

**DETAILED SYLLABUS OF M.TECH
(INDUSTRIAL ENGINEERING)
DAY TIME & EVENING COURSE
WITH EFFECT FROM
2019-2020 ACADEMIC YEAR**

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 101 PROBABILITY AND STATISTICS

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Discrete and Continuous random variables, Mathematical Expectations- Moments and moment generating functions.

Binomial distribution, Poisson distribution-Normal distribution, Uniform distribution, Weibull distribution.

Population and samples-sampling distributions of mean (known and unknown) proportions-sums and differences. Estimation-types of estimation-properties of good estimator-maximum likelihood estimation- interval estimation.

Introduction to statistical hypothesis -testing of hypothesis – Large sample tests for testing of mean and proportions - small sample tests for testing of mean and variance- Tests for independence of attributes and goodness of fit.

Introduction to ANOVA- Analysis of variance one way and two way classifications.

Introduction to time series- components of time series- measures of trends by least square method. Introduction stochastic process - classification-ergodic process-Markov process and Markov chains

Principle of least squares –curve fitting – simple regression and correlation – partial and multiple correlations.

References:

1. Introduction to Mathematical Statistics by Hogg, R.V. and Craig, A.T.
2. Elements of Probability Theory by Cramer, K.
3. Statistics for Management by Levin and Rubin, PHI, 2001.
4. Mathematical Statistics by John E. Freund, 5th Ed. PHI.
5. Probability & Statistics for Engineers and Scientists by Ronald E. Walpole, Pearson Education Asia Edition.

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 102 TOTAL QUALITY MANAGEMENT

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Concepts of TQM: Philosophy of TQM, Quality philosophies of Deming, Crosby, Juran Trilogy, Customer focus, Organization, Top management commitment, Team work,.

TQM process: QC tools, Problem solving methodologies, New management tools, Work habits, Quality circles, Bench marking, Strategic quality planning.

TQM systems: Quality function deployment, Standardization, Designing for quality, Manufacturing for quality, Failure Mode Effect Analysis.

Quality system: Need for ISO 9000 system, Advantages, Clauses of ISO 9000, Implementation of ISO 9000, Quality costs, Quality auditing, Case studies.

Implementation of TQM: Steps, KAIZEN, 5S, JIT, POKAYOKE, Case studies.

Text Books:

1. Total Quality Management by Besterfield et al., Pearson Education, India, 2009
2. The Essence of Total Quality Management by John Bank, PHI, 1993.
3. Total Quality Management by Rose, J.E., Kogan Page Ltd., 1993

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 103 MANAGEMENT PRINCIPLES AND PERSPECTIVES

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Management principles, Management functions, Roles & Skills - History of management thought - Various theories and approaches to management, Management by objectives - Formal and informal organizations - Organisation structure and design - Organization principles of line and staff authority and span of control – Concept of Motivation, Maslow Need Hierarchy theory, Herbergs Motivation Hygiene theory, McGregor’s Theory X and Theory Y and Theory Z, Motivational applications.

Planning process, tools and techniques – Fundamentals of Directing- Decision making process, approaches and aids Concept of Leader ship, Leader ship theories, Leadership Styles, Concept of Power and Concept of Authority and Responsibility, Delegation, decentralization and autonomy Concept of Communication, types of communication, aids and Barriers in communication, Conflict and Coordination. - Managerial control-need and principles - Role of information in control - Control methods and techniques - Managerial ethics and social responsibility.

Text Books:

1. Principles and Practice of Management by L.M. Prasad.
2. Introduction to Management by Plankett, W.R. and Attner, R.F., Kent Publishing Company.

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 104 METHODS ENGINEERING AND WORK DESIGN

Periods per week: 4
Examination (Theory): 3hrs.

Examination: 70; Sessionals: 30
Credits: 3

Work study: Concept of work and productivity – Productivity measurement - Methods study - Charting techniques – Elemental motions, THERBLIGS and principles of Motion Economy - Work measurement - Timing techniques - Introduction to predetermined motion time standards.- Concept of standard time and bench mark jobs.

Human factors engineering: Introduction to ergonomics and human factors Engineering - physiological basis of human performance - Biomechanics - Psychology of work and work load perception - Physical work environment - Basis of ergonomic problem identification - Safety.

Organization and methods: Procedure, analysis and developing office standards - MTM application to office work - Forms design and control - Records management.

Value engineering: VE concepts, Principles, Methodologies and standards - Methods of functional analysis.

Job evaluation and incentive scheme: Job description and job analysis - Job evaluation - different methods - Individual and group incentive concepts and implications - Different types of incentive schemes.

Text Books:

1. Introduction to Work Study, I.L.O., 3rd Revised Edn., 1986.
2. Methods, Standards and Work Design, Benjamin W. Niebel and Andris Freivalds, WCB McGraw Hill (1999).
3. Improving Productivity and Effectiveness by Mundel, Marvin, E., Prentice Hall, 1983.
4. Human Factors Engineering & Design by Sounders, M.S. and McCornic, E.J., McGraw Hill, 1983.
5. Fitting the Task to the Man by Grandjean, E., Taylor and Francis, London, 1989.
6. Compendium on Value Engineering by Tufty, H.G., The Indo-American Society, Bombay, 1983.
7. Compensation Administration by Belchar, David, W., Prentice Hall, N.J.

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 105 Elective Subject – I
A) ADVANCED OPTIMIZATION TECHNIQUES

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Geometric programming (G.P): Solution of an unconstrained geometric programming, differential calculus method and arithmetic method. Primal dual relationship and sufficiency conditions. Solution of a constrained geometric programming problem (G.P.P), Complementary Geometric Programming (C.G.P)

Dynamic programming(D.P): Multistage decision processes. Concepts of sub optimization and Principal of optimality, computational procedure in dynamic programming calculus method and tabular methods. Linear programming as a case of D.P. and continuous D.P.

Integer programming(I.P): Graphical representation. Gomory's cutting plane method. Bala's algorithm for zero-one programming problem. Branch-and-bound method, Sequential linear discrete Programming, Generalized penalty function method.

Stochastic Programming (S.P): Basic Concepts of Probability Theory, Stochastic Linear programming.

Non-traditional optimization techniques: Multi-objective optimization - Lexicographic method, Goal programming method, Genetic algorithms, Simulated annealing, Neural Networks based Optimization.

References:

1. Operations Research- Principles and Practice by Ravindran, Phillips and Solberg, John Wiley
2. Introduction to Operations Research by Hiller and Lieberman, Mc Graw Hill
3. Engineering Optimization - Theory and Practice by Rao, S.S., New Age International (P) Ltd. Publishers.
4. Engineering Optimization By Kalyanmanai Deb, Prentice Hall of India, New Delhi.
5. Genetic Algorithms - In Search, Optimization and Machine Learning by David E. Goldberg, Addison-Wesley Longman (Singapore) Pvt. Ltd.

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 105 Elective Subject – I
B) MAINTENANCE MANAGEMENT

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Characteristics, Benefits, Objectives and Policies of maintenance, Organization and structure of maintenance system, Mechanics of maintenance system - Planning and scheduling maintenance activities, Types of maintenance: Preventive maintenance - Development of preventive maintenance schedule - Planned prevention of breakdowns, Predictive maintenance, Condition monitoring, Equipment codification and classification, Maintenance budgeting and cost control, Production maintenance integration, Replacement - Policies and models, Maintenance manpower planning, spare parts management, Maintenance downtime analysis, Computerized maintenance system, Application of simulation technique, Design - Implementation and Operation of an integrated maintenance system.

Reliability models, State transition diagrams for maintained and non-maintained systems, Reliability measurement and life testing application of reliability. Maintenance strategies, Maintainability and availability and criteria.

Text Books:

1. Maintainability Principles and Practices by Blanchard, B.S., McGraw Hill, NY, 1969.
2. Maintenance Management by Carder, A.S., McGraw Hill, NY, 1976.
3. Maintenance Engineering and Management by Mishra, R.C. and Pathak, K., PHI, 2002.

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 105 Elective Subject – I
C) PRODUCT DESIGN MANAGEMENT

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Introduction to design, Product design, Design management, Product management. Traditional & modern design, Design process, Organizational objectives.

Need related intelligence, Identification of latent needs, Technology related intelligence, Development of technological competence.

Organizational strength & weakness, Criteria for a new product, New product management, Forward planning, Coordination and communication.

Innovation, creativity and diffusion, Techniques for creative idea generation. Evaluation of new products ideas, Functions- technological, Ecological, Legal.

Investigating user behaviour - User habits, Expectations, Perception, Techniques for investigating user behaviour.

Stating objectives, Product formulation, Development of business analysis, Analysis for development, Boundary search and functional innovation.

Product design and design methods, Selection of methods appropriate to design stage. Design evaluation - Analysis for fault, Value and Reliability. Ergonomic analysis, Analysis for maintenance and useful life.

Market preparation vendor search, Sales promotion, Test marketing product and introduction strategy.

Organizational structure for effective product innovation and role of product manager.

Text Books:

1. Corporate Strategy and product Innovation by Rothberg, Robert, R., The Free Press, 1976.
2. Design Methods, Seeds of Human Future by Jones, J.C., John Wiley, 1970.
3. New Product Development by Grunwald, G., Business Books, Illinois, 1985.
4. Product Design and Manufacturing, A. K. Chitale and R. C. Gupta, PHI (2002)

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 106 Elective Subject– II
A) ENGINEERING AND MANAGERIAL ECONOMICS

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Introduction to Engineering Economics : Definition and Scope of Engineering Economics; Origins of Engineering Economy; Principles of Engineering Economics; Engineering Economy and Design Process; Problem solving and Decision making - Intuition and Analysis, Tactics and Strategy, Sensitivity and Sub-optimization, Accounting and Engineering Economy Studies.

Economic Theory and Managerial Economics: Basic Economic Tools in Managerial Economics - Opportunity cost principle, Incremental Principle, Principle of time perspective, Discounting Principle and Equi- marginal Principle; Managerial Economist - Role and responsibilities.

Demand Analysis: Demand Distinctions; Demand Forecasting- Factors involved in Demand Forecasting, Purposes of Forecasting, Determinants of Demand, Approach to Forecasting, Forecasting Demand for New Products, Criteria of a good forecasting method; Presentation of a Forecast to the management.

Brief Explanation of Statistical Methods of Demand Forecasting:

Trend Projections Methods: Graphical method; Fitting Trend Equation: **Least Squares Methods** -

Linear Trend, Exponential Trend and Polynomial trend ; Box - Jenkins; Barometric method of Forecasting; **Econometric methods**- Simple Regression Technique, Multi- Variate Regression and Simultaneous Equation model.

Theory of Firm : Objectives of Business Firms- **Profit as Business Objective** - Accounting Profit vs. Economic Profit; **Brief explanation of theories of Profit**- Walker's theory, Clark's Dynamic theory, Hawley's risk theory of Profit, Knight's theory of Profit and Schumpeter's Innovation theory of Profit; A Reasonable Profit Target - Reasons and Standards; Profit as a control measure.

Theory of Production: Importance of Production function; Laws of returns to scale -phases of returns to Scale ; Economies of Scale: **Internal**- Labor, Technical, Marketing Managerial, Financial and Economies of survival; External Economies; Advantages and Limitations of Large - Scale and Small Scale Production.

Broad areas for Business Promotion: Monetary Policy: Meaning and Scope of Monetary Policy,

Objectives, Central Bank and Instruments of Monetary Policy ,Limitations of Monetary Policy.

Fiscal Policy: Meaning, Definition Objectives, and Instruments and limitations of Fiscal Policy.

Foreign Investment :Introduction, Types, Need for Foreign Direct Investment in Developing Countries.

Text Books :

1. William G. Sullivan, James A. Bontaldelli and Elin M. Wicks, **Engineering Economics**, Pearson Education Asia, Delhi, 2001.
2. Dwivedi, D.N.; **Managerial Economics**, Vikas publishing House Ltd. , New Delhi, 2004.

Reference Books:

1. James L. Riggs, David D. Bed Worth and Sabah U. Randhawa, **Engineering Economics**, Tata

- Mc Graw - Hill - Publishing Company Ltd., Delhi, 2004.
2. Varshney, R.L. and Maheswari , K.L. **Managerial Economics** , Sultan Chand & Sons, New Delhi, 1989.
 3. Mishra Sasmitra, **Engineering Economics and Costing**, PHI Learning pvt. Ltd., New Delhi 2011.
 4. Sankaram, S., **Managerial Economics**, Margham Publications, Chennai, 2006.

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 106 Elective Subject– II
B) PROJECT MANAGEMENT

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Industrial development - Corporate growth and business development. Product innovation research and development - Formulation and implementation of R&D projects. Project identification and formulation - Needs analysis - Resource surveys - Market research - Feasibility analysis. Technical feasibility - Technology forecasting - Choice of technology - Choice of process technology assessment technology - Transfer - Techno economic analysis - Appropriate technology.

Analysis of infrastructures: Inputs transports - Elements of economic geography - Location - Site selection. Investment analysis principles. Industrial policy - Incentives and regulations. Cost estimating - Cost-benefit analysis - Financial analysis - Economic analysis - Social-cost benefit analysis - UNIDO - World Bank and OECD methodologies. Project financing - Source of finance - Cost of capital - Capital structure - Internal finance and foreign exchange regulation - Projects and contracts planning and co-ordination - Project scheduling and monitoring tools and techniques - Project management information systems and documentation - Computer applications in project management.

Text Books:

1. Project Management, David I. Cleland, Mc Graw Hill(1999)
2. Managing Construction Contract by Colier Kint, Reston Publishing Co.
3. Engineering and Construction Project Management by Kerridge, A.E. and Verveelin, C.H., Gulf Pub. Co., Houston, 1986.
4. Project Formulation and Evaluation Series, No.1, No.2 and No.3, U.N.I.D.O., Oxford and IBH Publishing Co.

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 106 Elective Subject- II
C) LOGISTICS ENGINEERING AND MANAGEMENT

Periods per week: 4

Examination : 70 ; Sessionals : 30

Examination (Theory): 3hrs.

Credits : 3

Introduction to logistics

Scope and elements — Need for logistics Engineering — Related Terms and definitions.

Logistics in the design and Development phase

The design process related discipline — Design for maintainability — Design for Maintainability — Design for Human factors and safety — Design Integration — Configuration change control.

Logistics in the Production /Construction Phase

Industrial Engineering and operation analysis — quality control — production operations — Transition from Production to user operation.

Logistics in the utilization and Support Phase

Total Productive maintenance (TPM) — Data collection , Analysis and system evaluation — evaluation of Logistics support Elements.

Logistics Management

Logistics Planning — Work breakdown structure — cost estimating & controlling — Major Interfaces with other program activities — Management & Control.

Text Book:

Logistics Engineering and Management — Benjamin S. Blanchard.

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 107 WORK STUDY LAB

Periods per week : 3

Examination: 50 Sessionals : 50
Credits : 1.5

List of Experiments:

1. To measure the skill and dexterity in the movement of Wrist and Fingers using pin board.
2. To determine the cycle time using MTM.
3. To draw two handed process charts for
 - i. Bolt, washer and nut assembly
 - ii. Assembly of electric tester.
4. To draw Multiple Activity chart using an electric toaster.
5. To determine the percentage utilization using work sampling.
6. To draw flow process charts on activities in Workshop/ Laboratory/Office.
7. To determine the time required to perform motion sequence using work factor system.
8. To draw SIMO charts for
 - i. Ball point pen assembly
 - ii. Electric plug assembly.
9. To conduct time study of the bulb holder assembly operation of the existing method.
10. Performance rating

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 108 COMPUTATIONS LAB- I

Periods per week : 3

Examination: 50 Sessionals : 50
Credits : 1.5

List of Experiments:

1. Determination of basic statistics using Time-series data on statistica 6.0
2. Modeling of linear equation using Time-series data on statistica 6.0
3. Modeling of Polynomial equations using Time-series data on Minitab
4. Learning the usage of Catia package

SECOND SEMESTER WITH EFFECT FROM 2019-20

MTIE 201 QUALITY CONTROL ENGINEERING

Periods per week: 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Introduction: Quality – Definition – Difference between Quality control and inspection – variables– attributes – assignable and non-assignable causes.

Control charts for variables: \bar{X} , R and sigma control charts, Process Capability Analysis

Control charts for attributes: Control charts for fraction non conforming, Control chart for Nonconformities (defects)

Control charts for detecting small shifts: CUSUM chart, V-mask procedure, EWMA chart, Moving average control chart.

Control charts for short runs: \bar{X} , R and attribute control charts for short production runs.

Experiments for Process Design and Improvement: Guidelines for design of experiments, factorial experiments, 2^k factorial design, addition of centre points, blocking and confounding.

Taguchi's Quality Engineering: Loss function, Orthogonal Arrays, Signal-to-Noise (S/N) ratio.

Text Books:

1. Introduction to statistical quality control, 4th Edition by Douglas C Montgomery, John Wiley & Sons, Inc.
2. Taguchi methods explained by Tapan P Bagchi, PHI.
3. Total Quality Management by Besterfield et al., Pearson Education, India, 2009

References:

1. Fundamentals of quality control and improvement by Amitava Mitra, Pearson Education Asia.

SECOND SEMESTER WITH EFFECT FROM 2019-20
MTIE 202 OPERATIONS PLANNING AND CONTROL SYSTEMS

Periods per week : 4

Examination : 70 ; Sessionals: 30

Examination (Theory): 3hrs.

Credits: 3

Concept of operation planning and control for various operational systems in manufacturing and non-manufacturing sector – Types of operation and process systems – Functions of operation planning and control – Forecasting - Aggregate planning - Master production scheduling - Material requirement planning, MRP-II – Job shop production activity planning and control – Scheduling, sequencing, priority rules for dispatching jobs – Line of Balance. Capacity planning and control, Concepts of just-in-time - Pull and push system, Kanban systems. Inventory planning and control – Types of inventory, Inventory cost, Inventory systems, Inventory control techniques – Project planning, Monitoring and control. Maintaining and improving operations – Maintenance management. Spare parts management, Continuous improvement of operations.

Text Books:

1. Production Planning and Inventory Control, Narasimhan, Mc Leavy, Billington, PHI(1999)
2. Operation Management- Strategy and Analysis, Lee Krajewski and Larry P. Ritzman, Addison- Wesley (2000).
3. Operations Management: Theory and Problems by Monk, J.G., McGraw Hill, NY, 1985.
4. Operation Management for Competitive Advantage, by Chase R.B., Jacobs F.R. and Aquilano, N.J., TMH, 2003.
5. Operations Management Theory and Practice by B. Mahadevan.
6. Manufacturing Planning and Control Systems by Vollmann, Thomas, E. and Others, Richard D., Irwin, Illinois, 1984.

SECOND SEMESTER WITH EFFECT FROM 2019-20
MTIE 203 FACILITY PLANNING AND DESIGN

Periods per week : 4

Examination : 70 ; Sessionals : 30

Examination (Theory): 3hrs.

Credits : 3

Weberian location theory Evolution of Location including Quantitative and qualitative methods and factors effecting plant location Introduction to layout design process – Objectives and principles of plant layout, Process of plant layout, types of plant layout Systematic layout planning- Line Balancing - Computerized layout planning - ALDEP, CORELAP, CRAFT, Single and multi-facility location problems(with coordinate decent method only) - Quadratic assignment location problems - Minmax layout and location problems - Discrete plant location.

Introduction to Material handling Objectives and principles of Material handling, unit load containerization, types and classification of material handling equipments. Plant services and Auxiliary departments and factory building

Text Books:

1. Facilities Planning, James A. Tompkins and John A. White, John Wiley
2. Facility Layout and Location- An Analytical Approach, Richard L. Francis, Leon F Mc Ginnes and John A. White, PHI(1999)
3. Plant Layout and Material Handling by G.K.Agarawal

SECOND SEMESTER WITH EFFECT FROM 2019-20
MTIE 204 HUMAN RESOURCE DEVELOPMENT & INDUSTRIAL RELATIONS

Periods per week : 4

Examination : 70 ; Sessionals : 30

Examination (Theory): 3hrs.

Credits : 3

Personnel function: Its evolution, Objective principles, Philosophies, Duties and responsibilities of the personnel management in India. Manpower planning: Its uses and benefits - Problems and limitations - Manpower inventory: Manpower forecasting - Manpower skills analysis and practices in Indian industry recruitment: Selection process, Psychological testing - Interviewing techniques, Transfer, Promotion and its policies - Induction placement and exit interview wage and salary administration.

Training and development: Its objective and policy planning and organizing the training department - Training manager and his job - On and off the job training - Techniques, Career planning, Objective of performance appraisal and its methods.

Industrial relations: Problems of labour management relations - Causes for poor industrial relations - Conditions of good industrial relations - Trade union act - Objectives and advantages of trade unions - Collective bargaining - Industrial disputes act - Disciplinary action and domestic enquires - Machinery for settlement of dispute - Grievance procedure and its handling - Counselling - Lay-off, Lockouts, Strikes, Retrenchment - Labour participation in management, Joint management councils, Factories act and other social security acts relevant to the course.

Text Books:

1. Personnel Management by Monappa Arun and Saiyadain, M.S., 5th Reprint, Tata McGraw Hill, New Delhi.
2. Industrial Relations by Saiyadian, M.S., 1st Edn., Tata McGraw Hill, New Delhi, 1987.
3. The Industrial Law by Malik, P.L., 5th Edn., Eastern Book Co., 1982.
4. Personnel Management by Tripathi.

SECOND SEMESTER WITH EFFECT FROM 2019-20
MTIE 205 Elective Subject – III

A) RELIABILITY ENGINEERING

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Introduction: Concepts of quality and reliability, a brief history, terms, definitions, reliability function, MTTF, Hazard rate function, bath tub curve, conditional reliability.

Constant failure rate models: Exponential reliability, failure modes, failure modes with exponential distribution, applications, two parameter exponential distribution, Poisson process.

Time dependent failure models: Weibull distribution, burn-in screening for Weibull, three parameter Weibull distribution, Normal and Lognormal distributions

Reliability of systems: Series, parallel configurations, combined systems, k-out-of-n systems, complex configurations, common failure modes, minimal cuts and minimal paths.

State dependent systems: Markov analysis, load sharing, standby systems, degraded systems

Physical reliability models: Static models- random stress and random strength, dynamic models- periodic models, random loads.

Design for reliability: Reliability specification, Lifecycle costs, reliability allocation, design methods, failure analysis, FTA.

Reliability testing: Life testing, burn-in testing, acceptance testing-binomial acceptance testing.

Reliability growth testing: Reliability growth process, idealized growth curve, Duane growth model.

Text Book:

Introduction to Reliability and Maintenance engineering by Charles E Ebeling, Tata McGrawhill, India.

References:

Introduction to Reliability Engineering by E.E. Lewis, John Wiley & Sons, New York

Reliability based design by S.S.Rao, McGraw-Hill, New York

SECOND SEMESTER WITH EFFECT FROM 2019-20

MTIE 205 Elective Subject– III

B) ENERGY MANAGEMENT

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Introduction: Energy Scenario – World and India, Energy Resource Availability in India, Energy Consumption, Energy intensive industries – an overview, Need for Energy Conservation, Role of Energy manager, Principles of Energy Management. Energy conservation Act 2003.

Instruments for Energy auditing: Instrument characteristics – sensitivity, readability, accuracy, precision, hysteresis, Error and Calibration, Measurement of Flow, Velocity, Pressure, Temperature, Speed, Lux, Humidity, Analysis of stack, Water quality, Fuel quality and Power
Energy Audit: Definition and Concepts, Types of Energy Audits – Basic Energy Concepts – Energy audit questionnaire, Data Gathering – Analytical Techniques. Energy Consultant: Need of Energy Consultant – Consultant Selection Criteria

Energy Conservation: Technologies for Energy Conservation – energy flow networks – critical assessment of energy usage – Boilers, Thermic fluid heater, Furnaces, Waste heat recovery systems, Thermal storage systems, Steam traps, Refractories, Insulation - Optimum thickness
Synthesis of alternative options and technical analysis of options, Process integration.

Economic Analysis: Scope, Characterization of an Investment Project – Types of Depreciation – Time Value of money – budget considerations, Risk Analysis.

Methods of Evaluation of Projects: Payback – Annualized Costs – Investor's Rate of return – Present worth – Internal Rate of Return – Pros and Cons of the common methods of analysis – replacement analysis.

Text Books:

1. Energy Management Hand book by W.C. Turner (Ed)
2. Management by H.Koontz and Cyrill O Donnell
3. Financial Management by S.C. Kuchhal
4. Energy Management by W.R.Murthy and G.Mc Kay
5. Hamies, Energy Auditing and Conservation. Methods and Measurements, Management and Case study, Hemisphere, Washington, 1980
6. Energy Management by Trivedi, PR, Jolka KR, Commonwealth publication, New Delhi
7. Guide book for National Certificate Examination for Energy Managers and Energy Auditors (Could be downloaded from www.energymanagertraining.com)

REFERENCE:

1. Energy Management/W.R.Murphy, G.Mckay/Butterworths.
2. Energy Management Principles/C.B.Smith/ Pergamon Press.
3. Energy Economics/A.V.Desai/Wiley Eastern
Industrial Energy Management and Utilization/L.C. Witte, P.S. Schmidt, D.R. Brown/ Hemisphere Publication/Washingt

SECOND SEMESTER WITH EFFECT FROM 2019-20
MTIE 205 Elective Subject– III
C) DESIGNING AND MANAGING THE SUPPLY CHAIN

Periods per week : 4

Examination (Theory): 3hrs.

Examination : 70 ; Sessionals : 30

Credits : 3

Role of supply chain management in Economy and Organization- Introduction to SCM, Evolution, Key concepts, Decisions and Importance of SCM.

Supply chain strategy and Performance Measures- Competitive supply chain strategies, CRM strategy, Supplier relationship strategy- Performance Measures (Financial, Productivity, Quality and cycle time).

Supply chain drives- Introduction, Facilities, Inventory, Transportation and Information.

Supply chain design- Network design and operation models.

Sourcing and Transportation- Role of sourcing, Supplier selection and contracts, Procurement process, Role of Transportation, Design options for transportation network.

Planning and Managing Inventories-Introduction, cycle/safety/seasonal stock, Inventory for short life cycle products, Multi echelon inventory.

Information Technology in SCM- Role of IT, E-business and future trends.

Supply chain innovations- Introduction, Supply chain integration, Restructuring, Agile supply chains.

Text Books:

1. Designing and Managing the Supply Chain: David Simchi-Levi, Philip Kaminsky, Edith Simchi – Levi, Ravi Shankar, Mc Graw Hill Education, 2008
2. Supply chain management text and cases: Janat Shah, Pearson Education, 2009.
3. Supply chain management strategy, planning and operation, Sunil Chopra, Peter Meindl, PHI.
4. Supply chain management: Chopra, Pearson Education, 2009.
5. Business logistics/ Supply chain management, 5/e: Ballou, Pearson Education.

SECOND SEMESTER WITH EFFECT FROM 2019-20

MTIE 206 INDUSTRIAL ENGINEERING LAB

Periods per week : 3

Examination: 50 Sessionals : 50
Credits : 1.5

1. To study the changes in heart rate for different subjects using Tread mill.
2. To measure the Heart rate during working and recovery periods of the subjects under different loads, using Bicycle ergometer.
3. Control Charts for Attributes
4. Control Charts for Variables
5. To draw OC Curves
6. Normal Distribution
7. Rectangular Distribution
8. Computation of sales forecasting techniques and validation
9. Computation of lot sizing methods used in MRP
10. Development of Bill of Materials for MRP

SECOND SEMESTER WITH EFFECT FROM 2019-20

MTIE 207 COMPUTATIONS LAB-2

Periods per week : 3

Examination: 50 Sessionals : 50
Credits : 1.5

List of Experiments:

1. Learning the usage of SPSS for determination of Statistical constants
2. Modeling of Time-series data for formulating linear equations
3. Modeling of Time-series data for formulating Auto-Regressive equations
4. Modeling of Time-series data for formulating Dynamic Regression equations
5. Modeling of Time-series data for formulating ARIMA (P, D, Q)

SECOND SEMESTER WITH EFFECT FROM 2019-20

MTIE 208 SEMINAR

Periods per week : 3

Examination: 50 Sessionals : 50
Credits : 1

A student has to give seminar on the topics related to his specialization.

THIRD SEMESTER WITH EFFECT FROM 2019-20

MTIE 301 Elective Subject– IV

A) MANAGEMENT INFORMATION SYSTEMS

Periods per week : 4

Examination : 70 ; Sessionals : 30

Examination (Theory): 3hrs.

Credits : 3

Concepts of MIS: Global factors responsible of growth of information systems, Types of Information systems Evolution of information theory, Characteristics of management information System, Richard Nolan MIS Stages theory , Information Resource Management, Management information system organization functions MIS Long range planning Meaning and role of MIS in an organization. Analysis and design of information systems; Conceptual modeling of data and process in organizations. System development life cycle model, Methods of collection of data, Tools for modeling and analysis of data: Concept of Data Base Data base management systems and its functions Data flow diagram, Data dictionary , Data banks.

Tools for modelling and analysis of processes: Flow charts, Decision tables, Decision trees. Transform analysis, Transaction analysis. Information systems audit. Impact of MIS on organizations. Usefulness of various industrial engineering techniques in the design of MIS.

Text Books:

1. Management Information Systems, Laudon and Laudon, PHI(1999)
2. Management Information Systems by Jerome kanter
3. Management Information Systems by Davis Gordon.

THIRD SEMESTER WITH EFFECT FROM 2019-20

MTIE 301 Elective Subject – IV

B) HUMAN FACTOR ENGINEERING

Periods per week : 4

Examination : 70 ; Sessionals : 30

Examination (Theory): 3hrs.

Credits : 3

Introduction to Human factors and systems.

Information Input: Information input and processing, Text, Graphics, Symbols, and Codes, Visual displays of dynamic information, Auditory, Tactual, and Olfactory displays, communications

Human Output and Control: Physical Work and Manual Materials Handling, Motor Skills, Human Control of Systems, Controls and Data Entry Devices, Hand Tools and Devices

Workplace Design: Applied Anthropometry, Work-Space Design and Seating, Arrangement of Components within Physical Space, Interpersonal Aspects of Workplace Design

Environmental Conditions: Illumination, Climate, Noise, Motion

Human Factors Applications: Human Error. Accidents, and Safety, Human Factors in Systems Design

Text Books:

1. Human Factors in Engineering and Design, by Mark S. Sanders and Ernest J. McCormic, Tata McGraw-Hill & McGraw-Hill International Editions.
2. Human Factors Methods: A Practical Guide for Engineering and Design by Paul M. Salmon, Neville A. Ashgate Publishing, Ltd.
3. Ergonomics at Work by David J. Osborne, John Wiely & Sons Ltd.
4. Fitting the Task to the Man – A Text Book of Occupational Ergonomics by Taylor & Francis.
5. A Guide to the Ergonomics of Manufacturing by Martin Helender, Taylor & Francis.
6. Human Factors in Product Design by William H. Cushman and Daniel J. Rosenberg, Elsevier.

THIRD SEMESTER WITH EFFECT FROM 2019-20

MTIE 302 MATERIALS MANAGEMENT

Periods per week : 4

Examination : 70 ; Sessionals : 30

Examination (Theory): 3hrs.

Credits : 3

The role of Purchasing and materials management in the modern organization. The concept of integrated materials management. Purchasing - Basic procedures of purchasing. Specialized purchasing systems — Basic source selections procedures and related considerations in supplier selection.

Capital equipment purchases. Quality determination and control. Standardization, Simplification and Variety reduction. Make or buy analysis. Negotiation. Forward buying, speculation buying, import substitution, legal aspects of purchasing insurance buying. Buyer seller relationship, automatic and computer based systems evaluating purchasing performance.

Inventory Systems Introduction, types of inventory systems, ABC, VED and FSN analysis. Deterministic single item models with static demand. Multiple items and constraints. Quantity discounts. Stochastic single period models.

Receiving and Stores Responsibilities of receiving and stores. Receiving procedures and paper work. Codification of materials, stores systems and procedures — closed system, open system and random access storage system. Storing of materials — methods and equipment stores location and layout – Stores organization. Surplus Materials Primary sources of surplus. Organization for surplus. Disposal of surplus. Buying surplus materials.

Text Books:

1. Aijian, George, W., Purchasing Hand Book.
2. Gopalakrishnan, P. and Sundaresan, M., Materials Management — An integrated concept.
3. Johnson Lynwood, A., and Montgomery Douglass, C., Operations Research Production Planning Scheduling and Inventory Control.
4. Lee, JR, and Dobler Donald W., Purchasing and Materials Management Text and Cases.
5. Orlicky, J., Materials Requirement Planning Systems.
6. Zenz Carry, J., Purchasing and Management of Materials

THIRD SEMESTER WITH EFFECT FROM 2019-20
MTIE 303 INTERNAL ASSESSMENT OF PROJECT

Periods per week : 3

Viva : 100
Credits : 10

A student has to submit his proposal for his Project work, which includes the area of interest coupled with literature survey.

FOURTH SEMESTER WITH EFFECT FROM 2019-20
MTIE 401 EXTERNAL ASSESSMENT OF PROJECT

Total Marks: 100

Credits: 16

A student has to submit and defend his work in the presence of Expert Committee which includes external Examiner