSO

Course Contents:

Multi Criteria Decision Making, MAUT and related concepts, Data Envelop Analysis, Decision Trees, Types, Applications.

Analytical Tools: Simple Additive Weighting Method (SAW), Weighted Product Method (WPM),

Analytical Hierarchy Process (AHP), Fuzzy AHP, Analytical Network Process, steps, TOPSIS, Modified TOPSIS, Fuzzy TOPSIS, Compromise Ranking Method (VIKOR), Graph Theory and Matrix Approach, formulation, Applications

ELECTRE method, steps, Applications, numericals

PROMETHE, steps, Applications

Genetic Algorithm (GA), Concept, basic terms, flowchart, algorithm, applications

Simulated Annealing, concept, basic terms, flowchart, algorithm, applications,

Particle Swarm Optimisation. Concept, basic terms, flowchart, algorithm, applications

References:

1. R.V. Rao, Decision Making in the Manufacturing Environment using Graph Theory and Fuzzy Multiple Attribute Decision Making, Springer-Verlage London Limited, 2007.
2. Bernard P. Zeigler, Herbert Praehofer and Tag Gon Kim, Theory of modeling and simulation: Integrating discrete events and continuous complex dynamic systems - Second edition. Academic Press. 2000.
3. Kalyanmay Deb, Multi objective Optimisation using Evolutionary Algorithm.

(PPM- 25008) Decision Making and Optimization Laboratory

Teaching Scheme

Practical: 2 hrs/week

Examination Scheme

CIE- 100 marks

Course Outcomes:

At the end of course students will be able to

- Perform decision making using AHP, TOPSIS, SAW, WPM, Digraph
- Optimise the parameters using Genetic Algorithm (GA)
- Apply ELECTRE and PROMETHE methods

Course Contents:

Case studies and assignments on:

- Analytical tools: Simple Additive Weighting (SAW), Weighted Product Method (WPM)
- Analytical Hierarchy Process (AHP) for MCDM
- TOPSIS & Modified TOPSIS method for MCDM
- Compromise Ranking Method (VIKOR),
- Graph Theory and Matrix Approach,
- ELECTRE
- PROMETHE
- Genetic Algorithm (GA),
- Simulated Annealing,
- Particle Swarm Optimisation

(PPM 25009) Agile Project Management

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

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

- Understand Agile philosophy, values, and guiding principles
- Apply Agile concepts, methods, and frameworks in project management
- Analyze stakeholder engagement, roles, and communication in Agile projects
- Use Agile risk management, tracking, and continuous improvement techniques effectively

Course Content:

Introductions, Agile PM Fundamentals, Stakeholders, Agile Culture, Ethics, Project Selection, Product Owner, Retrospectives, Project Charter, Risk, Scope, User Roles, Product Roadmap, Story Map, User Stories.

Agile Concept, Agile Methods, Agile Tools, Agile Documentation, Agile Tracking and Reporting, Agile Project Management Process, Agile Value,

Agile characteristics, Agile Concepts, Agile Values, Agile Guiding Principles, Declaration of Interdependence

The Most Popular Agile Methods, Scrum Overview, Scrum Transparency, Adaptation, Inspection, Iterative and Incremental Development, Time- Boxing Collaboration, Self-Organization

Agile Stakeholder Engagement, Traditional Stakeholder Management Agile Stakeholder Management Concepts, Stakeholder Communications Management, Information Displays, Agile Documentation Best Practices

Agile Risk Management, Agile people Skills, Agile Teams, Agile Certification, Agile Contracts, Which projects should be Agile? Agile Change Management, Additional Agile Methods

Reference Books:

1. Rinivan Solingen, Eelco Rustenberg , The Power of Scrum, and Jeff Sutherland, 2012.
2. Ken Schwaber, Agile Project Management with Scrum, Microsoft Press, 2004
3. Team of practitioners Agile Practice guide ISBN: 978-1-62825-199-9 Published by: Project Management Institute,
4. Kenneth S. Rubin, Essential Scrum: A Practical Guide to the Most Popular Agile Process, Addison-Wesley Professional (Pearson Education). July 2012
5. Joanna Rothman, Pragmatic Bookshelf, Manage Your Project Portfolio, 2009.
6. Jeff Patton, O'Reilly, User Story Mapping, 2014.
7. Denise Canty Agile for Project Managers by, CRC Press, Taylor and Francis Group

8. Charles G. Cobb, Making Sense of Agile Project Management, Wiley, 2011.

(PPM-25010) Human Resource Management

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks, End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Understand the concept of Human Resource Management
- Define the policy goals of HRM & analyse the challenges with international aspect
- Apply various techniques of job evaluation and analysis of work design & Job design
- provide a solution to HR problem using motivation & training as a tool

Course Contents:

Concept of Human resource management: Functions, objective, and evolution of management, Nature and scope of Human Resource Development.

Procurement and placement: Resource planning, factors affecting HRD, recruitment, selection, induction and placement.

Job evaluation: Performance appraisals, introduction, objective, procedure, and method of job evaluation.

Work design & job design: Ergonomics, human engineering, factors affecting effective job design.

Motivation & Job satisfaction: Introduction, basis of motivation, importance, characteristics, basic principle and kind of motivation, quality of work life, stress management, time management, worker's participation in management.

Training and development: Introduction, Importance, Methods and techniques of training, employee development, quality circle, models of training and development, performance appraisal for training scheme.

Integration: Financial policies related to HRD, human relations- concept, objective, importance, scope and aspect of industrial relation (IR), IR strategy, Causes and effect of industrial dispute, dispute acts, trade unions.

Maintenance: Accidents, economy aspect, causes, employee welfare, social security.

Future challenges for HRM: International aspects of HRD.

References:

1. A.P.Verma, Human Resource Management, Kataria Publishers, 2006
2. Harold Koontz, Essentials of Management, Tata McGraw-Hill Education, 2010
3. Kelly D, Dual Perceptions of HRD: Issues for Policy: SME's, Other Constituencies, and the Contested Definitions of Human Resource Development. 2001,
4. McLean, G. N., Osman-Gani, A. M., & Cho, E. (Eds.). Human resource development as national policy. Advances in Developing Human Resources, August (2004).

Program Elective Courses (PEC-II)

(PPM (PE-25005) Supply Chain and Logistics Management

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

- Understand supply chain flows & supply chain strategies.
- Design the Supply Chain Network
- Designing transportation network & analyze factors affecting transportation decisions.

Course Contents:

- Introduction to supply chain and logistics management, concept, Supply chain stages and decision phases, process view of a supply chain. Supply chain flows. Competitive and supply chain strategies, importance in project Management
- Designing the Supply Chain Network, Distribution Network - Role, Design. Supply Chain Network (SCN) - Role, Factors, Framework for Design Decisions. Models for Facility
- Location and Capacity Allocation. Impact of uncertainty on SCN - Discounted Cash Flow Analysis, Evaluating Network Design Decisions using Decision Trees. Case studies & problems.
- Managing Multi-Echelon Cycle Inventory, Safety inventory determination. Impact of supply uncertainty aggregation and replenishment policies on safety inventory. Optimum level of product availability: Importance factors, managerial levers to improve supply chain profitability, supply chain contracts. Case studies & problems.
- Scoring & Assessment, Selection & Contracts. Design Collaboration.
- Role of Revenue Management in the Supply Chain, Revenue Management for: Multiple customer segments, Perishable assets, Seasonal demand, Bulk & spot contracts. Managerial levers to achieve co-ordination, Building strategic partnerships. The role of IT in Supply Chain, The Supply Chain IT Framework, CRM, Internal SCM, SRM. The role of E-business in a supply chain, The E-business framework, E-business in Practice. Case discussions
- Introduction to Logistic Management principles, operation, Design and administration
- System view of logistic co-ordination and transportation order processing, ware housing, material handling, customer service standards, cost analysis case

studies, Factors affecting transportation decisions. Modes of transportation and their performance characteristics. Designing transportation networks.

- Risk management, Types of project risks in SCLM, Risk issues, performance, concept and importance
- Introduction to Global Supply Chain Management. Globalization network design, Green SCLM, understanding supply chain excellence, case studies.

References:

1. Sunil Chopra & Peter Mcindl, "Supply Chain Management -Strategy, Planning & Operation" Pearson Education Inc, 11th Edition, 2003
2. Douglas Lanibert& James Stock, "Strategic Logistics Management" McGraw Hill, 4th Edition, 2004.

(PPM (PE) 25006) Reliability Engineering

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of the course, students would be able to:

- Apply the concept of Reliability and analysis of various configurations.
- Apply various techniques to analyse failure data.
- apply parametric & nonparametric methods to analyze real life cases of system reliability.

Syllabus Contents:

Concept of Reliability and analysis of various configurations of assemblies and sub-assemblies. Series, Parallel and other grouping.

System reliability. Set theory, optimal Cut Set and Tie Set, 'star-delta' method, matrix method etc.

System reliability determination through 'Event Tree' analysis and Fault tree analysis.

Usage monitoring of plant and evaluation of reliability through failure data analysis.

Concept of loading roughness, probability in design including evaluation of safety margin.

Reliability of Engineering Design; Mean, Median & K statistics for Reliability evaluation (non-parametric, Short Sample).

Optimal allocation of component reliability to achieve maximum system reliability – various techniques and methods such as Proportional, Conditional, AGREE, ARINC etc. Reliability, Availability and Maintainability of equipment. A number of case studies done in Indian perspectives using Short Sample, nonparametric reliability.

Fault Tree Analysis (FTA), Failure Modes and Effects Analysis (FMEA), Failure Modes, Effects and Criticality Analysis (FMECA). R.P.N., Graph theory etc. Diagnostic maintenance through ferrography, Vibration Signature, SOAP and other programme.

References:

1. L.S.Srinath Concepts in Reliability Engineering- Affiliated East West Press.
2. C. Singh and C.S.Dhillon, Engineering Reliability-New Techniques and Applications –John Wiley and Sons
3. K.C.Kapoor and L.R.Lubersome Reliability in Engineering Design, Willey Publication.
4. E.J. Henley and H. Kumamoto, Reliability Engineering and Risk Assessment, Prentice Hall.
5. Basu S.K., Sahu K.C and Rajiv B. Industrial Organization and Management –PHI New Delhi, 2012

(PPM (PE) - 25007) Management Information System

Teaching Scheme

Lectures: 3 hrs/week
Marks

Examination Scheme

TA – 20 Marks, MSE: 30 Marks, End-Sem Exam – 50

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Understand System development life cycle approach.
2. Perform Object Oriented Analysis and Design
3. Designing Human computer Interface & decision support system

Syllabus Contents:

Definitions, objective, structure, operating elements, MIS structure based on management activity, organizational function. System concepts - Definition, Types of systems, system decomposition, system entropy, system stress, methods of simplification, design concepts.

SDLC approach - System development life cycle approach, system requirement specifications, entity relationship diagram, data dictionary, report generation, database administration.

Object Oriented Analysis and Design Introduction, concepts of objects, class, encapsulation, various steps of OOA, methods like Booch, Rumbaugh etc. Domain Analysis, Human computer Interface, Introduction to System Testing.

Decision Support System Introduction to decision support system, expert's systems, hardware and software acquisition, legal Issues. Information Management and society, Computer security, privacy, manual versus electronic information, back up protection, user interfaces, encryption, responsibility and ethics. Ethical challenges in Information Systems.

References:

1. Roger S Pressman, Software Engineering: A Practitioner's Approach (6th ed.) McGraw-Hill. (2005).
2. Sommerville, Ian, Software Engineering. Harlow, England: Pearson Education (8th ed.)(2007)
3. Jalote, Pankaj, An Integrated Approach to Software Engineering (3rd ed.). Springer. (2005)
4. O'Brien, J (1999). Management Information Systems – Managing Information Technology in the Internetworked Enterprise. Boston: Irwin McGraw-Hill. ISBN 0071123733.
5. Kotler, Philip; Keller, Kevin Lane, Marketing Management (12 ed.). Pearson Education (2006).

(PPM(PE)- 25008) Business and Commercial Laws

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of the course, students will

- Gain knowledge about basics of laws
- learn about Sale and Acquisition of Goods and Personal Property
- gain knowledge about Consumer Credit and Protection

Syllabus Contents:

- Basics of law; law of tender; law of tort; role of the project manager; insurance; bonds; builders' liens; labour law; intellectual property; avoidance of claims and disputes; ADR, the arbitration act; future trends in contracting.
- Sale and Acquisition of Goods: Transfer of Title, The rule nemodat quod non habet, Exceptions to nemodat Legal Duties of Sellers and Buyers, Express and Equitable Interest, Sale of Goods Applicable Passing of Property, Implied Terms, and Implied Terms, nemodat Remedies Non-sale Acquisitions: exceptions, nemodat, Applicable nemodat exceptions.
- Personal Property: Personal Property and Interests in Personal Property, Types of Personal Property - Chose in Possession - Chose in Action, Ownership (especially mere equities) - Possession (finders' possessory, Legal and Equitable Assignment Credit and Security interests) - Bailment; Types of Security: Pledges - Liens - Mortgages (other than of land) - Bills of Retention of Title Sale - Fixed and Floating Charges (Romalpa) Clauses Set-off; Assignments of Choice in Action: Statutory, Legal and Equitable, Assignments, Rules of Priority, Banking and Customer Relationship, Negotiable Instruments: Bills of Exchange.
- Consumer Credit and Protection: Regulatory Money Lenders Ordinance and Pawn Brokers Ordinance, Function and Framework, Power of Consumer Council, Funds for Litigation and Group Litigation Consumer Unconscionable Contracts Law of Guarantees, Consumer Protection, Credit, Supply of Services Control of Exemption Clauses Ordinance, Ordinance, Protection of Vulnerable Money Lenders Ordinance, (Implied Terms) Ordinance, Powers and Consumers: Misrepresentation, Undue Influence, Duress, Responsibilities of Personal Guarantor, Doctrine of relation back and fraudulent preference.

References:

1. R Goode, "Commercial Law", Penguin, 3rd Edition, 2004

2. PS Atiyah, John N Adams & Hector MacQueen, "The Sale of Goods", 11th Edition, Longman, 2005
3. LS Sealy, RJA Hooley, "Commercial Law: Text, Cases and Materials", 4th Edition
4. R Calnan, Taking Security: Law and Practice, Jordans, 2006.
5. H Beale, M Bridge, LGullifer and E Lomnicka, The Law of Personal Property. System view of logistic co-ordination and transportation order processing, ware housing,

Program Elective Courses (PEC-III)

(PPM- PE 25009) Quantitative Techniques in Project Management

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Apply techniques of conceptual modelling of real-life decision-making problems,
- Analyze various models in real life case studies and learn about decision making.
- Simulate the models and optimize it.

Course Contents:

Introduction to Integer programming, Solution of Integer programming by various methods, introduction to Goal programming and parametric programming
Dynamic programming models.

Various models in queuing; inventory control models

Network theory- maximal flow and minimal spanning tree problems

Game theory- linear programming methods to solve mixed strategy games,
Vehicle routing problems and various mathematical models, transshipment, travelling salesman problems.

Simulation modelling & analysis, optimization models used in manufacturing – such as
Linear programming models, multi goal programming etc.

References:

1. Sharma J.K.: Operations Research Theory & Applications, Macmillan India Ltd.
2. Rao, S.S: Optimisation in Design, New Age International Limited Publishers, Fourth Edition, 2008.
3. Hamdy A. Taha: Operations Research, An Introduction, PHI Learning Pvt. Ltd., New Delhi.
4. Wagner Harvey M.: Principles of Operations Research with Applications to Managerial Decisions, Prentice Hall of India Pvt. Ltd., New Delhi.
5. Shenoy G.V.: Linear Programming Methods and Applications, Wiley Eastern Ltd.
6. Deb Kalyanmay: Optimisation in Engineering Design, PHI

PPM-(PE) 25010) Ergonomics in Design and Manufacturing

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Understand the importance of Human Factors considerations.
- Apply various ergonomic considerations and its significance in designing workplace and Human Factors in design & manufacturing
- Understand dynamic consideration in design of product using vibration stability in bio-mechanisms

Course Contents:

Introduction: Human Factors and Systems, Information Input and Processing, Visual Displays of Dynamic Information, Human Output and Control: Physical Work and Manual Materials Handling, Motor Skills, Human Control of Systems, Hand Tools and Devices.

Definition of Ergonomics and its significance in designing workplace layout and detailed motion plan of work, Man-Machine Symbiosis, Human Factors in design & manufacturing, Viz. pressure of the environment, temperature, humidity etc., Principles of motion economy, anthropometric condition, stability criterion etc. Biodynamic analysis for design of products & its concept of learning by man and machine.

Measurement of Learning Index and training for each job and each man, Product design – various aspects including ergonomic design and reliability-based design.

Dynamic consideration in design of product using vibration stability in biomechanisms. Safety in manufacturing. Considerations of human stress, Allowable limit of stress, stress adjustment.

Estimation of human error and human reliability, combining various forms of human error by random number simulation, Human Error, Accidents and safety, Human Factors and the Automobile, Human Factors in Systems Design.

Dynamic consideration in project operations, leadership, requirement, communication process, motivating a diverse workflow, facilitating team decisions, resolving interpersonal conflicts, managing different people, strengthening team accountability

References:

1. Sanders, M.M. & McCormick, E.J., Human Factors in Engineering & Design, McGraw-Hill, 7th ed. (1993) NY.
2. S. K. Basu, K.C. Sahu and Rajiv B, Industrial Organisation and Management –, PHI New Delhi, Nov 2012.

(PPM (PE) 25011) - Materials Management

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Understand consideration in materials Management
- Apply various Inventory control techniques for Materials Management
- Analyse the Economic order quantity

Course Contents:

Materials management – An overview – Introduction – Scope, Objective, Importance
Integrated approach to Materials Management

Material Planning – Introduction – Factors affecting material planning – Techniques of material planning - MRP

Purchasing, Procedure & Pricing Issues – Receipt – Storage - Issue

Inventories – Definition-Classification of Inventories- Need for inventories – Merits & Demerits of Inventories

Inventory control techniques and principles - classification, codification, standardization – ABC analysis –VED, GOLF, FSN - HML

Economic order quantity concept – Derivation of EOQ formula, modified EOQ , Case Studies
Mathematical versions of modified EOQ models,

Vender development, vender selection

Replenishment systems, Material forecasting, Material storage systems, ASRS. Material Handling equipments, stores layout, warehouse management.

Reference Books

1. Shailesh Kasande, Materials and logistics Management
2. L. C. Jhamb, Materials and logistics Management
3. K. K. Ahuja, Materials Management,
4. Gopalkrishnan & Sundersan, An integrated approach to Materials Management

(PPM (PE) 25012) Entrepreneurship Essentials

Teaching Scheme

Lectures: 3 hrs/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of course students will be able to

- Use Entrepreneurial approach
- Apply design thinking and TRIZ
- Analyse the opportunities based on financial, break even and margin of safety.

Course Contents:

Definition, Innovation and entrepreneurship, Contributions of entrepreneurs to society, risk-opportunities perspective and mitigation of risks. Corporate entrepreneurship or intrapreneurship.

Opportunity Identification, factors determining competitive advantage, Market segment, market structure, blue ocean strategy, Marketing research, Demand-supply analysis, Value proposition, Business Model Canvas, Developing an Effective Business Model, Legal forms of business.

Design Thinking, Design-Driven Innovation, TRIZ (Theory of Inventive Problem Solving),

Zero-based design, Systems thinking, SPRINT Lean product development, Lean entrepreneurship, Lean manufacturing, Go-to-market strategy, balance team and its importance, recruiting early employees, Writing a business plan, Pitching.

Preparing financial statements, analysis of opportunities based on -Financials, break-even & safety margin

Government incentives for entrepreneurship, Incubation, acceleration, Funding new ventures, Legal aspects of business

References

1. Norman M. Scarborough, Jeffrey R. Cornwell, Essentials of Entrepreneurship and Small Business Management, Pearson
2. H. Nandan, Fundamentals of Entrepreneurship 3rd Edition, PHI
3. Rishikesh T. Krishnan and Vinay Dabholkar, 8 Steps to Innovation: Going from Jugaad to Excellence
4. Peter Drucker, Innovation and Entrepreneurship
5. HBS series on Innovation and Entrepreneurship

(PPM- 25011) Creative Problem-Solving Laboratory

Teaching Scheme

Practical: 2 hrs/week

Examination Scheme

CIE-100 Marks

Course Outcomes:

At the end of course students will be able to

- Solve the problem/task in a creative way.
- Apply brainstorming technique in problem solving
- Clarify, Ideate, develop, Implement the solutions

Course Contents:

1. Constructive Controversy, Improving Solutions by Arguing for and Against Your Options
2. Inductive Reasoning, Drawing Good, Generalized Conclusions
3. Brainstorming
4. Lateral Thinking
5. Trial & Error
6. C-K Theory
7. Morphological Analysis
8. Systematic Inventive Thinking
9. Clarify, Ideate, develop, Implement

(PPM- 25012) Simulation Laboratory

Teaching Scheme

Practical: 2 hrs/week

Examination Scheme

CIE- 100 marks

Course Outcomes:

At the end of course students will be able to

- Model & simulate the system
- Carry out Layout simulation
- Carry out assembly line simulation
- Use linear programming software for analysis.

Course Contents:

Case studies and assignments on:

- Basic Simulation Modeling, System model & Simulation, continuous & discrete, simulation of an inventory system, Single server, simulation of simple systems.
- Introduction to Simulation Softwares, comparison of simulation packages with programming languages, classification of simulation software.
- Layout simulation using simple situations
- Assembly line simulation
- Generating and evaluating what –if scenarios for finalizing layout
- Mini project using simulation software

(SET-25001) Research Methodology

Teaching Scheme

Lectures: 3 hr/week

Examination Scheme

TA – 20 Marks, MSE: 30 Marks,
End-Sem Exam – 50 Marks

Course Outcomes:

At the end of this course, the students will demonstrate the ability to:

1. Formulate research problems by defining objectives, hypotheses, variables, and feasibility.
2. Synthesize literature using reproducible search and screening strategies.
3. Apply research ethics, authorship norms, compliance rules, and FAIR data practices.
4. Produce research outputs through ethical analysis, documentation, and dissemination.

Unit	Contents	Lecture
1	Introduction to Research: What is scientific research, objectives of research, motivation, types of research, research approaches, research methodology, significance of research, indications of good research	04
2	Designing a Problem: Research problems, formulation of feasible problems, hypothesis, errors in problem selection, selection of variables, literature review	06
3	Methods- Simulations and Experiments: Conventional approaches, selection of tools, setting up production, validation of results, performance analysis, sensitivity analysis, errors in measurements	08
4	Statistics and Uncertainty Quantification: Data, importance of analyzing data, types of analyses, selection practices, statistics, sampling techniques, uncertainty quantification, errors analysis	08
5	RCR and Ethics: Responsible conduct of research, IEC compliance, what is plagiarism, QRPs,	05
6	IPR, Research Ethics and Publishing: Introduction to IPR, significance of IPR, types of IPR, recent developments, technical writing	05

References:

3. Stuart Melville and Wayne Goddard, Research methodology: an Introduction for Science & Engineering students,
4. Dr. C. R. Kothari, Research Methodology: Methods and Trends
5. Wayne Goddard and Stuart Melville, Research Methodology: An Introduction
6. Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, 2nd Edition
7. Dr. S.D. Sharma, Kedar Nath, Operational Research, Ram Nath & Co

(LLC) Liberal Learning Course

Teaching Scheme

Contact Period: 2 hr/week

Examination Scheme

ISE – 100 Marks

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

- Learn new topics from various disciplines without any structured teaching or tutoring
- Understand qualitative attributes of a good learner
- Understand quantitative measurements of learning approaches and learning styles
- Understand various sources and avenues to harvest/gather information
- Assess yourself at various stages of learning

Course Features:

- 10 Areas, Sub areas in each
- Voluntary selection
- Areas (Sub areas):
 1. Agriculture (Landscaping, Farming, etc.)
 2. Business (Management, Entrepreneurship, etc.)
 3. Defense (Study about functioning of Armed Forces)
 4. Education (Education system, Policies, Importance, etc.)
 5. Fine Arts (Painting, Sculpting, Sketching, etc.)
 6. Linguistics
 7. Medicine and Health (Diseases, Remedies, Nutrition, Dietetics, etc.)
 8. Performing Arts (Music, Dance, Instruments, Drama, etc.)
 9. Philosophy
 10. Social Sciences (History, Political Sc., Archeology, Geography, Civics, Economics, etc.)

Reference:

Expert (s), Books, Texts, Newspaper, Magazines, Research Papers, Journal, Discussion with peers or faculty, Internet, etc.

(PPM-26001) Internship

Teaching Scheme

Practical work 40 hr/week

Examination Scheme

End Sem Exam: 100 Marks

Course Outcomes:

Students will demonstrate the ability to:

- Identify the case study for a practical problem from industry or research problem.
- Carry out an extensive literature review will help them in understanding the latest happenings in the field.
- understand and analyze the problem.

Internship should be Industry requirements involving detail analysis or development of the industrial case studies related to Project Management as per the common instructions for all branches of M.Tech..

(SLC) Massive Open Online Course –I

Teaching Scheme:

Self-Learning Mode (SLM)

Examination Scheme

End-Sem Exam - 100

*** Massive Open Online Course –I**

- MOOC courses available during the academic year through SWAYAM or NPTEL
- Earlier MOOC courses available on various portals

(SLC) Massive Open Online Course –II

Teaching Scheme:

Self-Learning Mode (SLM)

Examination Scheme

End-Sem Exam - 100

*** Massive Open Online Course –II**

- MOOC courses available during the academic year through SWAYAM / NPTEL
- Earlier MOOC courses available on various portals

(PPM- 26002) Dissertation Phase – I

Teaching Scheme

Practical work 22 hr/week

Examination Scheme

ISE: 70 Marks

ESE 30 Marks

Course Outcomes:

Students will demonstrate the ability to:

- Identify the case study for a practical problem from industry or research problem.
- Carry out an extensive literature review will help them in understanding the latest happenings in the field.
- understand and analyze the problem.

Project should be Industry requirements involving detail analysis or development of the industrial case studies related to Project Management as per the common instructions for all branches of M.Tech

SEMESTER IV

(PPM- 26002) Dissertation Phase – II

Teaching Scheme

Practical work 22 hr/week

Examination Scheme

ISE: 70 Marks

ESE 30 Marks

Course Outcomes:

- Students will be able to apply the techniques learned during the course.
- Students will be able to provide solutions to the problem
- Student will be able to publish their work in conference and Journals.

Project should be researching oriented experimental work, involving detail analysis or development of the industrial case studies related to Project Management as per the common instructions for all branches of M.Tech.