

ANDHRA UNIVERSITY

DEPARTMENT OF MECHANICAL ENGINEERING



M.TECH INDUSTRIAL ENGINEERING

(2019-2020)

REGULATION AND SYLLABUS

EFFECTIVE FROM 2019-2020 BATCH

M.TECH INDUSTRIAL ENGINEERING
FIRST SEMESTER WITH EFFECT FROM 2019-20

Code No.	Course title	Scheme of Instruction		
		Lec	Tut	Total
MTIE 101	Probability And Statistics	4	--	4
MTIE 102	Total Quality Management	4	--	4
MTIE 103	Management Principles And Perspectives	4	--	4
MTIE 104	Methods Engineering And Work Design	4	--	4
MTIE 105	Elective Subject -I	4	--	4
MTIE 106	Elective Subject -II	4	--	4
MTIE 107	Work Study Lab	--	3	3
MTIE 108	COMPUTATIONS LAB-I	--	3	3
Total		24	6	30

SECOND SEMESTER WITH EFFECT FROM 2019-20

Code No.	Course title	Scheme of Instruction		
		Lec	Tut	Total
MTIE 201	Quality Control Engineering	4	--	4
MTIE 202	Operations Planning And Control Systems	4	--	4
MTIE 203	Facility Planning And Design	4	--	4
MTIE 204	Human Resource Development & Industrial Relations	4	--	4
MTIE 205	Elective Subject – III	4	--	4
MTIE 206	Industrial Engineering Lab	4	--	4
MTIE 207	Computations Lab-2	--	3	3
MTIE 208	Seminar	--	3	3
Total		24	6	30

THIRD SEMESTER WITH EFFECT FROM 2019-20

Code No.	Course title	Scheme of Instruction		
		Lec ·	Tut ·	Total
MTIE 301	Elective Subject– IV	4	--	4
MTIE 302	Materials Management	4	--	4
MTIE 303	Internal Assessment Of Project	4	--	4

Code No.	Course title	Scheme of Instruction		
		Lec ·	Tut ·	Total
MTIE 401	External Assessment Of Project	4	--	4

M. Tech Industrial Engineering:

Program outcomes:

PO1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

PO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

PO3: An ability to communicate effectively with a range of audiences

PO4: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

PO5: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Program Specific Outcomes:

PSO1: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

PSO2: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

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

COURSE OBJECTIVES:

1. To enrich the student on the concepts of statistical methods.
2. To make the student understand the use of different theoretical and their properties.
3. To make the student understand the concept of sampling techniques.
4. To make the student understand the concept of curve fitting by least square method.
5. To make the student to understand the concept of Markov process and Markov Chains.
6. To make the student to understand the concept of Correlation and Regression.

Discrete and continuous random variables: Introduction to random variables- Definitions- Main fundamentals of mathematical expectations- Derivation of moments and moment generating functions.

Learning Outcomes

After the completion of this topic the student will be able to-

- (i). Understand the concepts of discrete and continuous random variables.
- (ii). Understand different properties such as expectations, variance and standard deviation.
- (iii). Understand the different moments and moment generating functions.

Distributions: Introduction- Binomial distribution- Poisson distribution-Normal distribution, Uniform distribution- Weibull distribution.

Learning Outcomes

After the completion of this topic the student will be able to-

- (i). Understand different distributions like Binomial distribution- Poisson distribution- Normal distribution, Uniform distribution- Weibull distribution etc.
- (ii). Derive the different mathematical properties like mean, Variance, moment generating function and probability generating function etc.
- (iii). Know about different types of Recurrence relations.

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.

Learning Outcomes

After the completion of this topic the student will be able to-

- (i). Understand Proportions-Sums and differences.
- (ii). Understand types of estimation; properties of good estimator, maximum likelihood estimation.
- (iii). Know about different estimation.

Statistical hypothesis: Introduction -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.

Learning Outcomes

After the completion of this topic the student will be able to-

- (i). Understand large sample tests and small sample tests.
- (ii). Understand tests for independence of attributes.
- (iii). Understand tests for goodness of fit.

ANOVA: Introduction- Analysis of variance one way - 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

Learning Outcomes

After the completion of this topic the student will be able to-

- (i). Understand the concept of analysis of variance one way classification.
- (ii). Understand and apply two way classification.

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

Learning Outcomes

After the completion of this topic the student will be able to-

- (i). Understand the concepts of components of time series.
- (ii). Find the different methods of least square method to find trend values.

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

Learning Outcomes

After the completion of this topic the student will be able to-

- (i). Understand the concept of curve fitting models.
- (ii). Estimate the value of regression equations.
- (iii). Understand the concept of partial and multiple correlations.

COURSE OUTCOMES:

1. The student is capable of understanding the concepts of various distributions and their application to industrial engineering.
2. The student is capable of understanding the different problems in sampling distributions and their applications.
3. The student is capable of understanding the principle of large sample tests and small sample test.
4. The student is capable of understanding the principle of least square.

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

COURSE OBJECTIVES:

1. To understand the concept and philosophy of TQM.
2. To get acquainted with the tools of quality control.
3. To understand the quality function - Quality function deployment, Designing for quality, Manufacturing for quality.
4. To learn the importance and use of quality systems - ISO standards.
5. To understand the process of implementing the quality tools like KAIZEN, 5S, JIT, POKAYOKE, Taguchi methods and the difficulties in implementing them.

SYLLABUS:

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

Learning outcomes: Students understand benefits of quality management. Students learn different philosophies of quality authors.

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

Learning outcomes: Students will learn old quality control tools and new management tools. Student understands concept of bench marking and quality circles.

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

Learning outcomes: Students can clearly distinguish between Quality policy deployment and Quality function deployment.

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

Learning outcomes: Students will know advantages of ISO 9000 system. Students will be able to implement ISO 9000 system in industries.

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

Learning outcomes: Students will understand concepts of KAIZEN, 5S, JIT, POKAYOKE.

COURSE OUTCOMES:

1. Students will have knowledge of quality and the contributions of quality gurus' like Deming, Crosby and Miller.
2. Can apply the quality and management tools and methodologies for solving the problems.
3. Will be able to apply and use functions like quality function deployment, standardization, designing and manufacturing for quality.
4. Get acquainted with ISO series and the process of implementing it.
5. Will be able to apply quality tools like KAIZEN, 5S, JIT, POKAYOKE, Taguchi methods.

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

COURSE OBJECTIVES:

1. To make the student understand the conceptual essence of theories of management developed by Henri Fayol, Chester Bernard, F. W. Taylor, Elton Mayo, Mchraggar etc.,.
2. T make the student understand different skills required to be exhibited by him during working environment of industry.
3. To make the student understand different roles to be played by the management during the working environment of industry.
4. To make the student understand necessary applications of scientific methods in the preparation pre-planning process.
5. To make the student understand different planning methods to be adopted under different conditions of industry.
6. To make the student understand the functions of organising and different optimising techniques required in achieving the goals of organising.
7. To make the student understand the importance of communications and its role in fulfilling the goals of organisation.
8. To make the student understand the functions of scheduling and identifying different optimal criteria required to make scheduling efficient and in this process the need of optimisation of meta-houristies.
9. To make the student understand the functions, responsibilities and different optimising methods and techniques to achieve it.
10. To make the student understand power, authority, responsibility, accountability and the delegation of powers.
11. To make the student understand different types of organisation and need and necessity of importance of organisation standards.
12. To make the student understand the different types of professional ethics and their need and necessity in executing the functions of manager.

SYLLABUS:

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.

LEARNING OUTCOMES:

1. The student will be able to address different challenges that he encounter in an organisation.
2. The student will be able to use his management skills when he addresses different roles in the organisation.
3. The student is be able to learn the usage different optimisation techniques in the execution of his functions in the organisation.
4. The student is be able to apply his powers, duties by efficient and judicious delegation methods.
5. The student is be able to understand the role of ethical behaviour and its effectiveness in the successful working of organisation.

Course Outcomes:

1. The student will be able to understand the conceptual essence of theories of management developed by Henri Fayol, Chester Bernard, F. W. Taylor, Elton Mayo, Mchraggar etc., and he could be able to address the duties in the organisations.
2. The student will be able to know the different skills required to be exhibited by him during the execution of his duties in the organisation.
3. The student will be able to understand different roles he has to play during the execution of his duties in the organisation.
4. The student will be able to select suitable scientific methods to be applied in execution of pre-planning functions.
5. The student will be able to plan his planning effectively so that its deviation from plan to actual realisation will be minimum.
6. The student will be able to select suitable optimization methods in execution of his organising functions and achieve the goals of organising.
7. The student will be able to understand the effective communication methods and will be able to minimise the communication gap in the execution of his duties in the organisation.
8. The student will be able to identify the different criteria and methods which will make the scheduling effective.
9. The student will be able to monitor the function of controlling efficiently with the use of different optimising methods.
10. The student will be able to exercise the power, authority in such a manner that a measurable responsibility and accountability can be achieved so that he can monitor the process of reaching his goal.
11. The student will be able to understand the process of delegation and will be able to select the correct sub-ordinate to whom he can delegate his powers.
12. The student will be able to understand the need and necessity of professional ethics required to be executed by himself.

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

COURSE OBJECTIVES:

1. To make the student understand about the concepts of work study and productivity management.
2. To make the student understand need of THERBLINGS in micro motion study and provide enough knowledge on principles of motion economy.
3. To make the student learn about different time study methods.
4. To make the student capable of calculating standard time for any new job.
5. To make the student understand about ergonomics and bio-mechanics.
6. To make the student competent enough about MTM methods and records management.
7. To make the student expert in value engineering.
8. To make the student expert in evaluation of job and design of incentives schemes.

SYLLABUS:

Work study: Concept of work and productivity – Productivity measurement - Methods study - Charting techniques – Elemental motions, THERBLINGS 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.

LEARNING OUTCOMES:

1. The student will be able to recognise the importance of work study in the work environment.
2. The student can able to redesign the existing workplace layout by using the methods of work study.
3. The student can be able to fix the reasonable work load on workers with the help of work study concepts.
4. The student can be able to reward the workers by best evaluation of their efforts in the execution of job.

COURSE OUTCOMES:

1. The student will become expert in concepts of Work study and productivity management.
2. The student will be able to apply principles of motion economy in any workplace design and he will be able to optimise any micro motion of worker using the THERBLINGS.
3. The student can able to apply different time study methods to calculate standard time for any new job.
4. The student will get complete understanding about ergonomics and their role in deciding the design of a new workplace arrangements and in that process his knowledge about bio-mechanics will be highly useful.
5. The student can apply MTM methods for calculating standard time.
6. The student can improve the quality of work place environment by utilising the concepts of value engineering.
7. The student can be able to calculate the evaluation of job and be able to design attractive incentive scheme.

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

COURSE OBJECTIVES:

1. To make the student aware of maintenance policies, objectives and benefits derived out from maintenance policies.
2. To make the student understand the need and necessity of maintenance organization and structure of maintenance.
3. To make the student know how to co-ordinate planning function with activities of maintenance.
4. To make the student know different types of maintenance and their applications.
5. To make the student to understand the concepts of condition monitoring.
6. To make the student learn the concept of equipment codification and classification.
7. To make the student understand how to prepare maintenance budget and how to integrate production with maintenance.
8. To make the student aware of replacement policies and models.
9. To make the student understand and learn spare parts planning in maintenance.
10. To make the student capable of making maintenance down time analysis.
11. To make the student understand how to integrate simulation techniques in maintenance activities.
12. To make the student understand the usefulness of reliability models, state transition diagnosis and their application in maintenance systems.
13. To make the student capable of planning maintenance strategies and know about maintainability and availability concepts.

SYLLABUS:

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.

LEARNING OUTCOMES:

1. The student get complete picture of maintenance and types of maintenance practices and he can take part in maintenance activities in any industry.
2. The student is able to utilize the manpower for maintenance activities effectively and can plan the maintenance activities with production activities.
3. The student is able to identify the real reason behind the breakdown of equipment and can plan effective maintenance activities on them.
4. The student is able to make equipment down time analysis and can make use of reliability concepts in the modern computerised maintenance management systems.

COURSE OUTCOMES:

1. The student will get complete understanding of maintenance policies, maintenance structure necessity etc.,
2. The student can know different types of maintenance practices and will be able to do maintenance planning.
3. The student will get complete knowledge about condition monitoring, equipment codifications and classification of equipment.
4. The student will be able to prepare maintenance budget and will be able to integrate production and maintenance activities.
5. The student will be aware of usefulness of replacement policies and models in maintenance.
6. The student will be able to do manpower planning and spare parts planning and maintenance down time analysis and integration simulation techniques in maintenance activities.
7. The student will be able to know usefulness of reliability models and state transition diagnosis in maintenance activities.
8. The student can plan for maintenance strategies and will be able to apply the concepts of maintainability and availability in maintenance activities.

FIRST SEMESTER WITH EFFECT FROM 2019-20
MTIE 105 PRODUCT DESIGN MANAGEMENT

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

Examination: 70; Sessionals: 30
Credits: 3

COURSE OBJECTIVES:

1. To make the student understand about product design and the issues related to development of product.
2. To make the student capable of designing a product and the necessary criteria required for creation of new product.
3. To make the student understand different types of design concepts which are necessary to understand product design.
4. To make the student understand the requirements, needs and facilities a user expected out of a product.
5. To make the student learn how to integrate different functions, facilities a product developed.
6. To make the student validate the different concepts like production designs, functional designs, process designs, ergonomic designs and the environmental impacts and legal aspects of product.
7. To make the student capable of integrating the user habits, expectations, user behaviour with the design of product.
8. To make the student capable of evaluating design model and its reliability and its maintenance requirements.
9. To make the student understand how to introduce the product in the markets with suitable advertisement strategy.

SYLLABUS:

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)

LEARNING OUTCOMES:

1. The student will be able to learn complete details about different aspects that lead to the product development process.
2. The student is able to learn different criteria for requirement new product out of generations of ideas from market and from his own creative, innovative ideas.
3. The student will be able to decide the boundaries within which different designs of product should accommodate for a market viable product.
4. The student will be able to learn different issues related to product market introduction and the necessary certification of its functions from a recognised institute.

COURSE OUTCOMES:

1. The student will be able to understand different stages of product development and different issues related to it.
2. The student will be able to know different designs necessary for complete development of a product.
3. The student will be able to know how to accommodate different features, facilities which can be incorporated in the product development.
4. The student will be able to balance different criteria's arising from different designs so that the product is convenient to the customer.
5. The student will be able to identify the short comings of product and its possible failure parts and should able to plan necessary repair facilities convenient to the customer.
6. The student will be able to plan complete product life cycle development and product life enhancement program so that the tenure of product life will be maximized.
7. The student will be able to plan proper product introduction into market linked with attractive marketing strategy so that it can attract maximum number of customers.

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

COURSE OBJECTIVE:

1. To integrate the basic concepts of economics with the tools of mathematics and statistics in order to analyze and make optimal business decisions.
2. To make the student to understand the relation between Engineering Economics and managerial economics and different principles of managerial economics.
3. To understand the demand Distinctions and to learn about how to forecast a demand for products and also for a new product.
4. To have exposure on qualitative and quantitative methods of forecasting.
5. To know much about theories of profit.
6. To know about significance of production functions.
7. To have an idea on areas for Business Promotions.

SYLLABUS

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.

Learning outcomes: Understanding the basic concepts of managerial economics and the reason for existence of firms.

Understanding the economic goals of the firms and optimal decision making.

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.

Learning outcomes: Student will be able to know about different managerial economics tools and principles of managerial economics.

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.

Learning outcomes: Understanding the concepts, importance and applications of different forecasting techniques to estimate product demand.

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.

Learning outcomes: Student will be able apply the quantitative and qualitative techniques of forecasting.

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.

Learning outcomes: Student will learn about theories of profit and also profit as a business objective.

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.

Learning outcomes: Student will identify functions of production and economies of scale.

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.

Learning outcomes: Student will understand the different areas which are required for business promotion.

COURSE OUTCOMES:

After the completion of the course, students will be able to –

- 1) Understand the roles of managers in firms
- 2) Understand the internal and external decisions to be made by managers
- 3) Analyze the demand and supply conditions and assess the position of a company
- 4) Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.
- 5) Analyze real-world business problems with a systematic theoretical framework.
- 6) Make optimal business decisions by integrating the concepts of economics, mathematics and statistics.

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:

2. James L. Riggs, David D. Bed Worth and Sabah U. Randhawa, **Engineering Economics**, TataMc Graw - Hill - Publishing Company Ltd., Delhi, 2004.
 3. Varshney, R.L. and Maheswari , K.L. **Managerial Economics** , Sultan Chand & Sons, New Delhi, 1989.
 4. Mishra Sasmitra, **Engineering Economics and Costing**, PHI Learning pvt. Ltd., New Delhi 2011.
- Sankaram, S., **Managerial Economics**, Margham Publications, Chennai, 2006.

FIRST SEMESTER WITH EFFECT FROM 2019-20

MTIE 106 Elective Subject– II

B) PROJECT MANAGEMENT

(FIRST SEMESTER WITH EFFECT FROM 2019-20)

Periods per week : 4

Examination (Theory): 3hrs.

Examination: 70; Sessionals: 30

Credits: 3

COURSE OBJECTIVES:

1. To make the student understand the concepts of industrial development, corporate growth and business development.
2. To make the student understand the issues related to formulation and implementation of R&D projects.
3. To make the student understand the concepts of need analysis recourse surveys, market research, feasibility analysis, technical feasibility etc.
4. The student will be able made to learn about technology forecasting, choice of technology, process and assessment technology.
5. To make the student understand the importance of techno economic analysis and appropriate technologies.
6. The student will be able to understand the analysis of infrastructure and its component elements.
7. To make the student learn about investment analysis principles, cost estimating, cost benefit analysis, financial, economic, social cost benefit analysis.
8. To make the student learn about UNIDO, World bank and OECD methodology.
9. To make the student learn financial management of capital and be able to learn about internal finance and foreign exchange regulations.
10. to make the student able to plan contracts and projects, and learn about projects scheduling and monitoring tools and techniques.
11. To make the student capable of computing entire applications in project management.

SYLLABUS:

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.

LEARNING OUTCOMES:

1. To make the student expert in the areas of Industrial development, corporate growth and business development.
2. The student will be expert in the application of project management related tools.
3. The student will be able to make Techno-Economic analysis of any project.
4. The student will be expert not only in technical area but also in the financial sector relating to the project and will be authority regarding rules and regulations of UNIDO, World Bank and OECD.

COURSE OUTCOMES:

1. The student will be in a position to understand the concepts of industrial development and issues related to R&D projects.
2. The student will be capable of making need analysis, research analysis market research etc.
3. The student will be capable of forecasting the technology and be in a position to select suitable technologies.
4. The student will be able to make independent techno-Economic analysis of any project.
5. The student will be able to use Investment-Analysis principles, cost benefit analysis etc. In any business proposal.
6. The student will be capable of making effective financial management of any project and will be well vested with the regulations of UNIDO, world Bank, and OECD methodologies.
7. The student will be able to plan effectively the contracts and projects by implementing project scheduling and monitoring tools and techniques.
8. The student will be able to computerize any project management.

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

COURSE OBJECTIVES:

1. To make the student understand the fundamentals of all issues relating to logistics engineering.
2. To make the student understand about design for maintainability, design for human factors and safety and integration.
3. To make the student understand the importance of logistics in production and construction phase.
4. To make the student know how to plan transition from production to user operation.
5. To make the student understand about the concept of total productive maintenance.
6. To make the student evaluation of logistics support elements.
7. To make the student able to learn about logistics planning and its interphase with other program activities.

SYLLABUS:

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

Totsal Productive maintainence (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.

LEARNING OUTCOMES:

1. The student will be expert in the area of logistics engineering with which he can speedily complete the execution of the project.
2. The student will be able to take care of human factors and safety by proper design and development of logistics.
3. The student will be able to implement many industrial engineering techniques in the field of logistics.
4. The student will be able to assess properly the need of logistics support elements.
5. The student will be able to plan efficiently the logistics planning and management.

COURSE OUTCOMES:

1. The student will be having complete understanding of the fundamentals of all issues relating to logistic engineering.
2. The student will be capable of making for any logistics proposal effective by implementing design for maintainability, design for human factors etc.
3. The student will be able to manage efficiently the logistics in any production and construction phases of any project.
4. The student will be effectively able to plan in any project its transition from production to user operation.
5. The student will be capable of implementing the concepts of total productive maintenance in any logistics related projects.
6. The student will be able to effectively do the evaluation of logistics support elements in any projects.
7. the student will be able to integrate the logistics planning and its interface with other activities.

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

Periods per week: 3
Sessionals : 50

Examination: 50
Credits: 1.5

COURSE OBJECTIVES:

1. To make the student skilful and able to express his dexterity in the movement of wrist and fingers.
2. To make the student capable of applying MTM methods to determine cycle time.
3. To make the student measure the movement of his both hands during work for the purpose of balancing work load on both hands.
4. To make the student identify his actual working time and also the working time of machine, so as to plan towards minimization of his ideal time.
5. To make the student capable of measuring actual working time during a work.
6. To make the student capable of drawing flow-charts for a worker/ machine/ material.
7. To make the student capable of calculating standard time for a job using work factors systems.
8. To make the student capable of drawing SIMO charts for a study of micro motion process.
9. To make the student capable of calculating standard time for a job using time study method.
10. To make the student capable of assessing the performance of a worker using performance rating method.

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

LEARNING OUTCOMES:

1. The student will be capable of effectively utilising any worker in any work environment.
2. The student is able to determine standard time for completing the job using time study methods.
3. The student is able to modify any abnormality in any micro motion process by a worker.
4. The student will be in a position to measure outcome of a worker during working time.

COURSE OUTCOMES:

1. The student will be capable of measuring his skill and dexterity of his wrist and fingers.
2. The student is capable of applying MTM methods to determine cycle time.
3. The student will be capable of nearly balancing work load on his both hands.
4. The student can be able to minimise his idle time by diverting him towards working of more than on machine
5. The student is capable of measuring actual working time during the work.
6. The student is capable of drawing flow charts for worker/ machine/ materials.
7. The student is capable of calculating standard time for any job using work-factor systems.
8. The student is capable of drawing SIMO charts for any micro motion process.
9. The student is capable of calculating standard time for any job using time study method.
10. The student is capable of assessing performance of worker using performance rating method.

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

Periods per week : 3

Examination: 50 Sessionals : 50

Credits : 1.5

COURSE OBJECTIVES:

1. To make the student capable of determining basic statistics values for a time-series data using STATISTICA 6.0.
2. To make the student capable of modelling a linear equation for a time- series data using STATISTICA 6.0.
3. To make the student capable of formulating polynomial equations using time series data on a MINITAB software.
4. To make the student capable of using CATIA package for different industrial engineering applications.

LIST OF EXPERIMENTS:

1. Determination of basic statistics using Time-series data on STATISTICA 6.0
2. Modelling of linear equation using Time-series data on STATISTICA 6.0
3. Modelling of Polynomial equations using Time-series data on MINITAB
4. Learning the usage of CATIA package.

LEARNING OUTCOMES:

1. The student will be learning the importance of basic statistics in determining the nature of time-series data.
2. The student can be able to decide which polynomial order is best for a specific time series data.
3. The student can apply CATIA package to address any industrial problems.

COURSE OUTCOMES:

1. The student is capable of determining basic statistical values for a time series data on STATISTICA 6.0.
2. The student is able to formulate linear equations for a time series data using STATISTICA 6.0
3. The student will be capable of formulating polynomial equations using time series data on MINITAB software.
4. The student is made capable of using CATIA package for any industrial engineering applications.

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

COURSE OBJECTIVES:

1. To impart the knowledge of course of variation and the need to reduce the variation.
2. To expose the students to different kinds of control charts so as to understand the construction, application and revision of control charts.
3. To make the students familiar with the different types of anon in control charts and run length in in-control and out-of-control situation.
4. To expose the student to select a basic process suitable based on the capacity analysis of the given process.
5. To expose the student to the use of control charts in the case of small shifts in the process mean and to understand the failure of shewhart control charts in such cases.
6. To expose the students to fractional designs and also to choose suitable OAS recommended by Taguchi in reducing the No.of experiments.

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

Learning outcomes:

Understands clearly that the variation is due to chance as well as assignable causes.

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

Learning outcomes:

Learns the construction of \bar{X} , R and σ control charts and the use of control charts in the study of process capability.

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

Learning outcomes:

Learns the construction and application of p,np,c and μ charts

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

Learning outcomes:

Learns the operation and construction of CUSUM charts , EWMA charts and MA charts for detecting Small shifts.

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

Learning outcomes:

Learns the implement of \bar{X} and R charts for short production runs using DNOM principle.

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

Learning outcomes:

Learns the concepts of experiments and the design and analysis of factorial experiments.

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

Learning outcomes:

Learns to setup an orthogonal array to reduce the experiments.

COURSE OUTCOMES:

1. The student clearly understands the variation in the quality characteristics and the possibility of reduction of variation.
2. Understands the application of variable and attribute control charts to control the engineering processes.
3. Understands different process capability ratios used in studying the centred and off-centred processes.
4. Under stands the use of non-shewhart type control charts for defecting small shifts in the process mean values.
5. Acquires the ability to apply design of experiments and the application of Taguchi's orthogonal arrays in the quality improvement.

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 (Theory): 3hrs.

Examination : 70 ; Sessionals: 30
Credits: 3

COURSE OBJECTIVES:

1. To make the student understand the concept of Production planning and production control. In this process the teacher will be attempting to make the student knowledgeable about the objectives of Production planning and production control.
2. To make the student to understand the concept of forecasting and able to apply different forecasting techniques to industry problems.
3. To make the student understand the concept of process planning and about computer aided process planning
4. To make the student understand the meaning of inventory and different types of inventories and able to formulate EOQ and EBQ models for different situations.
5. To make the student to understand the concept of MRP-1, MRP-2, JIT and to know about aggregate planning.
6. To make student understand the functions of PPC like Routing, scheduling and dispatching.

SYLLABUS:

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

Learning outcomes: Students will know objectives of PPC.

Identifies different functions of PPC and know types of production.

Forecasting - Aggregate planning - Master production scheduling - Material requirement planning, MRP-II – Job shop production activity planning and control

Learning outcomes: Students will know importance of forecasting and able to use qualitative and quantitative methods of forecasting wherever it is necessary. Students can be able to understand different aggregate planning methods. Student learns about material requirement planning.

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.

Learning outcomes: Students understands more about significance of scheduling function in manufacturing industry and also their classification.

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.

Learning outcomes: Understands the different relevant inventory costs associated with inventory management and formulation of EOQ model.

COURSE OUTCOMES:

1. Student is able to participate and can interact in real world scenario regarding production planning and production control and suggest the type of production required for specific real world requirement.
2. Student can undertake the responsibility of doing forecasting in real world situation is able to suggest correct forecasting method/technique for a specific real world situation and can also able to judge the suitability of the method for a real world situation depending on the error associated with the method.
3. Student can understand the need of inventory control and can able to undertake activities relating to inventory management.
4. The student is knowledgeable about MRP-1&2, JIT, Aggregate planning can able to implement them in real world situation.
5. Student can understand and participate in the design of both forward and backward scheduling and Master scheduling and can able to evaluate different job shop schedules with reference to priority scheduling rules.

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 (Theory): 3hrs.

Examination : 70 ; Sessionals : 30
Credits : 3

COURSE OBJECTIVES:

1. To make the student understand the different plant location theories and their utility.
2. To make the student understand and identify different plant location factors and their importance in the selection of plant location.
3. To make the student understand the different principles of plant layout and their need and necessity in efficient layout facilities in the plant.
4. To make the student understand different factors effecting layout efficiency.
5. To make the student understand different parameters which lead to selection of layout.
6. To make the student understand the determination of single optimum location using different service points using different methods.
7. To make the student understand the determination of multi optimum locations (limited 2 No. Only) serving different service points using Co-ordinate decent method.
8. To make the student understand the need and necessity of material handling principles and their importance in efficient serving of the organisation.
9. To make the student understand different types of M.H. equipments and their roles in execution of jobs in organisation.
10. To make the student understand different factors affecting the efficiency of M.H. equipment.

SYLLABUS:

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 McGinnes and John A. White, PHI(1999)
3. Plant Layout and Material Handling by G.K.Agarawal

LEARNING OUTCOMES:

1. The student is able to evaluate the business conditions and is capable of selecting best location for his enterprise.
2. The student is able to apply the maximum number of plant layout principles such that the layout will be efficient and will have less number of problems.
3. The student is able to identify best location (single One) for a multiple service points and he is also able to identify two best locations for a multiples service points using Co-ordinate decent method.
4. The student is able to design best M.H system for a practical situation.

COURSE OUTCOMES:

1. The student is able to understand the different plant location theories and their applicability and suitability in a location.
2. The student is able to achieve the capacity to decide the different factors of plant location which are necessary to make the decision of plant locations.
3. The student is able to recognise the need and applicability of different plant layout principles while laying the plant.
4. The student is able to identify the different factors which are effecting the layouts which are effecting the layout efficiency.
5. The student is able to select which types of layout is suitable basing on different parameters relating to the product to be manufactured.
6. The student is able to determine different methods of single optimum new locations to serve multiple service points.
7. The student is able to determine two optimum new locations to serve multiple service points using Co-ordinate decent method.

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

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

Examination : 70 ; Sessionals : 30
Credits : 3

COURSE OBJECTIVES:

1. To enlighten about Human Resource Management and its importance.
2. To familiarize with the functions of Human Resource Management.
3. To bring about an understanding of Industrial Relations and the key participants in industrial relations system.

SYLLABUS:

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 MonappaArun 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.

LEARNING OUTCOMES:

1. Understand the basic concept of Human Resource Management and the role played by Human Resource Manager in business organization.
2. Forecast Manpower requirements and design Recruitment and Selection policies.

3. Design Training and Development Programmes.
4. Develop, evaluate and administer Performance Appraisal tools.
5. Determine and establish Compensation structure that is consistent with organization goals.
6. Diagnose the important causes of Industrial disputes.
7. Implement participative management in organizations.
8. Implement methods of Industrial democracy.
9. Acquire skills in handling employer-employee relations.

COURSE OUTCOMES:

After completion of the course, to students will be able to:

1. To have an understanding of the basic concepts, functions and processes of Human Resource Management.
2. To design and formulate various Human Resource Management processes related to Manpower planning, Recruitment, Selection Training and Development, Performance appraisal and Compensation management.
3. To familiarize with the role of Management and Trade Unions in the promotion of Industrial Relations
4. To examine the labour relations issues and its management.

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

COURSE OBJECTIVES:

- To distinguish between quality of conformance and quality of performance and to model the failure of different engineering products and systems using appropriate statistical distributions.
- To model the different engineering systems as series, parallel, combination of series and parallel and complex systems. Also to lease the evaluation of different systems reliability
- Make analysis of system reliability
- To introduce the stress-strength based on reliability models and to highlight their importance over the design based on safety factors.
- To introduce the reliability design process, lifecycle costs, reliability allocation and FMEA and FTA.
- To introduce reliability tests methods and growth models

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

Learning outcomes:

Student Understands clearly quality of conformance and quality of performance .gains the ability to use the reliability concepts like MTTF and MTBF.

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

Learning outcomes:

Learns where to apply a constant failure rate models using exponential distraction and under stands its appropertaness

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

Learning outcomes:

Learn to model the time based failure rates models using Weilnll , normal and log-normal distribution

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

Learning outcomes:

Learn to categories the engineering system into low level, high level redundant systems
.Evaluate all kinds of engineering system reliability.

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

Learning outcomes:

Learns the application of MOVKOV analysis to engineering system reliability this leads to the understanding of state dependent system analysis.

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

Learning outcomes:

Learns the reliability analysis of components with
Exponential strength Vs exponential stress
Normal strength Vs normal Stress
Lognormal strength Vs log normal stress

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

Learning outcomes:

Learns to conducts FMEA and FTA methods and their importance in the design reliability.

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

Learning outcomes:

9. Learns the reliability methods like binomial tests and binomial acceptance tests fundamentals

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

Learning outcomes:

Learns the Duane model of reliability growth model.

COURSE OUTCOMES:

1. The student understands the importance of time based performance and its importance of time based performance and its modelling using different statistics dispute.
2. Gains the ability to model the engineering systems with different computation
3. Understands the application of MAVKOV analysis to every system reliability
4. Gains the knowledge to design the engineering products to the required reliability constraints
5. Understands the reliability allocation methods and the conduct of FMEA and FTA.
6. Gain knowledge in reliability tests and growth analysis.

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
A) ENERGY MANAGEMENT

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

Examination : 70 ; Sessionals : 30
Credits : 3

COURSE OBJECTIVES

1. Students will have an exposure to the present scenario of energy availability/demand and the need for energy conservation
2. Students will be given an insight about energy intensive industries and their energy consumption trends
3. Students will be taught, working of various instruments used during energy audits
4. Students will be taught about different types of audits and the activities coordinated during energy audits
5. Students will learn about various energy conservation opportunities available in process equipments/industries
6. A systematic approach towards financial assistance/evaluation of projects will also be taught during the course

SYLLABUS

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.

Learning Objective : *To learn the importance of energy conservation in the present day scenario*

Instruments for Energy auditing: Instrument characteristics – sensitivity, readability, accuracy, precession, hysteresis, Error and Calibration, Measurement of Flow, Velocity, Pressure, Temperature, Speed, Lux, Humidity, Analysis of stack, Water quality, Fuel quality and Power

Learning Objective : *To learn about different types of instruments used during energy audits*

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

Learning Objective : *To learn about different types of energy audits and activities done during energy audits*

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.

Learning Objective : *To learn about various energy conservation opportunities available in process equipments/industries*

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

Learning Objective : *To learn about financial risk analysis on investments*

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.

Learning Objective : *To learn fundamentals of pay back period and other financial 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/Washington

COURSE OUTCOMES:

1. Students can realize the importance of energy conservation in the present day scenario
2. Concepts learnt might help students to understand the working and limitations of instruments used during energy audits
3. Students can take up energy manager or energy auditor as their career in future
4. Students will understand and evaluate the energy conservation opportunities in a process/equipment
5. Their knowledge about financial approach can help them to logically evaluate the feasibility of modification/retrofitting in a process/equipment

SECOND SEMESTER WITH EFFECT FROM 2019-20
B) DESIGNING AND MANAGING THE SUPPLY CHAIN

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

Examination : 70 ; Sessionals : 30
Credits : 3

COURSE OBJECTIVES:

1. To make the student learn about concepts, decisions, evaluations of supply chain management in economy of an organisation.
2. To make the student competent enough to learn about supply chain strategies and performance measures.
3. To make the student to have complete understanding of supply chain drives.
4. To make the student to have complete understanding of supply chain designs.
5. To make the student understand about the role of sourcing and transportation.
6. To make the student understanding depth the planning and measuring inventories in a supply chain.
7. To make the student expert in the implementation of different IT tools in supply chain management.
8. To make the student expert in the area of supply chain integration, restructuring, Agile supply chain.

SYLLABUS:

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:

Designing and Managing the Supply Chain: David Simchi-Levi, Philip Kaminsky, Edith Simchi – Levi, Ravi Shankar, Mc Graw Hill Education, 2008

Supply chain management text and cases: Janat Shah, Pearson Education, 2009.

Supply chain management strategy, planning and operation, Sunil Chopra, Peter Meindl, PHI.

Supply chain management: Chopra, Pearson Education, 2009.

Business logistics/ Supply chain management, 5/e: Ballou, Pearson Education.

LEARNING OUTCOMES:

1. The student will be able to deal any issue related to supply chain management.
2. The student will be having planning and implementation capacity of supply chain management in any organisation.
3. The student with his knowledge in supply chain management he can effectively plan and manage inventories of organisation.
4. The student can implement IT tools in any organisation which are using supply chain management.

COURSE OUTCOMES:

1. The student will be expert in the area of supply chain management having complete knowledge about the fundamentals of supply chain management.
2. The student will be able to design a supply chain strategies and will be able to measure performance of any supply chain.
3. The student will be having complete authority over supply chain drives, supply chain design.
4. The student will be expert in deciding the role of sourcing and transportation in supply chain management.
5. The student will be expert in planing and management inventories in supply chain management.
6. The student will be expert in the implementation of IT tools in supply chain management.
7. The studenty will be expert in the area of restructuring in supply chain integration and in agile supply chain.

SECOND SEMESTER WITH EFFECT FROM 2019-20
MTIE 206 INDUSTRIAL ENGINEERING LAB

Periods per week : 3
Sessionals : 50

Examination: 50
Credits : 1.5

COURSE OBJECTIVES:

1. To make the student capable of measuring heart-rate at different working conditions using treadmill.
2. To make the student capable of measuring heart-rate at different working conditions using bicycle ergo-meter.
3. To make the student capable of determining upper control limit and lower control limit for a control chart suitable for attributes.
4. To make the student capable of determining upper control limit and lower control limit for a control chart suitable for variables.
5. To make the student capable of drawing OC curve for a specific production process.
6. To make the student capable of drawing normal curve for a population.
7. To make the student learn about the nature of rectangular distribution population.
8. To make the student capable of applying sales forecasting techniques for a specific sales data.
9. To make the student capable of using lot size methods in material resource planning.
10. To make the student capable of preparing bill of materials for a material resource planning.

LIST OF EXPERIMENTS:

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 ergo-meter.
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

LEARNING OUTCOMES:

1. The student is able to measure human fatigue under different load conditions, and can utilise this information for estimating number of workers required for a specific job.
2. The student can utilise sample inspection methods for mass production units.

3. The student will be capable of providing a necessary information for pre-planning process in the organisation.
4. The student can utilise MRP methods for any production organisation.

COURSE OUTCOMES:

1. The student is capable of assessing the reaction of human body under different conditions using treadmill.
2. The student is capable of assessing the reaction of human body under different conditions using bicycle ergo-meter.
3. The student is capable of drawing control charts for attributes.
4. The student is capable of drawing control charts for variables.
5. The student is capable of drawing OC curves for a specific production process.
6. The student can learn how to draw a normal curve for a normally distributed population.
7. The student learns that given rectangular distribution population also follow normal curves.
8. The student can predict future sales for an organisation with its cost sales data.
9. The student can learn usage of lot sizing methods in material resource planning.
10. The student is capable of preparing bill of materials for material resource planning.

SECOND SEMESTER WITH EFFECT FROM 2019-20

MTIE 207 COMPUTATIONS LAB-2

Periods per week : 3
Sessionals : 50

Examination: 50
Credits : 1.5

COURSE OBJECTIVES:

1. To make the student competent enough for the usage of SPSS software which will provide certain statistical constants, which determine the nature of the process.
2. To make the student capable of formulating autoregressive equations.
3. To make the student capable of formulating dynamic regressive equations.
4. To make the student capable of formulating ARIMA (P, D, Q).

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)

LEARNING OUTCOMES:

1. The student is able to recognise the difference between static regression and dynamic regression.
2. The student is capable of predicting future forecast with existing data so that the error in forecast is likely to be minimum.

COURSE OUTCOMES:

1. The student will be capable of making certain conclusions by observing the values of statistical constants.
2. The student will be capable of formulating autoregressive equations.
3. The student will be capable of formulating dynamic-regressive equations.
4. The student will be capable of formulating ARIMA (P, D, Q).

**SECOND SEMESTER WITH EFFECT FROM
2019-20 MTIE 208 SEMINAR**

Periods per week : 3
Sessionals : 50

Examination: 50
Credits : 1

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

THIRD SEMESTER WITH EFFECT FROM 2019-20

A) MANAGEMENT INFORMATION SYSTEMS

Periods per week : 4

Examination : 70 ; Sessionals : 30

Examination (Theory): 3hrs.

Credits : 3

COURSE OBJECTIVES:

1. To make the student understand the global changes that lead to the formation of information systems in the world.
2. To make the student identify the key parameters of Top, middle, lower managements which are going to effect their efficiency.
3. To make the student identify the different types of information systems which are suitable to Top, middle, lower managements.
4. To make the student to understand the characteristics of different information systems and their inputs requirement and expected outputs.
5. To make the student understand the role of different optimisation techniques which are useful in the design of information systems.
6. To make the student understand the functions and operations of management information systems.
7. To make the student to be able to plan MIS long range plan for an organisation.
8. To make the student understand the concepts of data base, data dictionary, DBMS etc. so that he can be able to plan for a new organisation.
9. To make the student capable of evaluating the improvement in efficiency after implementation of information systems in the organisation.
10. To make the student know how to approach for a design of information system for an organisation.

SYLLABUS:

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.

LEARNING OUTCOMES:

1. The student is able to understand the need and necessity of information system for an organisation. He is in a position to offer scientific suggestions for establishment of information system.
2. The student is able to design and suggest different types of information systems for different levels of organisation.
3. The student is able to advise the infrastructural needs of information systems at different levels.
4. The student is able to monitor and measure the improvement in the efficiency of organisation after implementation of information system.

COURSE OUTCOMES:

1. The student is able to recognise the key intel parameters which lead to the formation of information systems in the organisation.
2. The student is able to identify the key parameters which are affecting efficiency of Top, middle, lower managements.
3. The student is able to suggest suitable information systems for the needs of Top, middle, lower managements.
4. The student is able to design suitable input, output forms of regarding the data to different information systems.
5. The student is able to recognise and be able to select different optimisation techniques that may be incorporated in the different information systems.
6. The student is able to design different functions and jobs that can be executed by a management information system.
7. The student is able to know about how a MIS long range plan will be planned so that he can attempt to plan for a new organisation.
8. The student is knowledgeable to understand the recorded data, methods of recording data and the functions of DBMS and its link to the information system in the organisation.
9. The student is able to generate what types of reports requires to evaluate the outcome of implementation of information system in organisation.
10. The student is able to initiate an action towards design of information system for an organisation.

THIRD SEMESTER WITH EFFECT FROM 2019-20

B) HUMAN FACTOR ENGINEERING

Periods per week : 4

Examination : 70 ; Sessionals : 30

Examination (Theory): 3hrs.

Credits : 3

COURSE OBJECTIVES:

1. To make the student understand about fundamentals of human factor engineering.
2. To make the student knowledgeable about symbols, codes, auditory, tactile and olfactory displays.
3. The student is made to learn different tools which measure human output and control.
4. The student must be made to learn about applied Anthropometry.
5. The student must be expert in design of workplace and arrangement of components.
6. The student must have complete knowledge on the illumination, Climate noise, and motion.
7. The student must be made fully knowledgeable in the area of human factor applications.

SYLLABUS:

Introduction to Human factors and systems.

Information Input: Information input and processing, Text, Graphics, Symbols, and Codes, Visual displays of dynamic information, Auditory, Tactile, 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 Wiley & 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 Helander, Taylor & Francis.

6. Human Factors in Product Design by William H. Cushman and Daniel J. Rosenberg, Elsevier.

LEARNING OUTCOMES:

1. With his knowledge in human factors engineering, the student will be able to arrange the possible tools in the place of work.
2. With his efficient measurement of human stress, strain he can effectively incorporate necessary changes to minimize the human effort.
3. With his knowledge in workplace design, he can assure more comfort to the worker.
4. With his knowledge in environmental conditions, he can convert the place more convenient with minimal human error and more safety to the worker.

COURSE OUTCOMES:

1. The student will become fully knowledgeable in the area of human factor engineering.
2. The student will be having complete grip over the knowledge relating to different types of information inputs in human factor engineering.
3. The student will be able to measure different types of human output and human control of systems.
4. The student will be expert in the work place design and its related areas.
5. The student will be expert in fixing the levels of illumination, noise and motion.
6. The student will be able to minimise human error accidents in the human factors applications.
7. The student will become expert in the area of safety in work place and will be able to decide human factors in systems design.

THIRD SEMESTER WITH EFFECT FROM 2019-20

MTIE 302 MATERIALS MANAGEMENT

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

Examination : 70 ; Sessionals : 30
Credits : 3

COURSE OBJECTIVES:

1. To make the student aware of fundamentals in the area of purchasing and materials management in the modern organisation.
2. To make the student learn about specialized purchase systems and the procedures adopted in suppliers selection.
3. To make the student understand the concept of capital equipment purchases and quality determination.
4. To make the student understand the concepts like standardisation, simplification, make or buy analysis. Negotiations, forward buying, Speculation buying, and Imports substitution.
5. To make the student understand legal aspects of purchasing insurance buying.
6. To make the student understand buyer seller relationship and implementation of IT tools in evaluating purchasing performance.
7. To make the student understand different types of inventory systems, deterministic single item models with static demand, and multiple items with constraints.
8. To make the student understand quality discounts and stochastic single period models.
9. To make the student understand the purpose of stores.
10. To make the student understand codification of materials, different types of storage systems.
11. To make the student understand how to deal with surplus materials.

SYLLABUS:

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

LEARNING OUTCOMES:

1. The student will be expert in the area of purchasing and material management.
2. The student will be expert in maintaining quality in the areas of capital equipment purchases
3. The student will be able de-market efficiently different types of inventory.
4. The student will be expert in the efficient management of stores.

COURSE OUTCOMES:

1. The student will become expert in different in different areas of purchasing and in material management.
2. The student will be able to decide perfectly the purchases of capital equipment and quality determination.
3. The student will become expert in the areas like standardisation, simplification, make or buy analysis. Negotiations, forward buying, Speculation buying, and Imports substitution.
4. The student will be able to address effectively the legal aspects of purchasing insurance buying.
5. The student can judge well the buyer-seller relationship and can incorporate IT tools in evaluating purchasing performance.

6. The student will become expert in different types of inventory systems.
7. The student can understand the need and necessity of stores and can effectively store the materials and retrieve them in short span.
8. The student will be able to deal efficiently with surplus 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