Department of Mechanical Engineering

Curriculum for M. Tech. Programme in Industrial Engineering and Management

Semester 1

Code	Title of Course	L	T	P/S	C
ME6101	Decision Modeling - I	3	--	--	3
ME6102	Inventory and Supply Chain Management	3	--	--	3
ME6103	Accounting and Finance for Management	3	--	--	3
ME6104	Marketing Management	3	--	--	3
	Elective-I	3	--	--	3
	Elective-II	3	--	--	3
ME6191	Industrial Engineering Laboratory	--	--	3	1
ME6192	Seminar	--	--	3	1
	Total	**20**			

Semester 2

Code	Title of Course	L	T	P/S	C
ME6111	Decision Modeling – II	3	--	--	3
ME6112	Facilities Layout Planning	3	--	--	3
ME6113	Manufacturing Planning and Control	3	--	--	3
ME6114	Human Resource Management	3	--	--	3
	Elective-III	3	--	--	3
	Elective-IV	3	--	--	3
ME6193	Computational Laboratory-II	--	--	3	1
ME6194	Term Paper/ Mini Project/Industrial Training	--	--	3	1
	Total	**20**			

Semester 3

Code	Title of Course	L	T	P/S	C
ME7195	Project work	--	--	--	8
	Total	**8**			

Semester 4

Code	Title of Course	L	T	P/S	C
ME7196	Project work	--	--	--	12
	Total	**12**			

Total Credits: 60

Stipulations:

1. A minimum of 60 credits have to be earned for the award of M. Tech. degree in this programme.
2. Students have to credit a minimum of eight core courses and four electives during the programme; however they have option to credit two electives in the Third Semester, drawing one each from First and Second Semesters.
3. Students may undergo Industrial Training during May-June.

List of Electives

Sl. No.	Code	Title	Credits
1	ME6121	Statistics for Management	3
2	ME6122	Work System Design	3
3	ME6123	Management of Technology and Innovation	3
4	ME6124	Strategic Management	3
5	ME6125	Management Information Systems	3
6	ME6126	Group Technology and FMS	3
7	ME6127	Reliability Engineering and Management	3
8	ME6128	Product Management	3
9	ME6129	Project Management	3
10	ME6130	Technical Entrepreneurship	3
11	ME6131	Business Ethics	3
12	ME6132	Computer Methods in Management	3
13	ME6133	Organizational Behaviour	3
14	ME6134	Consumer Behaviour	3
15	ME6135	Soft Computing Techniques	3
16	ME6136	Risk Management and Insurance	3
17	ME6137	Financial Management	3
18	ME6138	Decision Support and Expert System	3
19	ME6139	System Modelling and Simulation	3
20	ME6140	Data Base Management	3
21	ME6141	Enterprise Resource Planning	3
22	ME6142	Industrial Scheduling	3
23	ME6143	Lean Production Management	3
24	ME6144	Investment Management	3
25	ME6145	Takeovers and Corporate Restructuring	3
26	ME6146	Forecasting Techniques	3
27	ME6147	Managerial Economics	3
28	ME6148	Computer Integrated Manufacturing	3
29	ME6312	Quality Engineering & Management	3
30	ME6329	Design of Experiments	3

Note: Students may choose any course offered in the Institute with the approval from the Programme Coordinator.

DEPARTMENT OF MECHANICAL ENGINEERING

BRIEF SYLLABI

M. Tech. Programme in Industrial Engineering & Management

Pre-requisite for courses: Nil
Total Hours for all courses except for Project: 42
Lecture hours for theory courses: 3
Hours for Practical/Seminar: 3
Credit for theory courses: 3
Credit for Practical/Seminar: 1

ME6101 DECISION MODELLING I
Theory of Simplex Method, duality in linear programming, Sensitivity analysis, Integer Programming, Network Models and Solutions, Complexity of algorithms, Non-linear Programming Problems, Theory and Algorithms for Unconstrained and Constrained Optimization.

ME6102 INVENTORY AND SUPPLY CHAIN MANAGEMENT
Introduction to Supply Chain Management (SCM), Sourcing and Procurement, Purchasing, Stores Management, Inventory Management- Independent Demand Systems (Deterministic Models), Multi-item Joint Replenishment, Inventory System Constraints, Independent Demand Systems (Probabilistic Models)- Single order Quantities, Dynamic Order Quantities, Managing inventory in supply chain.

ME6103 ACCOUNTING AND FINANCE FOR MANAGEMENT
Cost Management Concepts, Product Costing Systems- variance analysis, ABC costing, Accounting- Balance sheet, classify assets, liabilities and equity items, Financial Management- ratio analysis- time value of money- stock valuation.

ME6104 MARKETING MANAGEMENT
Introduction to Marketing, Planning Process, Market Segmentation and Market Targeting, Marketing mix variables and their importance, Pricing Strategies, Marketing Research Process, Consumer Behaviour, Product Development, Marketing Communication, Advertising Management, Sales Promotion.

ME6191 INDUSTRIAL ENGINEERING LABORATORY
Experiments on Method Study, Time Study ,Vocational Guidance , Muscle Dynamometer, Eye-Hand Coordination , Depth Perception and Visual Acuity Tests , Construction of Control Charts for Quality Planning and Analysis.

ME6111 DECISION MODELLING II
Decision analysis, multi-objective decision models, Sequential Decision Making (Deterministic and Stochastic Cases), Dynamic programming, Markov processes, Markov chains, Application of queuing models.

ME6112 FACILITIES LAYOUT PLANNING
Overview of Plant Design, Plant Location, Scope of Facilities Layout Planning, Single and Multi- Facility Location Problems, Computerized Layout Planning- Construction and Improvement Algorithms, Mass Production Management (Line Balancing), Line Balancing Algorithms.

ME6113 MANUFACTURING PLANNING AND CONTROL
Manufacturing Planning and Control (MPC), Enterprise Resource Planning (ERP), Demand Management and MPC environment, Forecasting framework, Sales and Operation Planning, Master Production Schedule (MPS), Material Requirement Planning (MRP), Shop floor control concepts, General job shop scheduling - Static, deterministic, Dynamic, probabilistic job shop.

ME6114 HUMAN RESOURCE MANAGEMENT
Definition of personnel management, Organizational objectives, Manpower planning, Selection, Training, Performance Appraisal, Wage and Salary Administration, Expectancy theory and compensation, Human Factor Management- behavioural models, motivation, Leadership, Communication and counseling.

ME6193 COMPUTATIONAL LABORATORY
Development of algorithms and computer programs using C, C++, MATLAB, LINDO, LINGO, EXCEL and ARENA for the modeling and analysis of decision problems in the areas of Production Planning and Control, Inventory and Supply Chain Management, Manufacturing System Design, Performance of Manufacturing

Systems, Facilities Planning, Financial Management, Human Resource Management and Marketing Management .

ME6121 STATISTICS FOR MANAGEMENT

Data Description, Probability distribution, Random samples and sampling distributions of mean and variance, Parameter Estimation: Point estimation, Statistical hypothesis tests, Design and Analysis of single and multifactor Experiments, Non-Parametric Statistics, Taguchi Approach to Design of Experiments**.**

ME6122 WORK SYSTEM DESIGN

Work Design and Methods Study, Process analysis, Operation analysis, Work Measurement, Work sampling, Ergonomics, Human information processing, Visual displays, Auditory and tactual displays, Speech communication, Nature of human activity and their effects ,Human control of systems.

ME6123 MANAGEMENT OF TECHNOLOGY AND INNOVATION

Understanding Management of Technology, Technology and competition, technology acquisition, Technology Strategy, Appropriation of technology , Technology evaluation and financing.

ME6124 STRATEGIC MANAGEMENT

Concept of strategic management, Strategy formulation, SWOT Analysis, Portfolio analysis , Strategy Implementation and Control, Strategic issues of technology.

ME6125 MANAGEMENT INFORMATION SYSTEMS

Information systems for Decision Making, General Steps in Information System Design, System requirements specification ,Modern software design techniques, Verification and validation methods, Capability Maturity Model(CMM), System Testing, System implementation issues and solution procedures, Distributed data management, Data mining and warehousing,, Security features in global information systems.

ME6126 GROUP TECHNOLOGY AND FMS

Group Technology (GT), Models for Cellular Manufacturing System (CMS) Design, Focused factory and Pull production, Work-cell Design, Approaches to process planning, Flexible Manufacturing System (FMS)

ME6127 RELIABILITY ENGINEERING AND MANAGEMENT

Basic concepts of Reliability, Maintainability and Availability, Reliability Evaluation, Reliability Determination Methods, Advanced Reliability Evaluation Concepts, Failure mode and effect analysis ,Reliability Optimization, Failure Data Analysis, Total Productivity Maintenance (TPM), Maintainability and Availability Concepts, Reliability Management

ME6128 PRODUCT MANAGEMENT

Introduction to Product Management, Target marketing, New product innovation and development, Brand Management

ME6129 PROJECT MANAGEMENT

Project Planning, Analysis and Appraisal Generation of Project ideas, Investment Appraisal, Project Implementation- Development of project networks, Time-cost Trade off procedure, PERT Network, Algorithms for Network Analysis, Linear Programming Formulation of Network Problems, Project Scheduling with Limited Resources, Project Review and Administrative Aspects.

ME6130 TECHNICAL ENTREPRENEURSHIP

Basis and challenges of entrepreneurship, Entrepreneurship Index and its need, Concept of new ventures, Appropriate technology, Starting a New Technological Venture and Developing the Business, Financing a new venture- Venture capital, Managing the New Technological Venture- Franchising or Acquisition.

ME6131 BUSINESS ETHICS

Some basic principles in Business Ethics, Historical perspective, culture and ethics in India, Economics and the environment, The sphere of personal ethics, Role of objectivity, practicability, Ethical Responsibilities of Economic Agents, Environmental protection, Corporate accountability, Ethical conflicts, Ethical responsibilities of Organizational Leader, Ethics in use of Information Technology, Ethics in Marketing, Ethics of advertising and sponsorship.

ME6132 COMPUTER METHODS IN MANAGEMENT

Programming and Problem Solving,, Efficiency of algorithms, Program design methods, Fundamentals of Programming- Data structures, Unix system Interface, Dynamic storage management, Framework of E-commerce, site security.

ME6133 ORGANISATIONAL BEHAVIOR
Introduction to Organizational Behaviour (OB), Foundations of group behavior, Work design and technology, Organizational change, stress management.

ME6134 CONSUMER BEHAVIOR
Consumer behaviour as discipline and Science, Consumer motivation, consumer perception, consumer learning, Consumer influence and diffusion of innovations, Consumers in their social and cultural settings.

ME6135 SOFT COMPUTING TECHNIQUES
Genetic Algorithms (GA), Differences and similarities between genetic algorithm and traditional methods ,Simulated Annealing Algorithm and Applications, Tabu Search- Algorithm and Applications, Fuzzy Logic, Design aspects of fuzzy systems , Artificial Neural Networks (ANN), Applications of ANN in optimization.

ME6136 RISK MANAGEMENT AND INSURANCE
Basic concept of risk and insurance, Personal property and liability risks, Commercial property and liability risks, Life and Health insurance.

ME6137 FINANCIAL MANAGEMENT
Goal of financial management – Financial statements, ratio analysis, fund flow analysis, time value of money, stock valuation, bond valuation - Investment in long term assets - Capital budgeting decision criteria, traditional techniques, discounted cash flow techniques, risk analysis - Cost of capital and long term financial policy - Capital structure theories, dividends and dividend policy - Introduction to CAPM - Short-term financial planning – Working capital planning and management - Leasing - International corporate finance - Foreign exchange, exchange rate, interest rate parity – international financing, futures and options in corporate finance.

ME6138 DECISION SUPPORT AND EXPERT SYSTEMS
Human Information Processing, Decision Support Systems (DSS), Subsystems in DSS, Group Decision Support Systems (GDSS), Knowledge-Based Expert System (KBES),Search Techniques, Engineering Design Synthesis, Criticism and Evaluation, Applications of Decision Support Systems, Process Models and Knowledge-Based Systems.

ME6139 SYSTEMS MODELLING AND SIMULATION
System Concept, Discrete and continuous systems, System analysis, system design and system postulation, Concepts in Discrete Event Simulation, Random Number Generation, Random Variate Generation, Input Modelling ,Verification and Validation of Simulation Models, Output Analysis for a Single Model, Metamodelling, Simulation Modelling and Analysis of Manufacturing Systems.

ME6140 DATA BASE MANAGEMNT
Database systems, Data Definition Language- Data Manipulation Language, ER Diagrams, Structure of Relational Databases- SQL, Design- Normalisation functional, Multi-valued and joint dependencies, File organization, Indexing and Hashing ,Query Processing ,Security and Integrity.

ME6141 ENTERPRISE RESOURCE PLANNING
Introduction to Enterprise Resource Planning(ERP), Systems and technology background , Reengineering, ERP Life Cycle, Designing ERP systems , Implementing ERP systems ,Successes and failures.

ME6142 INDUSTRIAL SCHEDULING
Importance of scheduling in implementation of production planning, Single machine sequencing with independent jobs- without and with due dates, Flow shop scheduling, Job shop scheduling, Scheduling of Flexible assembly systems.

ME6143 LEAN PRODUCTION MANAGEMENT
Lot sizing, Lot-size Reduction, Setup_Time Reduction, Pull Production Systems, Workcells and Cellular Manufacturing, Scheduling for Smooth Flow, Synchronising and Balancing Process, Centralised and Decentralised Planning and Control System, Maintaining and Improving Equipment.

ME6144 INVESTMENT MANAGEMENT
Investment environment: - securities and market, Characteristics and financial analysis of common stocks, Bond valuations and analysis, Mutual funds, international investing.

ME6145 TAKEOVERS AND CORPORATE RESTRUCTURING
Takeover process, merger process, theories of mergers, Restructuring and divestitures, Joint ventures and alliances, Takeover defenses, International takeovers and restructuring.

ME6146 FORECASTING TECHNIQUES

An overview of forecasting techniques, Time series data and models, Regression-moving average models Seasonal data and forecasting errors, Moving average models MA(q), Autoregressive models ÀR(p),Panel data, Qualitative forecasting, Relevance Trees, Delphi Method, Cross-Impact Analysis.

ME6147 MANAGERIAL ECONOMICS

Introduction to managerial economics – demand theory and analysis – regression techniques and demand estimation – production and costs – cost theory and analysis – market structure – perfect competition and monopoly – monopolistic competition – oligopoly and barriers to entry – pricing decisions – pricing of goods and services – pricing and employment of inputs – economic rent – wage and income differentials – labour unions - technological change, location theory and taxation - taxes and decision making

ME6148 COMPUTER INTEGRATED MANUFACTURING

Manufacturing models and metrics, Concurrent engineering, Classification scheme for manufacturing system, GT & Process planning, Introduction to CAPP, Material handling, FMS and Shop floor control, NC, CNC, DNC & CIM and Data base, Virtual Manufacturing.

DEPARTMENT OF MECHANICAL ENGINEERING

Detailed Syllabi for the M.Tech. Programme in INDUSTRIAL ENGINEERING AND MANAGEMENT

ME6101 DECISION MODELLING-I

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 hours)

Introduction: Theory of Simplex Method, Duality Theory, Duality theorems, Dual simplex method, Revised simplex method, Bounded variables algorithm, Sensitivity analysis.

Module II (10 hours)

Integer Programming: Cutting plane method, Branch and bound method. **Network Models and Solutions:** Shortest Route problems, Minimal spanning tree problems, Maximal flow problems. **Complexity of algorithms:** Complexity of algorithms for combinatorial optimization problems.

Module III (11 hours)

Non-linear Programming Problems: General non-linear programming problems; convex, quasi-convex, concave and unimodal functions, Theory of unconstrained optimization-Necessary and sufficient conditions for extrema, Theory of constrained optimization-Lagrange multipliers and Lagrangian optimization, Inequality constraints, Kuhn-Tucker conditions.

Module IV (10 hours)

Algorithms for Unconstrained Optimization: Fibonacci search method, Golden section search method, Hooke and Jeeve's method, Newton-Raphson method, Cauchy's (Steepest descent) method.
Algorithms for Constrained Optimization: Penalty function methods, Quadratic programming, Separable convex programming.

References

1. Hillier, F.S. and Liberman, G.J., Introduction to Operations Research, McGraw-Hill International edition, 2001.
2. Rao, S.S. Optimization: Theory and Applications, Second edition, Wiley eastern, 1994. 3. Ravindran, A., Philips, D.T., and Solberg, J.J., Operations Research: Principles and Practice, Second Edition, John Wiley & Sons, 1987.
4. Taha, H.A., Operations Research: An Introduction, Sixth Edition, Prentice-Hall of India, New Delhi, 1999.
5. Beighler, C., Philips, D., and Wild, D., Foundations of Optimization, Second Edition, Prentice-Hall, New Jersey, 1979.
6. Deb, K., Optimization in Engineering Design, Prentice-Hall of India, New Delhi, 1 994. 7. Papadimitriou, C.H., and Steghtz, K., Combinatorial Optimization:Algorithms and Complexity, Prentice-Hall, New Jersey, 1982.
8. Simmons, D.M., Ravindran, A., Non-linear Programming for Operations Research, Prentice-Hall, New Jersey, 1975.
9. Reklatis, G.V., Ravindran, A., and Ragsdell, K.M., Engineering Optimization: Methods and applications, Wiley Interscience, New York, 1983.

ME6102 INVENTORY AND SUPPLY CHAIN MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (10 hours)

Introduction to Supply Chain Management (SCM): Concept of Logistics Management, Concept of supply management and SCM, Core competency, Value chain, Elements of supply chain efficiency, Flow in supply chains, Key issues in supply chain management, Decision phases in supply chain, Supply chain integration, Process view of a supply chain, Competitive Strategy and supply chain strategies, Uncertainties in supply chain, Supply chain drivers.

Module II (10 hours)

Sourcing and Procurement: Outsourcing benefit, Importance of suppliers, Evaluating a potential supplier, Supply contracts, Competitive bidding and Negotiation, E-procurement
Purchasing: Objectives, Relations with other departments, Centralised and Decentralised purchasing, Purchasing procedure, Types of orders, Tender buying, Purchasing department records, Computer based systems/EDI.
Stores Management: Functions, Storage methods, Receiving, Inspection, Issues, Inventory Valuation.

Module III (12 hours)

Introduction to Inventory Management: Selective Control Techniques, MUSIC-3D systems, Various costs.
Independent Demand Systems: Deterministic Models, Quantity Discounts - all units, incremental price; Sensitivity, Make-or-buy decisions.
Multi-item Joint Replenishment: Economic Production Quantity for multiple items.
Inventory System Constraints: Exchange Curve (Optimal Policy Curve), Working Capital restrictions, Storage Space restrictions.

Module IV (10 hours)

Independent Demand Systems (Probabilistic Models):
Single order Quantities: Payoff Matrix, Expected Value Criterion, Lost sales case, Mathematical formulation of discrete and continuous cases.
Dynamic Order Quantities: Q- system, P- system, Mathematical modelling under known stock out costs and service levels,
Managing inventory in supply chain: Bullwhip effect, Information and supply chain trade-offs

References

1. Chopra, S., and Meindl, P., Supply chain Management: Strategy, Planning and Operations. Second Edition, Pearson Education (Singapore) Pte. Ltd, 2004.
2. Simchi-Levi, D., Kaminsky, P., and Simchi-Levi, E., Designing & Managing the Supply Chain: Concepts, Strategies & Case studies. Second Edition, Tata McGraw-Hill Edition, 2003.
3. Doebler, D.W. and Burt, D.N., Purchsing and Supply Chain Management: Text and Cases, McGraw-Hill Publishing Company Limited, New Delhi, 1996.
4. Tersine, R.J., Principles of Inventory and Materials Management, 4th edition, Prentice-Hall Inc., New Jersey, 1994.
5. Christopher, M., Logistics and Supply Chain Management, Pitman Publishing, Company, London, 1993.
5. Narasimhan, S.L., McLeavey, D.W. and Billington, P.J., Production Planning and Inventory Control, 2nd edition, Prentice-Hall India, New Delhi, 1995.
6. Starr, M.K. and Miller, D.W., Inventory Control : Theory and Practice, Prentice-Hall India, New Delhi, 1986.
7. Raghuram, G. and Rangaraj, N., Logistics and Supply Chain Management: Cases and Concepts, Macmillan India Limited, New Delhi, 2000.

ME 6103 ACCOUNTING AND FINANCE FOR MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (10 hours)

Cost Management Concepts: Concepts of cost – cost behavior and CVP relationships – cost functions – methods of measuring cost functions – Applications.

Module II (10 hours)

Product Costing Systems: Job costing, process costing – variable and absorption costing – standard costing, variance analysis, ABC costing.

Module III (10 hours)

Accounting: Conceptual basis of accounting – Balance sheet, classify assets, liabilities and equity items – construction of a balance sheet – balance sheet changes – preparation of profit & loss account – funds and cash flow statement- forms of ownership

Module IV (12 hours)

Financial Management: Working with financial statements, ratio analysis- time value of money- stock valuation, bond valuation. Capital budgeting – traditional techniques, discounted cash flow techniques - Risk analysis.
Cost of capital and long term financial policy: - Raising capital, cost of capital -Financial and operating leverage, capital structure theories, dividends theories.
Short-term financial planning – working capital – planning and management.

References

1. Khan M.Y. and Jain P.K,(2003) Financial Management, 3rd edn., Tata McGraw Hill 2003.
2. Ramachandran, N and Ram Kumar Kakani, (2005) Financial Accounting for Management, second edition, Tata McGraw-Hill,
3. Khan and Jain (2001) “Management and Cost Accounting” 2/e, Tata McGraw Hill Delhi.
4. I.M. Pandey, Financial Management, 8th edn., Vikas publishing house 2003.
5. Prasanna Chandra, Financial Management, 4th edn., Tata McGraw Hill 2003.
6. Jawahar Lal, Financial Accounting, 2nd edn., Wheeler publishing 2000.
7. Horngreen “ Cost Accounting – A Managerial emphasis” 11/e Pearson Education, Asia, 2002.
8. Horngreen “Introduction to management Accounting” 11/e, Pearson Education, Asia, 2002.

ME6104 MARKETING MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (9 hours)

Introduction to Marketing: Marketing defined, Marketing Concepts, Marketing functions, Marketing Environment.
Marketing Planning: Planning Process, Strategic Business Units, Evaluation of SBUs.

Module II (11 hours)

Market Segmentation and Market Targeting: Segmentation Procedure, Market Targeting, Product Positioning.
Marketing Mix: Marketing mix variables and their importance.
Pricing Strategies: Meaning of pricing, Importance, Objectives, Factors influencing price determination, Demand market based pricing, Tender pricing, Product line pricing, Selecting the final price.

Module III (11 hours)

Marketing Research: Marketing Research Process, Research objectives, Research Plan development, Collecting information, Analysis.
Consumer Behaviour: Factors influencing Consumer Behaviour, Decision making process in buying, Perceived risks.
Product Development: Idea generation, Concept development and Testing, Market Testing, Commercialization.

Module IV (11 hours)

Marketing Communication: Marketing mix variables communicate, Steps in developing effective communication.
Advertising Management: Purpose, Factors in advertising, Advertising Portfolio Selection, Deciding message or copy.
Sales Promotion: Sales Promotion Tools, Consumer promotion tools, Business promotion tolls.

References

1. Kotler, P., Marketing Management - Analysis, Planning, Implementation and Control, Prentice-Hall of India, New Delhi, 2001.
2. Ramaswamy, V.S. and Namkumari, S., Marketing Management - Planning, Implementation and Control, Macmillan India Limited, 1990.
3. Majumdar, R., Marketing Research - Text, Applications and Case Studies, New Age International (P) Limited Publishers, New Delhi, 1996.
4. Stanton, W.J., Etzel, M.J. and Walker, B.J., Fundamentals of Marketing, McGraw-Hill International Edition, 1991.
5. Mathew, M.J., Sales Management and Sales Promotion, First Edition, RBSA Publishers, 1994.

ME6191 INDUSTRIAL ENGINEERING LABORATORY

L	T	P	C
0	0	3	1

- Experiments on Method Study
- Experiments on Time Study
- Vocational Guidance Tests
- Muscle Dynamometer Tests
- Eye-Hand Coordination Experiments
- Depth Perception Tests
- Visual Acuity Tests
- Construction of Control Charts for Quality Planning and Analysis

ME6192 SEMINAR

L	T	P	C
0	0	3	1

Each student shall prepare a seminar paper on any topic of interest related to the core/elective courses (not course content) being undergone in the first semester of the M. Tech. programme. He/she shall get the paper approved by the Programme Coordinator/Faculty Members in the concerned area of specialization and shall present it in the class in the presence of Faculty in-charge of seminar class. Every student shall participate in the seminar. Grade will be awarded on the basis of the student's paper, presentation and his/her participation in the seminar.

ME6111 DECISION MODELLING-II

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (12 Hours)

Introduction to Decision Making: Decision analysis, Decisions under risk, Decision trees – Decision analysis with experimentation, Utility theory, Decisions under uncertainty.
Multi-objective Decision Models: Introduction to multi-objective decision making, Concept of pareto-optimality, Goal programming formulation, The weighting method of solution, Analytic hierarchy process.

Module II (10 Hours)

Sequential Decision Making (Deterministic Case): Sequential decision models, Dynamic programming, Bellman's principle of optimality, Forward recursion and backward recursion, Discrete state discrete time case, Continuous state continuous time case.

Module III (10 Hours)

Sequential Decision Making (Stochastic Case): Stochastic processes, Markov processes, Markov chains, Markov decision problems, Algorithms for solving Markov decision problems, finite-stage models, infinite stage models.

Module IV (10 Hours)

Queuing Models for Decision Making: Application of queuing models, Features of queuing process, Characterisation of queuing models and solutions - (M/M/1):(GD/∞/∞), (M/M/1): (GD/N/∞), (M/M/c): (GD/∞/∞) models – Queuing decision models.

References

1. Budnick F.S., McLeavey and R. Mojena, Principles of Operations Research for Management, 2/e, Richard D. Irwin Inc., Homewood, Illinois, 1991.
2. Taha H.A., Operations Research: An Introduction, 4/e, Maxwell Macmillan International Edition, 1989.
3. Hillier, F.S., and Liberman, G.J., Introduction to Operations Research, McGraw-Hill International Edition, 2001.
4. Rao, S.S. Optimization: Theory and Applications, Second edition, Wiley eastern, 1994.
5. Ravindran, A., Philips, D.T., and Solberg, J.J., Operations Research: Principles and Practice, Second Edition, John Wiley & Sons, 1987.
6. Bertsekas D.P., Dynamic Programming: Deterministic and Stochastic Models, Prentice Hall Inc., Englewood Cliffs, New Jersey, 1987.

ME6112 FACILITIES LAYOUT PLANNING

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 hours)

Introduction: Types of manufacturing processes, Overview of Plant Design, Plant Location - Location Factors, Location Theory, Nature, Significance and Scope of Facilities Layout Planning.
Plant Layout: Need for Layout, Objectives, Types of Layout, Layout Design Process, Layout Design Cycle, Data Collection, Equipment Requirement, Activity Analysis, REL Diagram, Employee Requirement, Development of Layout - Block Plan, Selection, Specification, Evaluation.

Module II (11 hours)

Single Facility Location Problems: Rectilinear Distance Problems, Squared Euclidean Distance Problems and Euclidean Distance Problems, Contour Lines (Iso-Cost Lines).
Introduction to Multifacility Location Problems: Formulation of Problems, LP formulation with rectilinear distance.

Module III (11 hours)

Computerised Layout Planning: Basic Philosophy in Computerised Layout Planning, Construction and Improvement Algorithms, Major features of Improvement Algorithms.
Major Features of Computerised Algorithms, such as ALDEP, CORELAP, CRAFT, FRAT, and MAT.
Formulation of Layout Problems: Quantitative, Qualitative, and multi-objective, Limitation of Computerised Layout Planning, Flow Dominance, Complexity Rating, Solution Efficiency.

Module IV (9 hours)

Mass Production Management (Line Balancing): Basic idea of assembly line balancing, Optimization of number of stations with given production rate, Minimization of cycle time with fixed number of stations.
Line Balancing Algorithms: Kilbridge and Wester, Rank Positional Weight method, COMSOAL, Moodie and Young method.

References

1. Francis, R.L. and White, J.A., Facility Layout and Location: An Analytical Approach, Prentice-Hall Inc., New Jersey, 1974.
2. Moore, J.M., Plant Layout and Design, Macmillan Company, New York, 1970.
3. Wild, R., Mass Production Management, John Wiley and Sons, New York.
4. Apple, J.M., Plant Layout and Material Handling, John Wiley and Sons, New York.
5. Tompkins and White, Facilities Planning, John Wiley and Sons, New York.

ME6113 MANUFACTURING PLANNING AND CONTROL

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (9 Hours)

Manufacturing Planning and Control (MPC): MPC systems, MPC system payoff, Hierarchy of managerial decisions, MPC system framework, Type of configurations manufacturing system, Options in dealing with the hierarchy of decisions.
Enterprise Resource Planning (ERP): What is ERP, ERP and functional units, How MPC fits within ERP, Performance measures.

Module II (11 Hours)

Demand Management: Demand management and MPC environment, Communicating with other MPC modules and customers, Forecasting framework; Time series analysis - Individual-item, short-term forecasting models, Forecast errors, Forecast error over lead time, Interval estimate, Special classes of individual items; Coefficient of correlation.

Module III (11 Hours)

Sales and Operation Planning: Nature of sales and operation planning, Relevant costs, Sales and operation planning methods.
Master Production Schedule (MPS): Nature of MPS, MPS Techniques, Time fencing and MPS stability, Structuring BOM, Final assembly schedule, Managing the MPS, Disaggregation techniques.

Module IV (11 Hours)

Material Requirement Planning (MRP): Nature of MRP, MRP records, MRP logic, Technical Issues, Using the MRP system, System Dynamics, Lot sizing methods, Buffering concepts, System nervousness.
Production Activity Control: Framework, Shop floor control concepts, Techniques, Performance measures, Gantt chart, Finite loading systems, Priority sequencing rules, General job shop scheduling - Static, deterministic job shop - Dynamic, probabilistic job shop.

References

1. Thomas E. Vollmann, William L. Berry, D Clay Whybark, and F. Robert Jacobs, Manufacturing Planning and Control for Supply Chain Management, Fifth Edition, Mc Graw Hill, International Edition. 2005.
2. Edward A. Silver, David F. Pyke and Rein Peterson, Inventory Management and Production Planning and Scheduling, Third Edition, John Wiley & Sons, 1998.
3. Seetharama L. Narasimhan, Dennis W. McLeavy and Peter J. Billington, Production Planning and Inventory Control, Second Edition, Prentice-Hall of India Pvt. Ltd., New Delhi, 2000.
4. Richard J. Tersine, Production/Operations Management, Second Edition, North Holland, 1985.
5. A. C. Hax and D. Candea, Production and Inventory Management, Prentice-Hall, Englewood Cliffs, NJ, 1984.

ME6114 HUMAN RESOURCE MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Introduction: Definition of personnel management, concept of labour, organisation and function of the personnel department, personnel policies.
Organisational objectives, functions, relationships, organisational structure of formal and organisations, job design.

Module II (11 Hours)

Manpower planning: Man power forecasting, mobility and promotion problems, job analysis and job description.
Selection: Developing sources, methods of recruitment, alternative selection policies, application blanks and qualification card, interviews, psychological testing.
Training: The nature of training, objectives in training, types of training, requirements of effective training conventional training techniques, group training, organisation development, evaluating training effectiveness.
Performance appraisal: Traditional performance appraisal systems, appraisal programs.

Module III (11 Hours)

Wage and Salary Administration: Factors affecting compensation policy - equity and compensation - comparable value, job evaluation, job evaluating systems - simple ranking - job grading - point systems - factor comparison system, effects of job evaluation on human relations, Expectancy theory and compensation, variable compensation, supplementary compensations.

Module IV (9 Hours)

Human Factor Management: Human factors in management behavioural models, motivation, Maslow's hierarchy of needs theory - hygiene approach to motivation, expectancy theory, reinforcement theory Mc-clleland's needs theory, motivational techniques.
Leadership: Definition, trait approaches to leadership, leadership behaviour and styles, situational approach to leadership.
Communication and Counselling: Nature and importance of communications, channels and structure, communication process, Management by objectives, counselling.

References

1. Scott, Clothier, Springel, Personnel Management, McGraw Hill
2. Strauss and Sayles Personnel, The Human Problems of Management, Prentice Hall.
3. Edwon, B. Fillipo, Personnel Management
4. Koontz, O. Donnel, Weihreich, Essentials of Managemnt, McGraw Hill.
5. Kapoor, N.D., Introduction to Commercial & Industrial Law, Sultan Chand & Sons.

ME6193 COMPUTATIONAL LABORATORY

L	T	P	C
0	0	3	1

Development of algorithms and computer programs using C, C++, MATLAB, LINDO, LINGO, EXCEL and ARENA for the modeling and analysis of decision problems in the following areas:

- Production Planning and Control
- Inventory and Supply Chain Management
- Manufacturing System Design

- Performance of Manufacturing Systems
- Facilities Planning
- Financial Management
- Human Resource Management
- Marketing Management

ME6194 TERM PAPER/MINI PROJECT/INDUSTRIAL TRAINING

L	T	P	C
0	0	0	1

Students are free to select any one assignment from the following term paper/mini project/industrial training.

Term Paper: Prepare a review paper on any industrial engineering and management topic with the individual analysis and comments.

Mini project: Students can select any project work and work under the guidance of any teaching staff in the department. End of the semester, each student has to submit a thesis report.
Project work is evaluated by the department as per M. Tech. regulations.

Industrial Training: Who are opting for industrial training, as to undergo a minimum of four weeks training in well established industries during in the summer vacation after the first two semesters. He has to submit a report on his training to the department and the same is evaluated as per M. Tech. regulations.

ME7195 PROJECT WORK

L	T	P	C
3	0	0	8

The student will be encouraged to fix the area of the project work and conduct the literature review during the second semester itself. The project work starts in the third semester. The topic shall be research and development oriented. The project can be carried out at the institute or in an industry/research organization. They are supposed to complete a good quantum of the work in the third semester. There shall be evaluation of the work carried out in the third semester.

ME7196 PROJECT WORK

L	T	P	C
3	0	0	12

The project work started in the third semester will be extended to the end of the fourth semester. The project can be carried out at the institute or in an industry/research organization. Students desirous of carrying out project in industry or other organization have to fulfill the requirements as specified in the "Ordinances and Regulations for M. Tech.". There shall be evaluations of the project work by a committee constituted by the department and by an external examiner.

Regulations for M. Tech. under the section - Project Work in Industry or Other Organization
At the end of the third semester, the students' thesis work shall be assessed by a committee and graded as specified in the "Ordinances and Regulations for M. Tech.". If the work has been graded as unsatisfactory, the committee may recommend a suitable period by which the project will have to be extended beyond the fourth semester. At the end of the fourth semester, the student shall present his/her thesis work before an evaluation committee, which will evaluate the work and decide whether the student may be allowed to submit the thesis or whether he/she needs to carry out additional work. The final viva-voce examination will be conducted as per the "Ordinances and Regulations for M. Tech."

ME6121 STATISTICS FOR MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 hours)

Data Description: Graphical presentation of data - Numerical description of data - Exploratory data analysis.
Probability distributions:- Introduction to probability and random variables - Binomial distribution, Poisson distribution, Geometric distribution, Hyper Geometric distribution, Normal distribution, Log-Normal distribution, Uniform distribution, Exponential distribution, Gamma distribution, Beta distribution and Weibull distribution - Random samples and sampling distributions of mean and variance.

Module II (11 hours)

Parameter Estimation: Point estimation - Properties of estimators, The method of maximum likelihood, The method of moments, Confidence interval estimation of mean, and variance.
Statistical hypothesis tests: Operations characteristic curve, Tests of hypothesis on the mean of a Normal Distribution, Tests of hypothesis on the means of two Normal distributions, The paired t-test, Tests of hypothesis on one variance, Tests of hypothesis for the equality of two variances, The testing for goodness of fit.

Module III (11 hours)

Design and Analysis of Experiments:- Fundamental assumptions of analysis of variance, Single factor experiments – Fixed/random effects model – Model adequacy checking - Multiple comparisons - Design of experiments with several factors - Two factor factorial experiments - General factorial experiments - The 2^k Factorial design –Introduction to response surface method in optimal design of parameters.

Module IV (9 hours)

Non-Parametric Statistics: The sign test - The wilcoxson signed rank test, The Wilcoxson Rank-sum test.
Taguchi Approach to Design of Experiments - The Loss Function – Orthogonal array – Signal-to-Noise ratio.

References

1. Garcia-Diaz, A and Phillips, D. T., Principles of Experimental Design and Analysis, Chapman & Hall, New York, 1995.
2. Hines, W. W, and Montgomery, D. C., “Probability and Statistics in Engineering and Management Science”, John Wiley and Sons, New York, 1990.
3. Freund, J. E. Mathematical Statistics”, Prentice Hall of India, New Delhi, 1990.
4. Hicks C.R. and Turner, K.V., Fundamental Concepts in the Design of Experiments, Fifth Edition, Oxford University Press, 1999.
5. Anderson, M.J. and Whitcomb, P.J., DOE Simplified: Practical Tools for Effective Experimentation, Productivity Press, 2000.
6. Levin, R.I. and Rubin, Statistics for Management, Seventh Edition, Prentice Hall International edition, 1997.

ME6122 WORK SYSTEM DESIGN

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (13 Hours)

Definition and scope of work design and measurement.
Work Design and Methods Study: Scope of work design – procedure for methods study – Process analysis – Process charts – Operation analysis – Principles of motion economy.

Work Measurement: Time study equipment – Establishment and maintenance of time standards – Allowances and Performance rating - Precision time measurement – Pre-determined fundamental motion time standards – Standard data – Work sampling – activity and performance sampling – Errors and sensitivity of technique – Physiological methods of work measurement.

Module II (11 Hours)

Ergonomics: Nature of man-machine systems – characteristics – purpose – operational functions and components – types of systems.
Information input and processing – sources and pathways of stimuli-Information theory – Information theory – Information input processes – Displays used in information input – Coding systems – Time sharing – Noise and the theory of signal detection – Human information processing.

Module III (9 Hours)

Visual displays – visual acuity and its types – Quantitative and qualitative displays – Visual codes, symbols and signs – General guidelines in design of visual displays.
Auditory and tactual displays – Masking – Types of auditory displays – cutaneous senses – Tactual displays.
Speech communication – Speech intelligibility – Components of speech communication.

Module IV (9 Hours)

Nature of human activity and their effects – Bases of human motor activity – Bio mechanics of motion – Energy expenditure – Strength and endurance – Speed and accuracy of movements.
Human control of systems – Input-output channels – Compatibility – Nature of continuous control systems – Influence of display factors and control factors on system control.

References

1. Barnes, R. M., Work Design and Measurement, Wiley & Sons.
2. Macormick, E.J., Human Factors in Engineering and Design, Tata McGraw-Hill.

ME6123 MANAGEMENT OF TECHNOLOGY AND INNOVATION

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Understanding Management of Technology, Key concepts – importance – issues. Process of technological change – innovation technology evaluation, Diffusion.

Module II (11 Hours)

Technology and competition, technology acquisition. Integration of strategic planning and technology planning. Key performance factors for technology management.

Module III (11 Hours)

Technology Strategy: - Technology intelligence – collaborative mode, Appropriation of technology – Deployment in new products, simultaneous engineering, Development in the value chain.

Module IV (9 Hours)

Technology evaluation and financing – changing role of R & D, Management of manufacturing technology – corporate cultures – technology audits.

References

1. Babcock D.L., “Managing Engineering Technology” Prentice Hall.
2. Burgelman et.al, “Strategic Management of Technology and Innovation” Tata McGraw Hill (2001).
3. Cleland and Bursic, “Strategic Technology management” Amacom, Newyork.
4. Narayanan U.K., “Managing Technology and Innovation for competitive Advantage” Pearson Education, Asia 2001.
5. Betz F, “Managing Technology – competing Through New Ventures, Innovation and Corporate Research.” Prentice Hall.

ME6124 STRATEGIC MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Basic Concepts: Concept of strategic management – social and other responsibility, Enviornmental scanning and Industry analysis – organisational analysis – mission and objectives.

Module II (11 Hours)

Strategy formulation: SWOT, alternative strategies – competitive strategies – Portfolio analysis – Functional Strategy.

Module III (11 Hours)

Strategy Implementation and Control: Implementation issues – analysis change, analysing culture, implementation approach, evaluation and control.

Module IV (9 Hours)

Strategic issues of technology, entrepreneurial ventures, non-profit organisations.

References

1. Certo and Peter, “Strategic Management - A focus on process,” Tata McGraw Hill (1990).
2. Pearce and Robinson, “Strategic Management, formulation, implementation and control” 7/e, McGraw Hill (2000).
3. Wheelen, “Concepts of Strategic Management and Business Policy 8/e, Pearson Education (2002).
4. David, “Strategic Management” Pearson Education (2002).

ME6125 MANAGEMENT INFORMATION SYSTEMS

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Information systems for Decision Making: Building blocks in information systems-input, output, model, technology, database, and control blocks, System view of business and information system design forces, Information systems development life cycle, Information systems for strategic planning.

Module II (11 Hours)

General Steps in Information System Design: System Investigation and requirements engineering, System requirements specification documents, Feasibility studies, System analysis and general system design, Charting tools in data base design, Data flow diagrams and E-R diagrams, Decision tools and models, Prototyping, Detailed system design, Form design, Code design, Database normalisation, Introduction to data structures and relational database.

Module III (11 Hours)

System Implementation: Modern software design techniques, Verification and validation methods, Performance of software systems, Software metric and models, Software standards, Introduction to Capability Maturity Model(CMM) and Quality Management in software organizations.
System Testing: Software testing, Review, walkthrough and inspection, Testing approaches, Software reliability, Errors, faults, repair and availability, Reliability and maintenance.

Module IV (9 Hours)

System Evaluation: System implementation issues and solution procedures, training and post implementation audit, System fine-tuning, Monitoring and updating.
Modern Information Systems: Multimedia technology, Distributed data management, Data mining and warehousing, Security features in global information systems.

References

1. Burch and Gruditski, Information Systems-Theory and Practice, Fifth edition, John Wiley & Sons, New York, 1989.
2. Hawryszkiewycz, I.T., Introduction to Systems Analysis and Design, Prentice Hall of India, 1989.
3. Ian Sommerville, Software Engineering, 6th. Edition, Pearson Education Asia, 2001.
4. Lucas, Henry C., Analysis, Design, and Implementation of Information Systems, 4th Edition, McGraw Hill, New York, 1992.
5. O'Brien J.A., Management Information Systems, 4/e, Tata McGraw Hill, 1999.

ME6126 GROUP TECHNOLOGY AND FMS

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Introduction: World class manufacturing, Ways of configuring manufacturing system
Group Technology (GT): Role of GT in Computer Aided Manufacturing (CAM), Features of GT, Cellular manufacturing, Role of similarity in GT, Composite part, Coding and classification, Similarity coefficient based clustering, Key machine approach, Binary ordering algorithm, Production flow analysis.

Module II (11 Hours)

Models for Cellular Manufacturing System (CMS) Design: CMS design factors, Mathematical programming approaches, Model for dynamic part population, Solution procedure using genetic algorithm.

Module III (11 Hours)

Cellular Manufacturing: Focused factory and Pull production, Building blocks of workcell, Linked cell, Different type of cells, Cycle time, Workcell Design; Worker assignment; Incentive plans; Issues in implementing Cellular Manufacturing.
Process Planning: Process planning for parts and assemblies – Manual process planning; Computer aided process planning (CAPP); Approaches to process planning; Process Planning systems; Variant process planning– Development stages – Family formation – search algorithm.

Module IV (9 Hours)

Flexible Manufacturing System (FMS): Types of automation, Flexibility, Types of FMS, FMS Layout configuration, Automated workpiece flow, Material handling, and machining, Performance measures – Bottleneck model – Extended bottleneck model – Sizing of FMS; FMS Scheduling and Control.

References

1. John Nicholas (1998). Competitive Manufacturing Management - Continuous Improvement, Lean Production, and Customer-Focused Qualities, McGraw-Hill International Editions.
2. Sing, N., and Rajamani, D., (1996), Cellular Manufacturing Systems: Design, Planning & Control, First Edition, Chapman & Hall.
3. Askin, R. G., and Standridge, C. R., (1993), Modelling and Analysis of Manufacturing Systems, John Wiley & sons. Inc.
4. Mikell P. Groover (2001). Automation, Production Systems, and Computer-Integrated Manufacturing, Second Edition, Prentice Hall of India Private Limited.
5. David D. Bedworth, Mark R. Henderson, and Philip M. Wolfe (1991). Computer- Integrated Design and Manufacturing, McGraw-Hill International Editions.
6. Tien-Chien Cheng, Richard A. Wysk, and Hsu-Pin Wang (1998). Computer-Aided Manufacturing, Second Edition, Prentice Hall International, Inc.
7. Wicks, E. M., and Reasor, R. J., (1999), Designing Cellular Manufacturing systems with dynamic part population, IIE Transactions, Vol. 31, pp 11-20.
8. Burbidge, J. L., (1991), Production Flow Analysis for Planning Group Technology, Journal of Operation Management, Vol. 10, No. 1 (January), pp 5-27.

ME6127 RELIABILITY ENGINEERING AND MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Basic Concepts of Reliability: Definitions-Reliability, Hazard rate, Active Redundancy, Maintainability, Downtime; Reliability and Quality, Failure and failure modes, Causes of failures, Maintainability and Availability.
Reliability Mathematics: Introduction to probability distributions, Concept of Bathtub Hazard Rate curve, Reliability Evaluation of two-state device networks-series, parallel, k-out-of-m systems; Standby redundant systems, Reliability evaluation of three-state device networks-series and parallel.

Module II (11 Hours)

Reliability Determination Methods: Network reduction technique, Path tracing technique, Decomposition technique, Delta-Star method.
Advanced Reliability Evaluation Concepts: Supplementary variables technique, Interference theory, Human reliability, Common cauae failures, Fault trees, Failure mode and effect analysis .
Reliability Optimization: Redundancy optimization-parallel, series-parallel, and series networks.

Module III (11 Hours)

Failure Data Analysis: Failure data banks, Nonrepairable items failure data analysis-complete data, incomplete data; Incomplete failure data hazard plotting technique, Maximum likelihood estimation technique.
Total Productivity Maintenance (TPM): Distinctive features of TPM, Basic philosophy of zero defects (ZD), ZD and TPM, Maximizing equipment effectiveness, Six major losses, TPM development activities, Steps of TPM development, Autonomous maintenance, Planned maintenance, Measuring TPM effectiveness.

Module IV (9 Hours)

Maintainability and Availability Concepts: Maintainability function, Availability function, Frequency of failures, Two-unit parallel system with repair, k-out-of-m systems, Preventive maintenance.
Reliability Management: Reliability Programme, Management policies and decisions, Reliability management by objectives, Reliability groups, Reliability data acquisition and analysis, Managing people for reliability.

References

1. Balagrusamy, E., Reliability Engineering, Tata-McGraw Hill Publishing Company Limited, New Delhi, 1984.
2. Balbir S, Dhillon, Reliability Engineering in System Design and Operation, Von Nostrand Reinhold Company, New York, 1983.
3. Nakajima Seiichi, Introduction to TPM, Productivity Press India (P) Madras, 1997.
4. Lewis, E.E., Introduction to Reliability Engineering, John Wiley & Sons, New York, 1987.
5. O'Connor Patric D.T., Practical Reliability Engineering, 3/e revised, John Wiley & Sons, 1995.
6. Stamatis D.H., Failure Mode and Effect Analysis, Productivity Press India (P) Madras, 1997.

ME6128 PRODUCT MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (10 Hours)

Product Management – Introduction – role of product managers – product policy, product market, market potential, product market planning and demand forecasting - product life cycle – product portfolio analysis.

Module II (10 Hours)

Target marketing – segmentation – product differentiation, product positioning – product recall/deletion – managing product line.

Module III (10 Hours)

New product innovation and development – stages, adoption process – diffusion – product pricing – new product launch, strategies.

Module IV (9 Hours)

Brand Management – concept – naming – brand equity – brand extension – brand positioning – product packaging.

References

1. Chunawalla, “Product Management” Himalaya publishing House (2002).
2. Majumdar, “Product Management” Prentice Hall of India.
3. Lehmann & Winer “Product Management” Tata McGraw Hill (2002).
4. Merle Crawford “New Product Management” Tata McGraw Hill (2002).

ME6129 PROJECT MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Project Planning: Analysis and Appraisal Generation of project ideas, Scouting for project ideas, Preliminary screening, Project rating index, Cost of project.
Investment Appraisal: Social cost benefit analysis, UNIDO approach, Net benefit in terms of economic prices, Measurement of impact on distribution, Savings impact and its value, Income distribution impact, Adjustment for merit and demerit, Goods Little Mirrless approach, Shadow prices.

Module II (11 Hours)

Project Implementation: Development of project network, Dummy activities, Activity on node networks, Cyclic network, Forward pass and Backward pass computations, Algorithm for critical path, Total slacks, free slacks and their interpretations.
Time-cost Trade off Procedure: Schedule related project costs, Time cost trade off, Lowest cost schedule.
PERT Network: Three time estimates for activities, Estimation of mean and variance of activity times, Event oriented algorithm for critical path, Probability of meeting a schedule date.

Module III (11 Hours)

Network Analysis: Algorithms for shortest route problems-Dijkstra's, Flyod's, Pollacks, and Dantzig's algorithms; Algorithms for minimal spanning tree- Kruskal's algorithm and Prim's algorithm; Algorithms for maximal flow problems-Ford and Fulkerson's algorithm(Labelling method), Maximum flow minimum cut explanation.
Linear Programming Formulation of Network Problems: A flow network interpretation for determination of critical paths, Time cost trade off and maximal flow, Chance constrained linear programming for probabilistic durations of activities in PERT network.

Module IV (9 Hours)

Project Scheduling with Limited Resources: Complexity of project scheduling with limited resources, Levelling the demands on key resources, A simple heuristic program for resource allocation.
Project Review and Administrative Aspects: Initial review, Performance evaluation, Abandonment analysis, Project organization, Matrix organization, Project control, Variance analysis approach, Performance analysis.

References

1. Jerome D. Weist and Ferdinand K. Levy, A Management Guide to PERT/CPM, Prentice Hall of India, New Delhi, 1994.
2. Prasanna Chandra, Projects Planning, Implementation and Control, Tata McGraw Hill Publishing Company Limited, New Delhi, 1995.
3. Ravindran A., Phillips D.T., and Solberg J.J., Operations Research: Principles and Practice, 2nd edition, John Wiley & Sons, 1987.
4. Moder J.V. and Phillips C.R.E., Project Management with CPM and PERT, Van Nostrand Reinhold Company, 1964.

ME6130 TECHNICAL ENTREPRENEURSHIP

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Introduction: Basis and challenges of entrepreneurship, Technological entrepreneurship, Innovation and entrepreneurship in technology based organizations, High Tech. Entrepreneurship, Role of technical entrepreneurs in Industrial Development, Entrepreneurial characteristics, Entrepreneurship Index and its need.

Module II (11 Hours)

New Ventures: Concept of new ventures, Technology absorption, Appropriate technology, Networking with industries and institutions, Medium and small ventures, Product design for Rural entrepreneurs, Management concern in small and medium Enterprises.

Module III (11 Hours)

Starting a New Technological Venture and Developing the Business: Business idea, Business plan, Marketing plan, Financial plan, Organizational plan, Financing a new venture-Sources of capital, Venture capital, Going Public.

Module IV (9 Hours)

Managing the New Technological Venture: Developing systems in new venture, managing during early operations, growth and expansion, ending the venture, Legal issues, Franchising or acquisition, Intrapreneurship, International Entrepreneurship.

References

1. Gautam, Vinayshil (Ed.), Technical Entrepreneurship, Global Business Press, New Delhi, 1992.
2. Hisrich R.D., and Peters M.P., Entrepreneurship: Strategy, Developing, and Managing a New Enterprise, Irwin, Chicago, 1995.
3. Roberts E.B., Entrepreneurs in High Tech- Lessons from MIT and beyond, Oxford University Press, New York, 1991.
4. Timmons J., New Venture Creation: Entrepreneurship in the 1990's, Irwin, 1998.
5. Dollinger M.J., Entrepreneurship: Strategies and Resources, Irwin, Illionis, 1995.
6. Patel V.G., Entrepreneurship Developing Programme in India and its Relevance to Developing Countries, EDI, Ahmedabad, 1987.

ME6131 BUSINESS ETHICS

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Basic Theory: Some basic principles-Meaning, Types of evil and consequences, Proportionality, Minor evils or Physical evils, Problems, Positive obligations, Rights, Cooperation in Evil, Location of responsibility, The gray areas, Economical and Political Considerations, Relationship between firm and employee, customers, competitors, intermediaries, and unions.

Module II (11 Hours)

Historical perspective, culture and ethics in India, codes and culture, Economics and the environment- green business, ethics and competition, The ethical code, social audit, A framework for analysis and action, The sphere of personal ethics- consequences, rights and duties, virtue and character, Role of objectivity, practicability, Judgement and balancing acts, The individual and corporation.

Module III (11 Hours)

Ethical Responsibilities of Economic Agents: role obligations, obligation to shareholder, rights and obligations to customer, obligation to pay taxes, Environmental protection, Corporate accountability, Ethical conflicts, Ethics, Government policies and laws.

Module IV (9 Hours)

Ethical responsibilities of Organizational Leader: power, leadership, obstacles to ethical conduct, pressures for conformity, Evaluation and rewards, Job pressures and issues, organizational change, Ethics in use of Information Technology, Intellectual Property Rights, Ethics in Marketing, Ethics of advertising and sponsorship, Acquisition and merger, Multinational decision making-Reconciling International norms.

References

1. Badaracco Jr J.L., Business Ethics: Roles and Responsibilities, Irwin, Chicago, 1995.
2. Drummond J., and Bain B.(Ed.), Managing Business Ethics, Butterworth Heinemann, Oxford, 1994.
3. Garrett M.Thomas, Business Ethics, The Times of India Press, Bombay, 1970.
4. Mathias T.A.(Ed.), Corporate Ethics, Allied Publishers Ltd., New Delhi, 1994.
5. Hendry J., and Sorell T., Business Ethics, Butterworth Heinemann, Oxford, 1994.

ME6132 COMPUTER METHODS IN MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 hours)

Programming and Problem Solving: Computer organisation, Steps involved in computer programming, Developing algorithms and flow charts, Efficiency of algorithms, Program design methods, Top-down modular programming, Measures of program performance. Introduction to object oriented programming: Basic concepts of OOP, Object-oriented languages, Applications of OOP, Moving from C to C++.

Module II (11 hours)

Fundamentals of Programming: Variables and Arithmetic statements, Arrays, Functions, Data types, Flow of control, Functions, Recursion, Pointers and strings, Bitwise operators and enumeration types, Structures and unions, Linear linked lists and list operations, Basic I/O functions.

Module III (11 hours)

Unix system Interface: File descriptors, Pointers and strings, Bit-wise operators and enumeration types, Structures and unions, Linear linked lists and list operations, Basic I/O functions.
Introduction to Data structures: Operations on binary trees, storage representation and manipulation of binary trees, conversion of General trees in to binary trees, Dynamic storage management, sorting – bubble sort, tree sort, Searching – sequential and binary searching, hashing functions.

Module IV (9 hours)

Computer applications in business: Framework of E-commerce, LAN, WAN, Internet – HTTP, HTML, VRML, site security – firewalls, Transaction security, cryptography and cryptographic algorithms, Digital signatures

References

1. Kelley, A and Pohl, I , A Book on C, 4/e, Pearson Education, 2001.
2. Kamthene, A. N., Programming with ANSI and Turbo C, Pearson Education, 2002.
3. Kernighan B.W. & Ritchie D.M., C Programming Language, Prentice Hall of India.
4. Tremblay J.P.& Sorenson P.G., An Introduction to Data Structures with Applications, Mcgraw-hill International editions.
5. Bhasker B., Electronic Commerce, Tata McGraw-Hill companies, 2 ed.

ME6133 ORGANISATIONAL BEHAVIOR

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Introduction to Organizational Behaviour (OB): - Development and challenges, assumptions of contemporary OB. Foundations of individual behavior values – attitudes – personality – emotions – perception – abilities – motivation in organisations – work related attitudes.

Module II (11 Hours)

Group Process: Foundations of group behavior, understanding team, communication, leadership, power, conflict and negotiation.

Module III (11 Hours)

Organisational Process: Work design and technology, organisation structure and design – organisational culture.

Module IV (9 Hours)

Special topics: Organisational change, stress management, decision making in organisations.

References

1. Robbins, “Organisational Behavior”, 9/e, Pearson Education, (2002).
2. Greenberg and Baron, “Behavior in Organisations”, 7/e, Pearson Education, (2002).
3. Machane and Vonglinow, “Organisational Behavior”, 2/e, TMH, (2003).
4. Hersey, Balaschard and Johnson, “Management of Organisational Behavior”, 8/e, Pearson Education, (2002).

ME6134 CONSUMER BEHAVIOR

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Introduction: - Diversity in the market place, market segmentation, Consumer behaviour as discipline and Science, Ethics in marketing.

Module II (11 Hours)

Consumers as individuals: - Consumer motivation, consumer perception, consumer learning, personality and life styles, attitudes, attitude change, communications and CB.

Module III (11 Hours)

Consumers as decision makers: - Consumer influence and diffusion of innovations, individual decision making, group influence and opinion leadership.

Module IV (9 Hours)

Consumers in their social and cultural settings: - Social class and CB, influence of culture, subculture and CB, income, Age, Ethnic, racial and religion subcultures.

References

1. Schiffman & Kanuk, “Consumer Behavior”, 7/e, Pearson Education, (2000).
2. Solomon, “Consumer Behavior”, 5/e, Pearson Education, (2001).
3. Peter & Olson, “Consumer Behavior and Marketing Strategy”, 6/e, TMH, (2001).
4. Arnould, Linda and Zinkhan, “Consumers”, TMH, (2001).

ME6135 SOFT COMPUTING TECHNIQUES

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Genetic Algorithms: Introduction to Genetic Algorithms (GA) - Goals of optimization - Differences and similarities between genetic algorithm and traditional methods - Schemata - Terminology of GA - Strings, Structure, Parameter set - Coding - Fitness function - Data structures - GA operators - Algorithm.

Module II (8 Hours)

Simulated Annealing: Introduction - Algorithm - Applications.
Tabu Search: Introduction - Algorithm - Applications.

Module III (11 Hours)

Fuzzy Logic: The concept of uncertainty and associated solutions - Fuzzy sets - Basic properties and characteristics of fuzzy sets - Fuzzy set operations - Fuzzy reasoning - Major components of a fuzzy logic system - Design aspects of fuzzy systems - Applications of fuzzy logic.

Module IV (12 Hours)

Artificial Neural Networks: Basics of artificial neural networks (ANN) – Characteristics of ANN - Historical development - Terminology - Models of neuron – Topology - Basic learning laws - Overview of neural computing - Neural approaches to computing - Engineering approaches to computing - Relationship of ANNs to other technologies - ANNs Learning Approches - Training set and Test set - Generalization - Learning curves - Applications of ANN in optimization - Simple examples.

References

1. Deb, K, Optimization for Engineering Design, Prentice Hall of India (P) Ltd., New Delhi, 1998.
2. Goldberg, D.E., Genetic Algorithms in Search, Optimization, and Machine Learning, Addison-Wesley, 1989.
3. Schalkoff , R.J., Artificial Neural Networks, McGraw-Hill Companies Inc., 1997.
4. Sundareswaran, K., A Learner's Guide to Fuzzy Logic Systems, Jaico Publishing House, 2005.
5. Yegnanarayanan, B., Artificial Neural Networks, Prentice Hall of India, 1999.

ME6136 RISK MANAGEMENT AND INSURANCE

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Basic concept of risk and insurance: - risk, meaning, type, insurance, characteristics, types, risk management, objectives, steps in RM, losses evaluation, legal principle, in risk and insurance.

Module II (11 Hours)

Personal property and liability risks: - Liability risks, House owners insurance, automobile insurance, other property and liability insurance coverage.

Module III (11 Hours)

Commercial property and liability risks: - commercial property insurance, commercial liability insurance, crime insurance.

Module IV (9 Hours)

Life and Health insurance: - Fundamentals, types, individual health and disability – income insurance, group life and health insurance, retirement plans.
Special topics – insurance company operation, insurance pricing.

References

1. Harrington and Niehaus, “Risk Management and Insurance”, TMH, (1999).
2. Williams, Young and Smith, “Risk Management and Insurance”, 8/e, TMH, (1988).
3. Rejda, “Principles of Risks Management and Insurance”, 7/e, Pearson Education, (2001).

ME6137 FINANCIAL MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Introduction to financial management and valuation of financial assets: - corporate finance, goal of financial management, FM decisions, financial statements – working with financial statements, ratio analysis, fund flow analysis, time value of money, stock valuation, bond valuation.

Module II (11 Hours)

Investment in long term assets:- capital budgeting decision criteria, traditional techniques, discounted casts flow techniques, NPV – IRR comparisons, capital rationing, risk analysis.

Module III (11 Hours)

Cost of capital and long term financial policy:- Raising capital, cost of capital, financial and operating leverage, capital structure theories, dividends and dividend policy, introduction to CAPM.

Module IV (9 Hours)

Special topics: - Short-term financial planning – working capital – planning and management.
Leasing – meaning – evaluation as an alternative source of financing.
International corporate finance: - foreign exchange, exchange rate, interest rate parity – international financing, futures and options in corporate finance.

References

1. Van Horne, " Financial Management and policy", 12/e, PHI, (2002).
2. Breally and Myers, "Principles of corporate Finance", 7/e, TMH, (2002).
3. Ross, Westerfield and Jordan, "Fundamentals of corporate Finance", 6/e, TMH, (2002).
4. Damodaran, "Corporate Finance", John Wiley & Sons, (2002).

ME6138 DECISION SUPPORT AND EXPERT SYSTEMS

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Introduction: Information systems, Human Information Processing, Newell and Simon model for human information processing-intelligence stage, decision stage, choice stage, Rasmussen model of judgment and choice, The Klein model Information and information value, Classification of decisions, Types of information systems, Decision support system.
Decision Support Systems (DSS): Subsystems in DSS-data management subsystem, model management subsystem, dialogue management subsystem, Computer Hardware for DSS, Group Decision Support Systems (GDSS).

Module II (11 Hours)

Knowledge-Based Expert System (KBES): Introduction, What is KBES, Architecture of KBES-knowledge base, predicate logic, Production rules, Procedural programs, Inference mechanisms-backward chaining, forward chaining, inexact reasoning, non-monotonic reasoning, reasoning based on certainty factors, expert system development shell.
Search Techniques: Introduction, Problem definition and solution process, Production systems, Search techniques-breadth first search, heuristic search, agenda-driven search, Problem decomposition and AND-OR graphs.

Module III (11 Hours)

Engineering Design Synthesis: Synthesis, Decomposition model for synthesis, building plant layout at a site-an example, Role of a synthesiser in KBES environment, An architecture for a synthesiser-a genetic tool.
Criticism and Evaluation: Methodologies used in a knowledge-based environment, A framework for critiquing and evaluation-knowledge representation framework, inference mechanism, Algorithm for overall rating of a hierarchical solution.

Module IV (9 Hours)

Applications of Decision Support Systems: Decision support in office information systems, Auditing, artificial intelligence and expert systems, Decision support systems for resource allocation.
Process Models and Knowledge-Based Systems: Expert systems for diagnosis- understanding of domain knowledge, evolution of knowledge nets, transformation of knowledge from nets to rule base, Blackboard model of problem solving-blackboard architecture, blackboard framework, integrated engineering system, an illustrative example, Conceptual Design of a Car Body Shape.

References

1. Holsapple, W. Clyde and Whinston B. Andrew (ed), Decision Support Systems for Engineers: Theory and Application, Springer-Verlag, New York, 1987.
2. Janakiraman V.S. and K. Sarukesi, Decision Support Systems, Prentice Hall of India, New Delhi, 1989.
3. Krishnamoorthy C.S. and S. Rajeev, Artificial Intelligence and Expert Systems for Engineers, CRC Press Inc., New York, 1996.
4. Bielawski Larry and Lewand Robert, Expert Systems Development: Building PC-Based Applications, QED Information Sciences Inc., Wellesley, Massachusetts, 1988.

ME6139 SYSTEMS MODELLING AND SIMULATION

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

System Concept: Systems and system environment, Components of a system, Discrete and continuous systems, Systems approach to problem solving, Types of system study, System analysis, system design and system postulation, System modelling, Types of models.
System Simulation: Technique of simulation, Comparison of simulation and analytical methods, Types of system simulation, Steps in simulation study, Monte Carlo simulation.
Concepts in Discrete Event Simulation: Event scheduling/Time advance algorithm, Modelling world views, Simulation programming tasks, Comparison and selection of simulation languages.

Module II (11 Hours)

Random Number Generation: Techniques for generating random numbers, Linear congruential method, Test for random numbers, Frequency tests, run tests, tests for autocorrelation, gap test, and Poker test.
Random Variate Generation: Inverse transformation technique, Exponential, Uniform, Weibull, Triangular, Empirical-Discrete and continuous distributions. Convolution method, Acceptance-Rejection technique.
Input Modelling for Simulation: Data collection, Identifying the distribution with data, Parameter estimation, Goodness of fit test, Chi square, Klomogrov and Smirnov tests, Selecting input model when data are not available.

Module III (11 Hours)

Verification and Validation of Simulation Models: Verification of simulation models, Calibration and validation of models, Face validity, Validation of model assumption, validating input-output transformation, Input-output validation using historical input data.
Output Analysis for a Single Model: Measures of performance and their estimation, Point estimation, Interval estimation, Output analysis for terminating simulations and Steady state simulations.
Metamodelling: Simple linear regression, Testing for significance of regression, Multiple linear regression.

Module IV (9 Hours)

Simulation Modelling and Analysis of Manufacturing Systems: Objectives, Performance measures, Issues in simulation of manufacturing systems, Simulation software for manufacturing applications, Simulation of job shop manufacturing systems, Simulation Modelling and Analysis of Single Server and Single Queue Systems, Inventory systems and PERT networks.

References

1. Banks, J., Carson, J.S., Nelson, B.L., and Nicol, D.M., Discrete-Event System Simulation, Third Edition, Pearson Education, Inc., 2001.
2. Deo, N., System Simulation with Digital Computer, Prentice Hall of India, 1997.
3. Askin R.G. and Standridge, C.R., Modelling and Analysis of Manufacturing Systems, John Wiley & Sons, 1993.

ME6140 DATA BASE MANAGEMNT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Database systems - purpose - Abstraction - models, Instances and Schemes - Data independence - Data Definition Language - Data Manipulation Language.
Entity Sets - Relationship Sets - attributes - Mapping Constraints - keys - ER Diagrams. Generalisation - Aggregation.

Module II (11 Hours)

Structure of Relational Databases - Relational algebra - Tuple relational calculus - Domain relational calculus - modifying the data base - views - SQL - Quel.
Integrity Constraints - Domain Constraints, Referential integrity - functional dependencies - assertions - triggers.

Module III (11 Hours)

Relational Data base design - pitfalls - Normalisation's using functional, Multi-valued and join dependencies, domain key normal form - alternative approaches.
File organisation - sequential files - Mapping relational data to files - Data dictionary Storage - Buffer Management - Indexing - Basic concepts - B^+ and B-tree index files - Static hash function - dynamic hash function - comparison of Indexing and Hashing.

Module IV (9 Hours)

Query Processing - Interpretations - equivalence of expressions - Estimating cost of Query processing and access using Index.
Security and Integrity - Violations - Authorisation and views - encryption - Data validation - Multiple user access.

References

1. Korth H.F. & Silberschatz, Database System Concepts, Second edition, Mcgraw Hill International Editions, 1991.
2. P. O'NEL and E O'NEIL, Data base: Principles, Programming and Performance, 2/e, Harcourt Asia PTE Ltd., 2001.

ME6141 ENTERPRISE RESOURCE PLANNING

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Introduction to Enterprise Resource Planning (ERP) - History of ERP – Requirements generation to Material Requirements Planning (MRP) – Closing the MRP loop – Manufacturing Resource Planning (MRP II) – Just-In-Time to Lean manufacturing – ERP – Internet's impact on ERP – Supply chain management.

Module II (11 Hours)

Systems and technology background – ERP systems background – ERP data input – ERP output capabilities – Reengineering - How does ERP create value – Why investigate ERP systems.

Module III (11 Hours)

ERP Life Cycle - Deciding to go ERP - Choosing an ERP system - Designing ERP systems - Should prune processes or ERP software be changed - Choosing standard model - Artifacts and processes.

Module IV (9 Hours)

Implementing ERP systems – Big bang versus phased – After going live – training – ERP and electronic commerce – ERP Risks – Successes and failures.

References

1. Garg, V.K., and Venkitakrishnan, N.K., Enterprise Resource Planning: Concepts and Practice, Prentice-Hall of India Private Limited, New Delhi, 1998.
2. O'Leary, D.E., Enterprise Resource Planning Systems: System, Life cycle, Electronic Commerce and Risk, John Wiley & Sons, 2001.
3. Ptak, C.A., and Eli, S., ERP Tools, Techniques and Applications for Integrating the Supply Chain, St. Lucie Press/APICS Series on Resource Management, 2000.
4. Wallace, T.F., and Kremzar, M.H., ERP: Making it Happen: The Implementer's Guide to Success with Enterprise Resource Planning, John Wiley & Sons, 2001.

ME6142 INDUSTRIAL SCHEDULING

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 hours)

Introduction: Importance of scheduling in implementation of production planning- overview of models – machine configurations – processing characteristics and constraints – objectives and performance measures – computational complexity; NP complete and NP hard – optimality of schedules
Single machine sequencing with independent jobs; without due dates, with due dates – adjacent pairwise interchange methods – branch and bound approach – neighborhood search techniques – random sampling – parallel machine models.

Module II (10 hours)

Flow shop scheduling: Introduction – permutation schedules – Johnson's problem-Ignall and Schrage algorithm – dominance properties for makespan problems –CDS, Palmer, Gupta heuristics - Scheduling in process industries with no waiting or work in process.

Module III (10 hours)

Job shop scheduling Introduction, types of schedules, schedule generator – Disjunctive programming and Branch and bound – shifting bottleneck heuristic and the makespan – simulation studies -elements of dynamic job shop , Scheduling in dynamic flow systems. Use of priority disciplines.

Module IV (11 hours)

Applications and directions: Scheduling of Flexible assembly systems – lot sizing and scheduling -Scheduling balancing and other aspects of design in mixed model assembly lines and flow lines- A survey of other scheduling problems. Applications in manufacturing systems.

References

1. Michael Pinedo and Xiuli Chao (1993) Operations Scheduling: With application in Manufacturing and Services, McGraw Hill.
2. Kenneth R.Baker (1974), Introduction to sequencing and scheduling, John Wiley and Sons.
3. R.W. Conway, W.L. Maxwell and L.W.Miller (1967), Theory of Scheduling, Addison, Wesley.
4. Michael Pinedo (1995), Scheduling: theory, algorithms and systems, Prentice Hall, New Delhi.
5. S. French (1982), Sequencing and Scheduling, Elis Horwood Ltd., Chichester, U.K.

ME6143 LEAN PRODUCTION MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Small-Lot Production: Lot-size Basics; Lot sizing; Lot-size Reduction; Facilitating Small Lot Size.
Setup-Time reduction: Setup_Reduction Methodology; Techniques for Setup-Reduction; Setup_Reduction Projects.

Module II (11 Hours)

Pull Production Systems: Pull Systems and Push Systems; Conditions for Pull Production Systems; How to achieve Pull Production; Mechanisms for Signal and Control.
Workcells and Cellular Manufacturing: Cell layout and Capacity Measures; Design of Workcells; Worker Assignment; Implementation Issues.

Module III (11 Hours)

Scheduling for Smooth Flow: Production Leveling; Level Scheduling in Pull Production; Master Production Scheduling.
Synchronising and Balancing Process: Synchronisation; Bottleneck Scheduling; Balancing; Adapting to Schedule changes.

Module IV (9 Hours)

Planning and Control in Pull Production: Centralised Planning and Control System; Decentralised planning and Control system; Adapting MRP-Based Production Planning and Control System to Pull production
Maintaining and Improving Equipment: Equipment Maintenance; Equipment Effectiveness; Total Productive Maintenance.

References

1. Harold J. Steudel and Paul Desruelle (1992). Manufacturing in the Nineties - How to Become a Lean, World-Class Competitor, Van Norstrand Reinhold, New York
2. John Nicholas (1998). Competitive Manufacturing Management - Continuos Improvement, Lean Production, and Customer-Focused Qualities, McGraw-Hill International Editions.

ME6144 INVESTMENT MANAGEMENT

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Investment environment: - securities and market, investment process, capital market, primary and secondary, efficient markets.

Module II (11 Hours)

Investment theory: - Portfolio selection problem, Portfolio analysis, CAPM, Factor models, Arbitrage pricing theory.

Module III (11 Hours)

Common stocks – characteristics, financial analysis of common stocks, dividend, earnings, investment management and performance evaluation.

Module IV (9 Hours)

Fixed income securities: - Types, Bond valuations, Bond analysis and portfolio management.
Mutual funds, options, futures and international investing.

References

1. Alexander, Sharpe and Bailey, “Investments”, 3/e, PHI, (2002).
2. Bodie, “Essentials of investments”, 4/e, TMH, (2001).
3. Corrado & Jordan, “Fundamentals of investments”, 2/e, TMH, (2001).
4. Haugen, “Modern Investment Theory”, 5/e, PHI, (2002).

ME6145 TAKEOVERS AND CORPORATE RESTRUCTURING

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (11 Hours)

Takeovers and Mergers in Practice: Takeover process, merger process, legal aspects, Accounting for M & A.

Module II (11 Hours)

M & A theory: Strategic processes, theories of mergers, timing of merger activity, empirical tests, valuation approaches.

Module III (11 Hours)

Restructuring : Restructuring and divestitures, Restructuring organisations and ownership, financial restructuring.

Module IV (9 Hours)

Special topics: Joint ventures and alliances, share repurchase, Takeover defenses, International takeovers and restructuring, corporate governance.

References

1. Benninga "Corporate Finance – Valuation approach" TMH, (1997).
2. Weston, Siu and Johnson "Takeovers, Restructuring and Corporate Governance" 3/e, Pearson Education, (2001).

ME6146 FORECASTING TECHNIQUES

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (10 hours)

Introduction: Nature and uses of forecasts – An overview of forecasting techniques - Defining the forecasting problem – methods of forecasting, qualitative and quantitative forecasting – Time series data and models – univariate statistics – bivariate statistics, autocorrelation. Stochastic process. Time series as a discrete stochastic process. Stationarity. Main characteristics of stochastic processes (mean, autocovariation and autocorrelation functions). Stationary stochastic processes. Stationarity as the main characteristic of stochastic component of time series. Lag operator.

Module II (10 hours)

Regression-moving average models: Regression methods in time series analysis – simple linear regression, multiple linear regression. Simple moving averages for a constant process, moving averages for a linear trend process – Exponential smoothing for a constant process, estimation of demand variance – Exponential method for smoothing a linear trend, choice of a smoothing constant

Module 3 (15 hours)

Seasonal data and forecasting errors: Smoothing models for seasonal data – a multiplicative seasonal model, an additive seasonal model. Period and cumulative forecasts – variance of forecast errors, definition, variance of period forecast errors, variance of cumulative forecast errors, prediction intervals. Analysis of forecast errors – Estimation of variances
ARMA models: Moving average models MA(q). Condition of invertibility. Autoregressivemodels ÀR(p). Yule-Walker equations. Stationarity conditions. Autoregressivemoving average models ARMA (p,q). Coefficients estimation in autoregressive models. Coefficient estimation in ARMA (p) processes. Goodness of fit in time series models. AIC information criterion. BIC information criterion. Q-statistics. Box-Jenkins methodology to identification of stationary time series models.

Module 4 (10 hours)

Panel data, Qualitative forecasting: Definition of panel data. Types of panels. Brief History. Benefits and drawbacks of longitudinal data. Exploratory analysis of panels. Basic models: fixed effects, random effects, between and pooled estimators. Traditional vs. modern approaches to panel data. Monitoring, Network Analysis, Scenarios, Morphological Analysis, Relevance Trees, Delphi Method, Cross-Impact Analysis.

References

1. Douglas C. Montgomery and Lynwood A. Johnson, (1976), Forecasting and Time Series Analysis, McGraw Hill
2. Enders W. Applied Econometric Time Series. 2nd ed., John Wiley & Sons, Inc., 2004 (WE)
3. Wooldrige J. M. Econometric Analysis of Cross Section and Panel Data. The MIT Press, 2002.
4. Alan L. Porter, A. Thomas Roper, Thomas Wimason , Jery Banks,Fredrick A. Rossini Forecasting and Management of Technology
5. Makridakis, S., Wheelwright, S. C., and McGee, V. E., (1983), Forecasting, Methods and Applications, 2nd edn., Wiley, Hong Hong.
6. Porter Alan L., Roper Thomas A., Mason Thomas W., Rossini Frederic A., Banks Jerry. 1991. Forecasting and management of technology. New York, John Wiley & Sons, Inc.

ME6147 MANAGERIAL ECONOMICS

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (10 hours)

Introduction to managerial economics – the nature of the firm – the concept of economic profit – economics and decision making – economic models.
Demand theory and analysis – market demand – price elasticity – income elasticity – cross elasticity
Regression techniques and demand estimation – business and economic forecasting.

Module II (9 hours)

Production and costs – production theory and analysis – economies of scale and scope – estimating the production function – cost theory and analysis – economic concept – production and cost.
Market structure – perfect competition and monopoly – monopolistic competition – oligopoly and barriers to entry – market structure and barriers to entry – game theory and strategic behaviour

Module III (10 hours)

Pricing decisions – pricing of goods and services – pricing of multiple products – price determination – product bundling – peak-load pricing – cost-plus pricing – cyclical pricing – pricing and employment of inputs – economic rent – wage and income differentials – labour unions.

Module IV (10 hours)

Technological change, location theory and taxation – the impact of technological change - technological change and market structure – locating the firm in a global economy – market area determination – threshold analysis.
Taxes and decision making – taxes on profit – taxes on inputs – property taxes – tax preferences.

References

1. Peterson C.H., Lewis W.C. and Jain S.K., Managerial Economics, Fourth Edition, Pearson Education Asia, 2006.
2. Davies H. and Lam P-L., Managerial Economics, Pearson Education, 2001.
3. Froeb L.M., and McCann, B. T., Managerial Economics: A problem Solving Approach, Second Edition, 2009.

ME6148 COMPUTER INTEGRATED MANUFACTURING

Pre-requisite: Nil
Total Hours: 42

L	T	P	C
3	0	0	3

Module I (9 hours)

Introduction Manufacturing operations – product/production relationships-Manufacturing models and metrics-Elements of automation system – concurrent engineering. Components of a Manufacturing system – Classification scheme for manufacturing system – Analysis of single station systems.

Module II (11 hours)

GT & Process planning Part families – part classification and coding. Cellular manufacturing – quantitative analysis in cellular manufacturing. Process planning –Process engineering – experiment based planning – decision trees – process capability analysis. Introduction to CAPP – Variant PP – Generative PP.

Module III (11 hours)

Material handling, FMS and Shop floor control Analysis of material transport system – Analysis of vehicle-based system, conveyor analysis. Storage systems – storage system performance, storage location strategies, automated storage systems – ASRS, Carousel storage systems, Engineering Analysis.
Automatic Identification and Data capture, Bar codes and RFID.
FMS components-Material handling and storage system – computer control system. Quantitative analysis of FMS. Shop floor control and data capture – simulation.

Module IV (11 hours)

NC, CNC, DNC & CIM and Data base Control systems – Computer process control. Numerical control, fundamentals of NC technology, application of NC - CNC, machine control of CNC- DNC - Just-in-time manufacturing systems, Internet Enabled Manufacturing, Virtual Manufacturing, and e-maintenance.

References

1. Mikell. P. Groover “Automation, Production Systems and computer integrated manufacturing”, Pearson Education 2001.
2. Singh, N., Systems Approach to Computer-Integrated Design and Manufacturing, Wiley, New York. 1996
3. Tien-Chien Chang and Richard A.Wysk,“Introdution to automated process planning system“, Prentice – Hall, 1985.
4. Mikell, P. Groover, „CAD/CAM“, Prentice – Hall, 1985.
5. Yorem koren, “Computer Integrated Manufacturing System”, McGraw-Hill, 1983. Kant Vajpayee S, “Principles of Computer Integrated Manufacturing”, Prentice Hall India, 2003.