JSS SCIENCE AND TECHNOLOGY UNIVERSITY

Sri Jayachamarajendra College of Engineering, Mysore – 6.
Department of Mechanical Engineering

M.Tech. in Master of Engineering Management (MEM)

Curriculum

SEMESTER I											
Sl. No.	**Subject code**	**Course Name**	**Credits**				**Contact Hours**	**Marks**		**Total**	**Exam Duration**
			L	**T**	**P**	**Total**	**Per Week**	**CIE**	**SEE**		**in Hrs.**
1	**MEM 110**	Marketing Management	4	1	-	5	6	50	50	100	3
2	**MEM 120**	Quantitative techniques	4	1	-	5	6	50	50	100	3
3	**MEM 130**	Operations Management	4	1	-	5	6	50	50	100	3
4	**MEM 14X**	Elective – I	4	1	-	5	6	50	50	100	3
5	**MEM 15X**	Elective – II	4	1	-	5	6	50	50	100	3
6	**MEM 16L**	Data analytics Lab	-	-	1.5	1.5	3	50	-	50	-
7	**MEM 170**	General Seminar	-	-	-	1.5	3	50	-	50	-
TOTAL						**28.0**	**36**			**600**	

Elective – I	
MEM 141	Human Resources Management.
MEM 142	Total Quality Management.
MEM 143	Industrial Relations.
Elective – II	
MEM 151	Managerial Economics.
MEM 152	Computer Application in Management.
MEM 153	Knowledge Management.

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Curriculum

SEMESTER II											
Sl. No.	**Subject code**	**Course Name**	**Credits**				**Contact Hours**	**Marks**		**Total**	**Exam Duration**
			L	**T**	**P**	**Total**	**Per Week**	**CIE**	**SEE**		**in Hrs.**
1	**MEM 210**	Supply Chain Management	4	1	-	5	6	50	50	100	3
2	**MEM 220**	Project management	4	1	-	5	6	50	50	100	3
3	**MEM 230**	Organization Behavior	4	1	-	5	6	50	50	100	3
4	**MEM 24X**	Elective – I	4	1	-	5	6	50	50	100	3
5	**MEM 25X**	Elective – II	4	1	-	5	6	50	50	100	3
6	**MEM 26L**	Data synthesis lab	-	-	1.5	1.5	3	50	-	50	-
7	**MEM 270**	General Seminar	-	-	1.5	1.5	3	50	-	50	-
TOTAL						**28.0**	36			600	

Elective – I	
MEM 241	Industrial Marketing.
MEM 242	Advertising and Publicity.
MEM 243	Energy Management.
Elective – II	
MEM 251	Advanced Operations Research.
MEM 252	Maintenance Engineering and management.
MEM 253	Product Data Management.

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Department of Mechanical Engineering

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Scheme of Teaching and Examination

SEMESTER III											
Sl. No.	**Subject code**	**Course Name**	**Credits**				**Contact Hours Per Week**	**Marks**		**Total**	**Exam Duration in Hrs.**
			L	**T**	**P**	**Total**		**CIE**	**SEE**		
1	MEM 310	Industrial Training/ Internship	0	0	4	4	3	100	-	100	-
TOTAL CREDITS						**4**	**3**			100	

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Department of Mechanical Engineering

M.Tech. in Master of Engineering Management (MEM)

Scheme of Teaching and Examination

SEMESTER IV											
Sl. No.	**Subject code**	**Course Name**	**Credits**				**Contact Hours Per Week**	**Marks**		**Total**	**Exam Duration in Hrs.**
			L	**T**	**P**	**Total**		**CIE**	**SEE**		
1	ME M410	Project Work	0	0	40	40	3	100	200	300	3
TOTAL CREDITS						**40**	**3**			**300**	

MARKETING MANAGEMENT

Subject Code	**MEM110**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course objectives:

1. To provide students with a critical appreciation of marketing from both academic and practitioner perspectives of marketing fundamentals.
2. To describe, analyze and evaluate the role of consumers as purchasers and users of goods and services in Consumer Markets, Organizational Markets and Government Markets.
3. To identify, describe, analyze and evaluate market segments & targets during the various stages of the PLC along with the new product development.
4. To formulate pricing strategies for products and services and discuss the management of brands and packaging.
5. To describe,analyze and evaluate the integrated marketing communications plan which includes promotional strategies, the unique marketing mixes and selling propositions for specific product offerings.

Course Content

UNIT-1

INTRODUCTION TO MARKETING MANAGEMENT- Role of marketing in today's organizations – core concepts of marketing management: Orientation of businesses - the evolution of marketing management concept. Marketing Mix: The 4ps namely Product, Price, Place and promotion. Unique Selling Proposition. **MARKETING ENVIRONMENT**– actors in the company's Micro Environmental Factors.: Customers, competitors, public, suppliers, and Government agencies. Macro Environmental Factors: Demographic, Cultural, Social, Technological and political influences on the company's marketing performance .Changes in the company's marketing plan.

10 Hours

UNIT-2

CONSUMER MARKETS AND BUYING BEHAVIORS –A Model of consumer behaviour – Major factors influencing consumer behaviour; Social, cultural, Personal and Psychological factors. The buying decision process. The model of the buyer decision process. Types of buying behaviour **ORGANIZATIONAL MARKETS AND BUYING BEHAVIOR –**the industrial market – the reseller market – the government market. **INDUSTRIAL MARKETS –** Characteristics of Industrial markets, Model of Buyer Behaviour, Major types of Buying situations, Participants in the Business Buying Process. Major influences on Industrial Buyers, The Industrial buying process. Differences between Industrial Markets & consumer Markets with examples. **THE GOVERNMENT MARKET**- Characteristics of Government markets, Problems & prospects of operating in Government markets, Advantages &limitations of operating in the reseller market**.**

10 Hours

UNIT-3

MARKET SEGMENTATION – MARKET TARGETING – MARKET POSITIONING– the marketing plan. Stages in the Segmentation Process, Segmentation variables: Demographic, Geographical, Psychographic and behavioural variables evaluating market segments, Target marketing, Patterns of target market selection, Market coverage strategies. Market positioning: Definition, steps in market positioning, Competitive advantage through positioning strategies, choosing the right competitive advantage. **CONCEPT OF PRODUCT LIFE CYCLE**.- Different stages in the PLC, Different strategies in the stages of PLC. **NEW PRODUCT DEVELOPMENT PROCESS-** Definition, Types of New products, eight successive Stages in the new product development process. Reasons for new product failure.

10 Hours

UNIT-4

PRICING AND CHANNEL DECISIONS –The pricing objectives, methods and steps. Channel types, General pricing approaches, Price discounts, types of Price discounts, Major factors influencing pricing decisions. Channel Decisions: Types of channels, selection of appropriate channel for consumer goods. **PRODUCT BRANDING AND PACKAGING DECISIONS**- Branding decisions; Family brands, multi brand decisions, Brand extensions Nature and importance of brands, Characteristics of a good brand name, Branding strategies of producers and middlemen ,Building and using brand equity. Packaging & labelling decisions: Nature and importance of packaging and labelling, Packaging strategies.

10 Hours

UNIT-5

COMMUNICATION AND PROMOTION MIX DECISION-.Steps in developing effective communication. Objectives of promotional plan, six common promotional strategies. Above & below the line advertising, Promotional mix, promoting products through Advertising, Personal Selling, Publicity and Sales promotion. **Advertising**: Definition, Types of advertising, Characteristics, advantages and limitations of different media, **Sales promotion**: Objectives of sales promotion, types of sales promotion, Strategies of sales promotion: Push, pull and combination strategies, methods of sales promotion **Personal Selling:** Definition, steps in direct selling, advantages and limitations of direct selling. **Publicity:** Definition, Importance of publicity in promotion, advantages and limitations. Popular publicity campaigns in Indian Environment.

12 Hours

Text Books:

1. **Marketing Management: analysis, planning and control –** Philip Kotler & Kevin Lane Keller – PHI. 13th Edition.

Reference Books:

1. **Fundamentals of Marketing** – William J Stanton – John Wiley., 2000
2. **Marketing Management**-Global Perspective, Indian context, Ramaswamy and Namakumari, Macmillan India Ltd. 2014, 5th Edition

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Identify and describe the key marketing concepts, theories and techniques for analysing a variety of marketing situations and demonstrate the dynamic nature of the environment in which marketing decisions are made and implemented.
CO2	Describe, analyse and evaluate the role of consumers as purchasers and users of goods and services in Consumer Markets, Organizational Markets and Government Markets.
CO3	Identify, describe, analyse and evaluate market segments & targets during the various stages of the PLC along with the New product development process.
CO4	Formulate pricing strategies for products and services and discuss the management of brands and packaging.
CO5	Describe, analyse and evaluate integrated marketing communications plan which includes promotional strategies, the unique marketing mixes and selling propositions for specific product offerings.

QUANTITATIVE TECHNIQUES

Subject Code	**MEM120**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To apply knowledge of mathematics and statistics to the defined procedures, processes, systems and methodologies.
2. To identify and analyze broadly defined manufacturing and design problems and reach out to substantial solutions through mathematical and analytical tools.
3. To evaluate, validate and infer through standard codes and practices of specific problems and provide solutions.
4. To select and use appropriate statistical application packages to provide solutions with a comprehensive understanding of feasibility and limitations.
5. To analyze the findings of statistical solutions arrived at, using proper charts, tables and other presentation techniques.

Course Content

UNIT – 1

Introduction: Arranging data, frequency distributions, graphing frequency distributions. **Measures of Central tendency**: Definition, objectives, types and application of: Mean, median, mode. **Measures of Dispersion:** The idea of dispersion, the range, the quartile deviation, the mean deviation, the standard deviation, the coefficient of variation, Skewness and Kurtosis.

10 Hours

UNIT – 2

Probability: The concept, types of probabilities, Laws of probability, Probabilities under statistical independence and dependence, conditional probability and Baye's theorem. **Probability distributions:** Concept, Discrete and continuous probability distributions, Binomial, Poisson, Poisson as an approximation to binomial and Normal distributions.

10 Hours

UNIT –3

Sampling: Types of sampling, sampling distributions, **Estimation:** Point & interval estimates, Features of a good estimator, Confidence intervals for mean & proportion, sample size determination.

10 Hours

UNIT – 4

Testing of hypothesis: Hypothesis testing of mean and proportion, differences between means & proportions, Chi-square test for independence & goodness of fit -Analysis of variance.

10 Hours

UNIT - 5

Correlation and Regression: Introduction, Scatter diagram and types of correlation, Estimation using least square regression, Standard error of estimate and prediction intervals, Coefficient of determination, Correlation coefficient. **12 Hours**

Text Books:

1. Richard I. Levin, "Statistics for management", Prentice-Hall of India Private Limited, 1990.

Reference Books:

1. S.C. Gupta & V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand & sons publishers, 1987.
2. N. P. Bali, P. N. Gupta, C. P. Gandhi, "Quantitative Techniques", Firewall Media, 2007.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Apply knowledge of mathematics and statistics to the defined procedures, processes, systems and methodologies.
CO2	Identify and analyze broadly defined manufacturing and design problems and reach out to substantial solutions through mathematical and analytical tools.
CO3	Evaluate, validate and infer through standard codes and practices of specific problems and provide solutions.
CO4	Select and use appropriate statistical application packages to provide solutions with a comprehensive understanding of feasibility and limitations.
CO5	Analyze the findings of statistical solutions arrived at, using proper charts, tables and other presentation techniques.

OPERATIONS MANAGEMENT

Subject Code	**MEM130**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To analyze with an overall view of the decision-making process as it relates to the major areas of Production and Operations Management.
2. To discuss the evolution of principles of design facilities, processes, and control systems with a degree of predictability as to their performance.
3. To explain the principles of operations economies such as how to employ labor, buy materials and machines and invest capital, with regards to changing relative values of the basic components.
4. To evaluate computer projects, problems, cases, and discuss with competency in controlling the operations system that are designed to meet the products and services to meet quality standards, availability, and predict cost.
5. To solve operational problems such as scheduling, forecasting, inventory control, project management, MRP, etc. using software.

Course Content

UNIT – 1

Introduction to Operations Management: Historical development of OM. Discussion on goods and service Transformation process Types of Decision making process in OM Discussion on production function (Conversion Process) Types of production systems with examples. Introduction to demand forecasting, Factors affecting demand forecasting and types of demand. Types and characteristics of forecasting methods. Moving average method of forecasting with example Weighted average method with examples. Time series method with examples. Regression method. Exponential smoothening method with examples

10 Hours

UNIT –2

Introduction to plant location: Factors affecting plant location. Discussion of methods inplant location like factor rating method, load distance model and gravity model Problems related to plant location. **Introduction to plant layout**.: Discussion of types of product flow Types of layout Product layout Process layout Fixed position layout Line balancing Method adopted in line balancing Discussion on relationship diagram Discussion on factor to be considered in designing plant layout.

10 Hours

UNIT - 3

Product Development And Design: Introduction, purpose of product design, product analysis, framework of process design – Product Planning, Process Design : MACRO & MICRO, design for manufacture, Design for Excellence. Introduction to materials management, purchasing, stores management, Inventory control or management, standardization, simplification and value analysis, Ergonomics and Just in Time (JIT) manufacturing.

10 Hours

UNIT – 4

Introduction to Materials Planning: Discussion on procedures and benefits. Product tree structure and MRP. Introduction to Inventory management, material classification and codification, Problems on MRP. Aggregate planning and its strategies Discussion on pure strategies Aggregate planning as distribution model. Problems related to Aggregate planning.

10 Hours

UNIT – 5

Introduction to job scheduling: Discussion on Different types of scheduling Forward loading and backward loading Assumption made in job sequencing Problems on n _Jobs 2 Machine Problems on n _Jobs 3 Machine Problems on n-jobs m machine. Introduction to Supply chain management, steps involved in supply chain management, issues in supply chain management.

12 Hours

Text Books:

1. Production and Operations Management prentice-Hall of India Private Limited, 9th print 2004.
2. Theory and problems of Operations Management, Tata-Mcgraw hill publishing company limited, 2nd edition 2004, Joseph G Monks.

Reference Books:

1. Production Systems, Planning, Analysis and Control JAMES.L. RIGGS,
2. Operations Management, ROGER.G. SCHROEDER, Mc Grawhill, 2002.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Analyse with an overall view of the decision-making process as it relates to the major areas of Production and Operations Management.
CO2	Discuss the evolution of principles of design facilities, processes, and control systems with a degree of predictability as to their performance.
CO3	Explain the principles of operations economies such as how to employ labour, buy materials and machines and invest capital, with regards to changing relative values of the basic components.
CO4	Evaluate computer projects, problems, cases, and discuss with competency in controlling the operations system that are designed to meet the products and services to meet quality standards, availability, and predict cost.
CO5	Solve operational problems such as scheduling, forecasting, inventory control, project management, MRP, etc. using software.

HUMAN RESOURCES MANAGEMENT

Subject Code	**MEM141**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To discuss the importance of Human Resource Management (HRM) in organizations.
2. To discuss and analyse the need for scientific selection and training.
3. To design human systems for organizations.
4. To analyse the value human resource as an important source in any organization.
5. To create and manage a productive work force.

Course Content

UNIT - 1

Introduction to Human Resources: Importance of Human Resources -Human Resource Planning, Human resource planning at different levels, Process of HRP. Control and review mechanism, Job Analysis and Methods, Job Description, Job Specification. **Recruitment-Recruiting Sources**: Recruiting Efforts with possible constraint -ability to attract incumbents, Strategic management in recruitment, Sources of Recruitment, recruitment techniques.

10 Hours

UNIT – 2

The Selection Process: Cost of Selection -discrete Selection Procedure, Significance, Factors affecting selection decisions, Selection Process -The Comprehensive Approach -Key Elements in successful Predictors -selection Devices -Employment Tests and Interviews – Job Previews and Background Investigation -Socializing the New Employee**.** Cost benefit analysis of selection, Recent trends in selection, Placement and Induction.

10 Hours

UNIT – 3

Employee Training: Introduction and objectives, Stages in Training, Determination of Training Needs and Priorities -Forn1al Employee Training Methods -Methods, for Training Managers Evaluating Training Effectiveness, Special aspects of training. Career Development: Value of Effective Career Development -External versus Internal. Dimensions to career -Career Stages

10 Hours

UNIT – 4

Motivating the Employees: Types and steps in motivation, Different Theories and Approaches to work Motivation –Job Design. Work Scheduling and Motivation - Performance Appraisals –Rewarding the Productive-Employee. Leadership- theories, traits, leadership styles. Communication - Purpose, Importance, MIS and IT, Organizational communication and informal communication. Barriers to effective communication.

10 Hours

UNIT – 5

Compensating the Work Force: Compensation Administration -Factors influencing the Compensation Administration -job Evaluation and Pay structure -Incentive Compensation Plans -Benefits and Services. **Maintaining the Work Force:** Labor Relations -some Legislation governing Labor Relations -Safety and Health of Workers -Combating Stress and Burnout Problems - Employee Discipline -disciplinary Actions -collective Bargaining Process.

12 Hours

Text Books:

1. Human Resource Management – T.V.Subba Rao – Himalaya Publishing House.
2. Personnel and Human Resource Management –Memoria, HPH.

Reference Books:

1. Human Resources Management- Ashwathappa – Himalaya Publishers.
2. Principles of Personnel Management -Flippo –Mcgraw hill.
3. Personnel Principles and Policies for Modern Manpower –Yoder, PHI.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Appreciate and distinguish the professionalism in human resource management.
CO2	Analyze the needs and skill sets to be found in the human resource to perform well.
CO3	Demonstrate the capability to design a human resource system for any given Organization.
CO4	Locate the various sources for recruitment.
CO5	Define the productive workforce, and be able to manage it.

TOTAL QUALITY MANAGEMENT

Subject Code	**MEM142**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To provide the knowledge of TQM, Benefits of TQM, and Contribution of Gurus.
2. To learn characteristics of leaders and role of TQM leaderships. Continuous process improvement.
3. To selectively choose Tools & Techniques of TQM.
4. To learn how to select product acceptance control plan and characteristics of OC curves.
5. To learn how to check reliability and life of process.

Course Content

UNIT - 1

Over view of Total Quality Management: Introduction, Definition, Basic Approach, Contribution Of quality Gurus. Quality circle TQM frame work , Historical review, benefits of TQM, TQM organization . **Leadership:** characteristics of quality leaders, Demings Philosophy, role of TQM Leaders, continuous processes improvement, Juran's Triology. Quality costs, 6 sigma, Reengineering.

10 Hours

UNIT - 2

Tools and techniques of TQM: Basic tools of TQM, Bench marking, processes of bench marking, quality management systems .ISO-9000 series of standards, implementation and documentation of ISO_9000. Introduction to QFD and QFD process, TQM exemplary organisation, Design of Failure Mode and Effect analysis [FMEA], process of FMEA.

10 Hours

UNIT – 3

Statistical Process control (SPC): Seven basic tools of quality control, control charts for variables .construction and interpretation and analysis of control charts process capability indices, process improvement through problem analysis . (Intensive coverage with numerical problems) Control charts for attributes: construction ,interpretation and analysis of P-chart, np-chart, C-chart and U-chart, improvement through problem analysis .(Intensive coverage with numerical problems)

10 Hours

UNIT – 4

Product acceptance control: Design of single sampling, double sampling and multiple sampling plan analysis of the characteristics of the SSP, DSP and MSP . (Intensive coverage with numerical problems).**Operating characteristics curves (OC-Curves):** construction, characteristics of OC curves, Terms used in OC curves, LTPD, Outgoing quality Level, {OQL]) , LTPD.AOQ,AOQL etc., (Intensive coverage with numerical problems)

10 Hours

UNIT – 5

Reliability and Life Testing: Reliability and analysis of components, standard configurations systems like series, parallel redundancy and principles of design for reliability .reliability testing (Intensive coverage with numerical problems). **Experimental design :**one factor design, two factor design, orthogonal design, full factorial and fractional design .Taguchi philosophy of quality engineering, loss function, orthogonal array, sign to noise function, parameter design, tolerance design (Basic concepts and treatment only).

12 Hours

Text Books:

1. Total quality Management Dale H Berster field (et.al.) Pears education , Third edition Indian Reprint -2004
2. Statistical quality Control by Grant Leven worth (2000)

Reference Books:

1. Statistical quality control by Douglos C Mantego third edition Pearson Education -2006
2. A new American TQM for revolution in management: Shoji-shiba, Alan Graham and, David Walder Productivity press Oregon-1990
3. Organizational excellence through TQM H Lal, New Age Publishers

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Express basic approaches in TQM, will know the contribution of Quality gurus and able to explain the aspects of leadership qualities.
CO2	Understand the details of various tools in TQM and concepts of QFD and FMEA
CO3	Demonstrate their knowledge on Statistical process control tools, apply and interpret the same.
CO4	Explain the concepts of sampling plan and quantify their
CO5	Explain the concepts of reliability and life test, and will be able to solve simple numerical. The students will also be able to explain the basic concepts of design of experiments with special reference to Taguchi method.

INDUSTRIAL RELATIONS

Subject Code	**MEM143**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To recognize the different industrial relations systems in the changing marketing and Political scenario in India.
2. To distinguish the procedure concerning worker participation and participatory institutions and instruments of trade union representation.
3. To classify the authorized services and agencies for employment and to distinguish employee rights and obligations according to the scope of employment.
4. To defend employ rights before supervisory and control institutions and to analyze the field of labor relations in an interdisciplinary manner.
5. To synthesize proposals for legislative initiatives.

Course Content

UNIT – 1

Background of Industrial Relations – Definition, scope, objectives, factors affecting IR, participants of IR, importance of IR. Approaches to industrial relations, system of IR in India. – Historical perspective & post-independence period, Code of Discipline and historical initiatives for harmonious IR, Government policies relating to labour, ILO and its influence on Legal enactments in India. **Industrial Relations:** Concepts, Approaches and Organization -HRD in perspective -Special features of Industrial work -Importance of Industrial Relations - Basic facts about IR, Objectives of IR, Scope and Approaches to IR.

12 Hours

UNIT – 2

Characteristics of Industrial Labour: Social consumption of Industrial Labour - Emergence of tribal Labour -low level of literacy -heterogeneity of labour class - undifferentiated class character -high rate of absenteeism and turnover -Migratory character - causes of migration - Evil effects migration benefits of migration. **Trade Unionism** -Meaning and concept -characteristics of TU's -Functions of TU's- Principles regulating trade union functions -methods of achieving objectives - Types and structure of TU's -Trade Union Movement in India -Problems of TU's -Worker's Education and Training.

10 Hours

UNIT – 3

Anatomy of Industrial conflict -Industrial conflicts /disputes -definition and essentials of a disputes -causative factors of industrial conflict -Industrial factors -Management attitude towards labour -Government machinery' -other causes. Strikes -forms of strike -Lockouts - Legal and illegal strike -Right to strike -Prevention of strikes. Industrial conflict – perspectives, Nature of conflicts and its manifestations causes and types of Industrial conflicts, prevention of Industrial conflicts, industrial disputes act of 1947, settlement Machinery of Industrial disputes. Paradigm shift from industrial relations to employee relations – shift in focus, difference, employee relations management at work, culture and employee relations, future of employee relations.

10 Hours

UNIT – 4

Preventive measures for Industrial Disputes: Labour Welfare Officer Labour Welfare Work -Importance and need -Qualification -Functions and duties -Basic features of Labour welfare work -need- Aims- Approaches- Scope. Tripartite and Bipartite bodies -Standing orders and Grievance procedure -Ethical codes and IR -Wage policy and Wage Regulation Machinery - Workers Participation in Management -collective Bargaining -conciliation – agreement – arbitration – adjudication. Principles of Hot stove rule.

10 Hours

UNIT – 5

Labor Legislations: Trade Union Act -the Industrial Employment or Standing Orders Act - the Industrial Disputes Act -payment of Wages Act- Minimum Wages Act -Maternity Benefit Act -Factories Act –Definitions and salient features.

10 Hours

Text Books:

1. Industrial Relations and Labour Laws by S C Srivastava, Vikas Publishing House; Sixth edition (2012)

Reference Books:

1. Industrial Relations by Venkataratnam, Oxford (2 March 2006)
2. A textbook of industrial relations management - George F. Thomason, Institute of Personnel Management, 1984

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Recognize and describe the different industrial relations systems in the changing marketing and Political scenario in India.
CO2	Distinguish and apply the procedure concerning worker participation and participatory institutions and instruments of trade union representation
CO3	Classify and analyze the authorized services and agencies for employment and to distinguish employee rights and obligations according to the scope of employment.
CO4	Recognize and evaluate employ rights before supervisory and control institutions and to analyse the field of labour relations in an interdisciplinary manner.
CO5	Synthesize proposals for legislative initiatives.

MANAGERIAL ECONOMICS

Subject Code	**MEM151**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To learn and understand the concept of Demand estimation and forecasting in Industry.
2. To understand the concepts related to Production functions, and determine optimal combination of inputs and learn empirical production functions and cost functions.
3. To understand the important features of various market structures, and explain pricing and output determination in the short run and the long run and evaluate.
4. To understand the importance of various types of pricing and to compute NPV and IRR.
5. To understand the concepts of Economic growth, development and planning, economic aggregates and their relationships.

Course Content

UNIT 1

Demand Analysis: Demand Theory, Preference and Choice, Empirical demand curves, Demand estimation and forecasting, Goods-characteristic approach.

10 hours

UNIT 2

Production and Cost: Production theory and estimation, Production function, Production function with one and two variable input, Optimal combination of inputs, Returns to scale, Empirical production functions, Cost concepts, Cost functions, Empirical cost functions.

10 hours

UNIT 3

Market structures: (i) Perfect competition: Meaning, Characteristics and Importance, Price and Output determination in the short run and long run, Derived demand for inputs, Short comings. (ii) monopoly: Meaning and characteristics, Importance, Short run and long run analysis, evaluation. (iii) Monopolistic competition: meaning, characteristics and importance, short run and long run analysis. (iv) Oligopoly: Meaning, characteristics and importance, Non collusive oligopoly and kinked demand curve, collusive oligopoly, Efficiency implications.

12 hours

UNIT 4

Pricing and Practice: Cost plus pricing, Evaluation, Incremental analysis in pricing. **Capital budgeting:** Meaning and importance, projecting cash flows, NPV and IRR.

10 hours

UNIT 5

Economic growth: Economic aggregates and their relationships. Economic growth, development and planning, capital budgeting: Meaning and importance, cash flows.

10 hours

Text Books:

1. DOMINIC SALVATORE, Managerial economics**,** Mcgraw hill Book Co.
2. CAMPBELL R Mc. CONNELL, Economics: Principles, Problems and Policies, Mc graw hill Book Co.

Reference Books:

1. DOMINIC SALVATORE, Theory and Problems of Microeconomic theory, Mcgraw hill Book Co.
2. JOEL DEANS, managerial economics, Prentice hall India Ltd.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Explain the concept of Demand, Empirical demand curves, methods of demand estimation and forecasting and Goods characteristics approach.
CO2	Explain the concepts of Production theory, Production functions, Determine optimal combination of inputs, explain returns to scale, Cost functions, Empirical production functions and cost functions.
CO3	Explain the Meaning, characteristics, and importance of various market structures, explain pricing and output determination in the short run and the long run and evaluate.
CO4	Explain cost plus pricing, evaluate, explain incremental analysis in pricing, explain the meaning and importance of capital budgeting, principles of cash flow projections, Compute NPV and IRR and evaluate.
CO5	Explain the concepts of Economic growth, development and planning, explain economic aggregates and their relationships.

COMPUTER APPLICATIONS IN MANAGEMENT

Subject Code	**MEM152**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To understand the importance of computer hardware and software in Engineering management applications.
2. To understand the need and importance of general and real time Operating systems
3. To learn and develop various modules applicable to engineering management using MS Office tools.
4. To learn and develop various modules applicable to engineering management using Excel sheets.
5. To learn and prepare presentation materials for professional communication using power point tools and essentials of internet.

Course Content

UNIT – 1

Overview of computers – History & Generation of Computer (From First to 5th) – Applications of Computer – Advantages of Computer – Terms related to Computer – Characteristics of Computer: Speed, Storage, Versatility and Diligence – Hardware & Software. Block Diagram and Working Principle of Computer – Types of Computer: On the Basis of Working – Analog, Digital & Hybrid, On the Basis of Size – Main frame, Mini Computer, Super Computer, Work station, Micro Computer, Desktop Computer, Laptop Computer, Palmtop Computer; On the basis of Processor – XT, AT & Pentium(i3, i5, i7);Memory: Units, Representation, Types – Primary memory: RAM, ROM, PROM, EPROM, EEPROM, DDR Secondary memory: Hard disk, CD, DVD, Blue ray Disc, Pen Drive Magnetic tape & Zip disk – CPU: Components of CPU – Mother board, Hard disk, RAM, ROM, Processor, SMPS & Connecting wire – Graphics Card, Sound Card, Network Card – Modem; Input, Output devices: Keyboard, Mouse, Scanner, Digital Camera, Joystick, Pen drive, Monitor, Printer, Plotter – Connecting port – Serial, parallel – USB port.

12 Hours

UNIT - 2

OPERATING SYSTEMS: Windows: Definition of Operating System – Functions of OS – Types of OS: Single user, Multi-User, multi-task, RTOS, Single-user, Multi-tasking – Windows Desk top – GUI: Definition, Standards, Cursors/Pointers, Icons, GUI Menus, GUI-Share Data – Desktop icons and their functions: My computer, My documents, Network neighborhood, Recycle Bin, Quick launch tool bar, System tray, Start menu, Task bar – Dialog Boxes: List Box, Spin Control Box, Slide, Drop-down list, Radio button, Check box, Text box, Task Bar – System Tray – Quick launch tool bar – Start button – Parts of Windows -Title bar-Menu bar – Scroll bar- Status bar, Maximize, Minimize, close and Resize & Moving a Window – Windows – Start Menu –Help Menu- Preview Menu; Logoff & Shutdown – Keyboard Accelerators: Key board short keys or hotkeys – Working with Notepad and Wordpad: Opening & Saving files, Formatting, Printing, Inserting objects, Finding & replacing text, Creating & Editing Images with Microsoft paint, using the Calculator – Personalizing Windows. Computer on Office Automation.

10 Hours

UNIT - 3

Introduction to MS Office - MS Word – Working with Documents -Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help, Formatting Documents – Setting Font styles, Font selection- style, size, colour etc., Type face – Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering. Setting Page style – Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes – Shortcut Keys;
Inserting manual page break, Column break and line break, Creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page. Creating Tables- Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula, Drawing – Inserting Clip Arts, Pictures/Files etc., Tools – Word Completion, Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature. Printing Documents – Shortcut keys.

10 Hours

UNIT – 4

Introduction to MS Office – MS Excel–: MS Excel: Spread Sheet & its Applications, Opening Spreadsheet, Menus – main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types. Working with Spreadsheets- opening, Saving files, setting Margins, Converting files to different formats (importing, exporting, sending files to others), Spread sheet addressing – Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys. Entering & Deleting Data- Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & replace, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks, Setting Formula – finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), Using other Formulae. Formatting Spreadsheets- Labelling columns & rows, Formatting- Cell, row, column & Sheet, Category – Alignment, Font, Border & Shading, Hiding/ Locking Cells, Anchoring objects, Formatting layout for Graphics, Clipart etc., Worksheet Row & Column Headers, Sheet Name, Row height & Column width, Visibility – Row, Column, Sheet, Security, Sheet Formatting & style, Sheet background, Colour etc., Borders & Shading – Shortcut keys. Working with sheets – Sorting, Filtering, Validation, Consolidation, and Subtotal. Creating Charts – Drawing. Printing. Using Tools – Error checking, Spell Checks, Formula Auditing, Creating & Using Templates, Pivot Tables, Tracking Changes, Security, Customization. Open Office-Calc – Introduction – Introduction to Spreadsheets, Overview of a Worksheet, Creating Worksheet & Workbooks, Organizing files, Managing files & workbooks, Functions & Formulas, Working with Multiple sheets, Creating Charts & Printing Charts – Operating with MS Excel documents, which are already created and saved in MS Excel.

10 Hours

UNIT – 5

Introduction to MS Office – MS Power point -PowerPoint Presentations: Getting started in PowerPoint, Creating a presentation, Creating & editing slides, previewing a slide show, Adding picture & graph, Adding sound & video, Adding auto shape, Animating objects. **Computer Networks**: Introduction to Internet Intranet tools: E-mail: Anatomy of e-mail, e-mail address, finding e-mail address, adding signature, attaching files, opening attachments, managing e-mail account, Web mail, and Case study: Yahoo Mail, Outlook express. FTP, ftp commands, ftp software, Telnet, using telnet, Web pages, HTML, basics of HTML, computer virus and antivirus software, Voice and Video chat, web browsers etc. E-governance (introduction): E-government, need of e-governance, e-assistance, e-democracy, e-administration, citizen services, e-procurement, Mobile government, Software and Hardware required for E-governance Implementation, E-governance in a Small Office, and Web Portal for E-governance.

10 Hours

Text Book:

1. Computer Applications for Management Decisions – R. Rajagopalan -TMG

Reference Books:

1. Computer Basics with Office Automation -Archana Kumar
2. Computers for beginners – V. K. Jain
3. Microsoft Office for Dummies – Roger Parker
4. Managerial Communication – Paul R Timm
5. Business Communication – Zane Quible, Margaret Johson and Dennis Mott.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Understand the importance of computer hardware and software in Engineering management applications.
CO2	Understand the need and importance of general and real time Operating systems.
CO3	Learn and develop various modules applicable to engineering management using MS Office tools.
CO4	Learn and develop various modules applicable to engineering management using Excel sheets.
CO5	Learn and prepare presentation materials for professional communication using power point tools and essentials of internet.

KNOWLEDGE MANAGEMENT

Subject Code	**MEM153**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To discuss the history, state-of-the-art and future of Knowledge Management System applications.
2. To evaluate the importance of Knowledge Management in the management of engineering systems in organizations.
3. To apply Knowledge Management Systems to facilitate individual and group work for corporate business management.
4. To develop a thorough review of Knowledge Management applications both traditional and modern.
5. To discuss about the physical components needed for the development of Knowledge information system and adopt to organize files and databases in business management.

Course Content

UNIT- 1

Knowledge Management: -KM Myths–KM Life Cycle–Understanding Knowledge– Knowledge, intelligence –Experience – Common Sense – Cognition and KM – Types of Knowledge – Expert Knowledge – Human Thinking and Learning, Knowledge society-from data to information to knowledge- Drivers of knowledge management Intellectual capital-KM and learning organizations- case studies. Strategic alignment- creating awareness-articulation- Evaluation and strategic alignment Infrastructural development and deployment-Leadership, measurement and refinement- Role of CKO.

12 Hours

UNIT- 2

Knowledge Management System Life Cycle: - Challenges in Building KM Systems– Conventional Versus KM System Life Cycle (KMSLS), Knowledge Creation and Knowledge Architecture – Nonaka's Model of Knowledge Creation and Transformation. Knowledge Architecture Analyzing business environment-knowledge audit and analysis – designing KM team – creating KM system blue print- implementation- capture –store and sharing, Technology components –Internet, Intranet and Groupware solutions- tools for collaborative intelligence package choices, implementing security.

10 Hours

UNIT- 3

Capturing Knowledge: Evaluating the Expert–Developing a Relationship with Experts– Fuzzy Reasoning and the Quality of Knowledge – Knowledge Capturing Techniques, Brain Storming – Protocol - Analysis – Consensus Decision Making – Repertory Grid-Concept Mapping –Definition – Computer based user machine system – Integrated system – Need for a database – Utilization of models – Evolution – Subsystems – Organizational subsystems – Activities subsystems.

10 Hours

UNIT- 4

Knowledge Codification: - Modes of Knowledge Conversion–Codification Tools and Procedures – Knowledge, Developer's Skill Sets – System Testing and Deployment – Knowledge Testing–Approaches to Logical Testing, User Acceptance Testing – KM System Deployment Issues – User Training – Post implementation, Operating elements – Physical components – Processing functions – Outputs – MIS support for decision making – Structured programmable decisions – Unstructured non-programmable decisions – MIS structure based on management activity and Organizational functions – Synthesis of MIS structure.

10 Hours

UNIT- 5

Knowledge Transfer And Sharing: -Transfer Methods–Role of the Internet–Knowledge Transfer in e-world, KM System Tools – Neural Network– Association Rules – Classification Trees – Data mining and Business Intelligence – Decision Making Architecture – Data Management – Knowledge Management Protocols – Managing Knowledge Workers. Data Presentation – Communication Network – Distributed systems – Logical data concepts – Physical storage devices – File organizations – Database organization – Transaction processing.

10 Hours

Text Books:

1. Knowledge Management - Elias. M. Award & Hassan M. Ghaziri –Pearson Education-2003.
2. The essential guide to knowledge management, -Amrit Tiwana,' Pearson education-2001.
3. Knowledge Management – Sudhir Warier, Vikas Publishing House, ISBN:81-259-1363-7. 1st Edition, Sept 2008.

Reference Books:

1. Hand book on knowledge Management – C W Holsapple, Springer, 2003 Porter M Competitive Advantage, Free Press, 1985.
2. Knowledge Engineering and Management - Gus Schreiber, Hans Akkermans, Anjo Anje wierden, Robert de Hoog, Nigel, Shadbolt, Walter Van de Velde and Bob Wielinga, Universities Press, 2001.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Learn about the importance of knowledge management with a specific emphasis on application in business organizations.
CO2	Classify and Comprehend difference of the conventional and modern methods of management of knowledge.
CO3	Understand and analyse capturing and coding of knowledge management using system tools and packages.
CO4	Study and evaluate various knowledge transfer and sharing platforms using system platforms with a special focus on security and networking.
CO5	Conceive, design and develop knowledge management systems applicable to business house in tune with the management information system developed in the organization.

DATA ANALYTICS LAB

Subject Code	MEM16L	No. of Credits	0 - 0 – 1.5
No. of Lecture Hours / Week	3	Exam Hours	--
Total No. of Contact Hours	42	Exam Marks	--

Course Objectives:

1. To explain the SPSS environment, data analysis using numerical, analytical and software.
2. To apply the above mentioned knowledge in handling the data, descriptive statistics, Summary statistics: Mean, median, mode, Variance, standard deviation, standard error of mean, and create OLAP, plots, tables, analyze results, make inferences.

Course Content

Introduction to SPSS environment, Stages of data analysis, Error checking and verification, Describing data: Numerical and graphical, Bar charts and pie charts, Control variables and degree categories, Histograms, Stem and leaf graphs, Checking the reliability and validity of the data, Screening and cleaning the data, Manipulating, transforming, editing and coding the data, Tables and graphs for one variable and two variables, Descriptive statistics for one variable and two variables, Summary statistics: Mean, median, mode, Variance, standard deviation, standard error of mean, Creating OLAP, Box plots, Cross tabulation tables, Normal distribution.

42 Hours

Reference Books:

1. Harper W. Boyd, Ralph Westfall and Stanley F. Stasch (1986), "Marketing Research, Text & cases", V Kumar, Arya publishers, Delhi, India.
2. Richard I Levin (1990), "Statistics for Management", Prentice Hall of India Pvt. Ltd.
3. SPSS (Statistical Package for Social Sciences) manual (1990), SPSS Inc.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Explain the SPSS environment, data analysis using numerical, analytical and software.
CO2	Apply the above mentioned knowledge in handling the data, descriptive statistics, summary statistics: Mean, median, mode, Variance, standard deviation, standard error of mean, and create OLAP, plots, tables, analyze results, make inferences.

SUPPLY CHAIN MANAGEMENT

Subject Code	**MEM210**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To describe and identify the importance of Supply Chain Management as a support function.
2. To design effectively the supply chain to meet a given objective.
3. To analyse effectively skill sets in assessing the inventory levels.
4. To analyse and identify the need to right transportation combination in order to meet the Supply Chain Management objectives.
5. To discuss the role if IT and integrate the same with the activities of Supply Chain Management.

Course Content

UNIT – 1

Building a Strategic Frame Work to Analyse Supply Chains: Supply Chain Definition,Supply Chain Stages, Decision Phases in A Supply Chain, Process views, some examples of Supply Chains, Competitive and Supply Chain Strategies, Achieving Strategic Fit, Drivers of Supply Chain Performance, Framework for Structuring Drivers-Inventory, Transportation, Facilities and Information.

12 Hours

UNIT – 2

Designing the Supply Chain Network: Role of Distribution in Supply Chain, Design of Distribution Network, Factors Influencing Distribution, Network Design, Frame work for Network Design Decisions. **Facility Location and Network Design:** Facility Location, Capacity Allocation, Impact of Uncertainty on SCN, Discounted Cash Flow Analysis, Evaluating Network Design Decisions Using Decision Trees. (No Numerical Problems).

10 Hours

UNIT – 3

Planning and Managing Inventories in a Supply Chain: Cycle Inventory, Managing Multi-Echelon Cycle Inventory, Safety Inventory-Definition and Role, Supply Uncertainty-Impact on Safety Inventory, Replenishment Policies (Theoretical), Optimal Level of Product Availability, Managerial Levers to Improve Supply Chain Profitability. **Sourcing**: Role of Sourcing, Supplier–Scoring and Assessment, Selection and Contracts, Design Collaboration.

10 Hours

UNIT – 4

Transportation and Pricing Products: Role of Transportation in Supply Chain, Modes of Transportation and Their Characteristics, Designing Transport Network, Trade Off in Transport Design, Tailored Transportation, Role of Revenue Management in Supply Chain, Revenue Management for: Multiple Customer segments, Perishable Assets, Seasonal Demand, Bulk and Spot Contracts. (Numerical Problems). **Coordination:** Coordination in Supply Chain, Bullwhip Effect, Obstacles to Coordination, Managerial Levers to Achieve Coordination, Building Strategic Partnerships.

10 Hours

UNIT – 5

Role of IT and Emerging Concepts: Role of IT in Supply Chain, Supply Chain IT Frame Work, CRM, Internal SCM, SRM, E-Business: Role and Frame work, Emerging Concepts: Reverse Logistics, RFID Systems, Lean Supply Chains, Implementation of Six Sigma in Supply Chain.

10 Hours

Text Books:

1. Supply Chain Management-2001, Strategy, Planning and Operation. Sunil Chopra and Peter Meindl; Pearson Education Asia, ISBN: 81-7808-272-1.

Reference Books:

1. Supply Chain Redesign-Transforming Supply Chains into Integrated Value Systems, Robert
   B Handfield, Ernest L Nichols, Jr.2002, Pearson Education Inc, ISBN: 81-297- 0113-8.
2. Modelling the Supply Chain-Jeremy F Shapiro, Duxbury 2002, Thomson Learning, ISBN 0-534-37363.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Describe and identify the importance of Supply Chain Management as a support function.
CO2	Design effectively the supply chain to meet a given objective.
CO3	Analyze effectively skill sets in assessing the inventory levels.
CO4	Analyze and identify the need to right transportation combination in order to meet the Supply Chain Management objectives.
CO5	Discuss the role if IT and integrate the same with the activities of Supply Chain Management.

PROJECT MANAGEMENT

Subject Code	**MEM220**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To explain role, Project Cycle, importance of Project Management, project appraisal, planning and determine the feasibility of the project prior to implementation.
2. To describe the phases of project cycle and various types of feasibilities that a project should be appraised for.
3. To describe Project Management, compare costs and benefits, explain concepts of Time Value of Money and Resources.
4. To describe the importance of Project Management of compounding and discounting in order to compare the present worth in alternative projects.
5. To describe and analyze various techniques in the Critical Path Method, PERT and explain the importance of human factors in project management.

Course Content

UNIT – 1

Introduction: Capital investments, types of capital investments, Phases of capital budgeting, objectives of capital budgeting, common weakness in capital budgeting. **Generation and screening of project ideas:** Tools to identify investment opportunities, scouting for project ideas project rating index.

10 Hours

UNIT – 2

Market and demand analysis, technical analysis, cost of project means of finance, cost of production, working capital requirement and its analysis. Time value for money, investment criteria- NPV, IPR, Benefit Cost Ratio, Payback period, Project cash flow. Balance sheet and Budgetary control.

10 Hours

UNIT - 3

Risk analysis: Sources measures and perspectives of Risk, discussion on different methods of Risk analysis, like sensitivity analysis, scenario analysis, break-even analysis and decision tree analysis. **Social Cost Benefit Analysis:** rationale for SCABA, UNIDO approach, Little-Mirrles's approach, shadow pricing, public sectors investment decision in India.

10 Hours

UNIT – 4

Project organizations: Types of project organizations structure for project management, Human aspects in project Management. **Networks Techniques in Project Management**: Development of project network, time estimation, determination of critical path. PERT Model and CPM model. Network cost system.

12 Hours

UNIT – 5

Project review and administrative aspects, control of in-process projects, post completion audit Atonement Analysis. Discussion of case studies in project management.

10 Hours

Text Books:

1. Projects - Appraisal, Preparation, Budgeting and Implementation – Prasanna Chandra - Tata Mcgraw Hill.

Reference Books:

1. Hand book of project management -Dennis lock
2. Project management-Dennis lock.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Explain the role of project management, Project Cycle and importance of Project Management of the project appraisal, planning and determine the feasibility of the project prior to implementation.
CO2	Describe the phases of the project cycle and various types of feasibilities that a project should be appraised for.
CO3	Describe Project Management of being able to compare costs and benefits, explain the concepts of Time Value of Money and Resources.
CO4	Describe the importance of Project Management of compounding and discounting in order to compare present worth in alternative projects.
CO5	Describe various techniques in Critical Path Method and when each should be used. Prepare the lists of activities, Gantt or Bar Charts, Precedence Diagrams, Arrow Diagrams and PERT, critical function of time estimate and explain the importance of human factors in project management.

ORGANIZATIONAL BEHAVIOR

Subject Code	**MEM230**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course objectives:

1. To explain theories of Psychology, research at individual, group and organizational levels.
2. To describe organizational behaviour and management practices by examining psychological principles.
3. To evaluate critically the organizational practices, their impact on work behaviours, attitudes and performance.
4. To describe the group and individual dynamics in organizations.
5. To identify the organizational culture and describe the methods of resolving conflicts through effective communication techniques in a political and power cantered organizational climate,.

Course Content

UNIT-1

The Foundations of Organization Behaviour- The Foundations of Organization Behavior-Historical Background, Research Methodology, Theoretical Frameworks. OB in global context. Role of Technology in OB. INDIVIDUAL BEHAVIOR-ABILITY-Definition, Types of abilities-Physical Abilities and Intellectual Abilities, Ability job fit. INDIVIDUAL BEHAVIOR- PERCEPTION: Introduction- Perceptual process model, Factors influencing Perception, Attribution theory, Kelly's model of attribution, Stages of the perceptual process, Perceptual biases and errors, Perception and individual decision making.

10Hours

UNIT-2

INDIVIDUAL BEHAVIOR– PERSONALITY-Definition, Determinants of personality, personality traits, Big Five model, 4 type thesis, personality disorders. Personality attributes in influencing OB.INDIVIDUAL BEHAVIOR-LEARNING–Definition, theories of Learning-Classical conditioning, operant conditioning and social learning. Reinforcement and schedules of reinforcement. Positive reinforcement and Negative reinforcement, Behaviour modifications and shaping behaviour through learning. Learning attributes in influencing OB.

10 Hours

UNIT-3

INDIVIDUAL BEHAVIOR–MOTIVATION-Definition, Early theories of Motivation, contemporary theories, Implications of the theories for the managers. INDIVIDUAL BEHAVIOR ATTITUDE, VALUES AND JOB SATISFACTION: Definition, formation of attitude, theories of attitude, effect of job satisfaction on employee performance, Measuring job satisfaction, Impact of satisfied and dissatisfied employees. Values: Types of values, Importance of values, loyalty and ethical behaviour. Motivational and attitudinal attributes in influencing OB.

12 Hours

UNIT-4

FOUNDATIONS OF GROUP BEHAVIOR- Groups and types of groups, Stages in group development. Performance and group size. Cohesive groups- advantages and disadvantages. Strengths and weaknesses of group decision making. Group structure-differences in group status, size and social loafing, Group decision making; Group decision making techniques. Group dynamics. Leadership Styles and Skills: Leadership and management, Types of trait theories; advantages and limitations, Types of Behavioural theories: advantages and limitations. Communication and Skills and Inter-group behaviour.

10 Hours

UNIT-5

ORGANIZATION CULTURE- organizational Change -Organizational Development, Organizational Climate-Work stress. Realities of Organizational Life- Politics, Power & Conflict. Politics: Definition, Factors contributing to political behaviour, Organizational politics and impression Management. Power: Definition, Bases of power, Dependency, Power tactics, Power in groups: coalitions. Conflict: Definition, Transitions in conflict thought, the conflict process, Incompatibility, cognition and personalization, bargaining strategies in conflict resolution, the negotiation process.

10 Hours

Text Books:

1. Organizational Behavior- Stephen P. Robbins -Prentice Hall India.

Reference Books:

1. Organizational Behavior- Fred Luthans -Mcgraw Hill.
2. Human Behavior at work -Keith Davis -Prentice Hall India.
3. Organizational psychology -Robin, Kolb, etc.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Explain the evolution of Organizational behaviour along with the key variables of it.
CO2	Describe the importance of ability, personality and learning as key variables in determining Individual behaviour.
CO3	Outline, Analyse, Compare and contrast various theories of motivation, attitude and Perception in shaping Individual behaviour.
CO4	Identify, describe & analyse the team dynamics in organizations with respect to group behaviour.
CO5	Evaluate the organizational change, development and climate.

INDUSTRIAL MARKETING

Subject Code	**MEM241**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To provide students with appreciation of Industrial marketing from both academic and professional perspectives.
2. To describe and analyze the role of consumers in purchases of industrial goods and services in institutional and Government Markets.
3. To identify, describe, analyze and evaluate the channel and price components of industrial markets.
4. To describe, analyze and evaluate the effectiveness of advertising, sales promotion and personal selling.
5. To formulate and analyze goal based sales budgets using quantitative methods.

Course Content

UNIT-1

INTRODUCTION: The Industrial Marketing system: Participant, Channels, contracts of sale, Franchise agreements Loyalty, confidence and reciprocity. Market as a business philosophy. The functional dimension: Mission definition, the organizational dimension, Structural integration. Customer based organization structure. **Demand and product characteristics:** Market levels and product type: Major equipment, Minor or accessory equipment, Fabricating of components and parts. Process materials. Derived Demand; Influence of ultimate buyer, business conditions, financial conditions, Influence of price.

12 Hours

UNIT- 2

Industrial Customer: Buyer Motives: The core variables, Quality, Service, Price, Savings assurance of supply. Buyer temperament, Buyer characteristics: Customer types. **Buyer Population, Size and distribution. Geographical concentration Types of purchasing organizations. Business and Institutional Buyers, Governmental buyers. Marketing Strategy:** The concept of strategy Mission Strategy, Operating, plans, Organizational Plan and logistical plans; choice of strategy components. Recognition of need and documentation, Invoice handling, Receipt and Inspection. Vendor analysis and rating vendor performance.

10 Hours

UNIT -3

The Channel & Price component: The Channel component: Industrial Distributors, Geographical distributions; Size, Characteristics. Condition influencing channel structure, Intensive versus selective strategy. **The Price Component:** Condition affecting price: Condition affecting price: Competition, firm size product type, Direct and Indirect Costs. The nature of demand. Pricing decisions, New Markets versus established markets pricing policies; Net pricing; Discount pricing, trades discount, Quantity discounts & cash discounts. Legal considerations & pricing methods.

10 Hours

UNIT-4

The Promotional Component: Advertising functions, Identifying new customers, motivating distributor's sales & message formulation, media budgetary support, use of advertising agencies. Measuring advertising effectiveness. Exhibition scheduling and planning, Catalog preparation & distribution Sales promotion & public relations: promotional letters and novelties, personal selling & selling support. Personal selling: Sources of candidates, Task assignment and selling support Compensation, Commission and Bonuses.

10 Hours

UNIT -5

Marketing Control: Strategic goals. Identifying market opportunity. Projecting industry sales, Goals based on sales, Short-term goals, expense based goals. Goal definition Market share, higher degree polynomials, asymptotic curves, weighted moving average, adjusting projections. The market and sales budget. The expense budget. Budgetary Control, Steps in Budgeting and budgetary control, the process of control. Comparing standards and performance. Measuring deviations, Corrective action.

10 Hours

Text Books:

1. Industrial Marketing: Richard M. Hill and Ralph.S Alexander, Richard. D, Irwin incorporation, 1986

Reference Books:

1. Industrial Marketing: Text and Cases by Krishna K. Havaldar , Tata McGraw-Hill Education, 2005

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Demonstrate and appreciate Industrial marketing from both academic and professional perspectives.
CO2	Describe and analyze the role of consumers in purchases of industrial goods and services in institutional and Government Markets.
CO3	Identify, describe, analyze and evaluate the channel and price components of industrial markets
CO4	Describe, analyze and evaluate the effectiveness of advertising, sales promotion and personal selling.
CO5	Formulate and analyze goal based sales budgets using quantitative methods.

ADVERTISING AND PUBLICITY

Subject Code	**MEM242**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To discuss history, importance of advertising, publicity for information and business.
2. To classify and differentiate between advertising and publicity.
3. To describe how advertisement messages are planned, created and executed by paying importance to branding and product promotion.
4. To critically analyze how the advertising agency functions from the concept of execution of advertisements.
5. To evaluate the scope of advertising research in the promotion of messages, strategies of digital media in effective, professional communication, messages of advertising and publicity campaigns.

Course Content

UNIT- 1

Advertising: Introduction, " Concept, Nature, Definitions, Evolution and History " Role, Objectives, Functions, and Significance "Basic Theories and Applications" Types and Classification of Advertising, Factors Determining Advertising Opportunity of a Product/Service/Idea, Types of Appeals and Advertising Messages, Advertising and Society Ethical Issues in Advertising Social Criticism of Advertising Laws in Advertising, Advertising Statutory Bodies in India, Role of AAA and ASCI, Study of Various Codes of Conduct.

10 Hours

UNIT- 2

Digital Advertising: " Defining Digital Advertising: Evolution and Current Status " Digital Media Landscape " E-mailers and Search Engine Optimization Mobile Marketing and Augmented Reality Emerging Trends " Digital Advertising Agencies – Structure and Functions " How mainstream advertising agencies are going Digital and Integration today " Digital Media Integration across Advertising, Market Research, Activation etc. Advent of Hybrid Advertising (Online merging with Offline) "Digital Laws –IT Act/ TRAI" Various **Case Studies:** Successful and Disasters Brand Presence on Social Media. Copy in advertising, types of copy, requirements of a good copy, features and importance of layout, type of layout, design for various messages, art work and importance of visuals in advertising campaigns.

10 Hours

UNIT- 3

Evolution of Advertising Agencies: Various Stages and Current Status, Various Functional Departments and Scope of their Works (Account Planning, Account Servicing. Creative-Copy & Art, Media, Production, Billing, HR etc.), Advertising Agency: Functions, Types, Structure, Departments, Remuneration, Pitching, Client Agency Relationship, Major advertising agencies in India and other continents, Revenue and Commission Systems.

10 Hours

UNIT- 4

Advertising Budget and Account Management: ” Setting and Allocating Budget, Various Methods of Budgeting Budget and Audit Process: “Allocation of Budget and Methods”, Agency Revenue Processes“ Audits and its, Processes, Introduction to Account Management-Scope, Definition, Responsibilities and Implementation Paths" Agency, Operation: The organizations in Advertising, the Role of Advertising Agency, Types of Advertising Agencies " Client related Issues and the Process: Stages in the Client-Agency Relationship, Factors Affecting Client-Agency Relationship, The Pitching Mechanism-Simulation Creative and Media Briefing Process: " Agency -Media Interface " Agency Revenue Process ".

10 Hours

UNIT- 5

Strategic Planning and Brand Management: " Introduction to Strategic Planning and Client Servicing : The Concept of a Brand, Characteristics of Brands (generic, expected, augmented, potential), the Importance of Brand Planning, Issues Influencing Brand Potential " Role and Relevance of Strategy in Advertising: Understanding the Branding Process and Advertising Perspective " Brand Positioning, Brand Benefits, Consumer Benefits " Brand Matrix and Media Matrix Brand Management: " The Evolution of Branding in Today’s World" Understanding Brand Management " Various Theories and Models in Brand Management, 8 " Brand Prism Model, Perceptual Mapping, " Brand Purchasing under Dissonance Reduction, Brand Name Spectrum, " Product Research—Important Tools and Analysis " Brand Anatomy, Strategy and Structure, Brand Positioning, Personality " Image, Brand Extensions-Advantages & Pitfalls " Brand Architecture " How Integrated Marketing Communications (IMC) builds Brands – including Digital Ecosystem and the Integration of Digital Channels " Brand Audit – Inventory and Exploratory and Tracking, Co-branding/Licensing, Luxury Brands, B2B Brands " The Making of Indian & Global Brands " Leveraging Secondary Brand Associations to Build Brand Equity " Digital Brand Building: The FLIRT Model " What is a Global Brand? How can Indian Brands become Global?" Zaltman Metaphor Elicitation Technique (ZMET) " Various Case Studies.

12 Hours

Text Books:

1. MANUKONDA R.: Advertising Promotions and News Media (DPS Publishing House India, 2013).

Reference Books:

1. VILANILAM J. V. & VERGHESE A.K: Advertising Basics (Sage Publications, India, 2012).
2. MUELLER, BARBARA: Dynamics of International Advertising: Theoretical and practical perspectives (New York: Peter Lang, 2006).

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Explain the importance of advertising, publicity and learn to differentiate betweentheir role in the promotion of products and services.
CO2	Classify and Comprehend role of ethics, legal and social implications of messages inadvertising and publicity messages.
CO3	Analyze brand positioning, media decisions and strategies for an effective campaign.
CO4	Analyze the role of advertising agencies from the concept to reality of messages invarious campaigns.
CO5	Design and develop messages for the fictitious campaigns through artworks, casestudies, collages, copy writing and visual content allocation in effective media messages for advertising effectiveness.

ENERGY MANAGEMENT

Subject Code	**MEM243**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To apply knowledge of energy management fundamentals for its conservation and future scenario.
2. To apply and analyze the various financial management and energy monitoring systems.
3. To identify and analyze the need for the energy management and audit in optimizing energy requirements.
4. To identify and analyze the potential of waste heat recovery from major industrial equipments.
5. To analyze and evaluate the energy conservation and effect of climate changes as per United Nation Standards

Course Content

UNIT-1

Energy Scenario: Classification of Energy, Indian energy scenario, Sectorial energy consumption (domestic, industrial and other sectors), energy needs of growing economy, energy intensity, long term energy scenario, energy pricing, energy security, energy conservation and its importance, energy strategy for the future. Energy Conservation Act 2001 and related policies: Energy conservation Act 2001 and its features, notifications under the Act, Schemes of Bureau of Energy Efficiency (BEE) including Designated consumers, State Designated Agencies, Electricity Act 2003, Integrated energy policy, National action plan on climate change, ECBC code for Building Construction.

12 Hours

UNIT- 2

Financial Management and Energy Monitoring and Targeting: Investment-need, appraisal and criteria, financial analysis techniques simple payback period, return on investment, net present value, internal rate of return, cash flows, risk and sensitivity analysis; financing options, energy performance contracts and role of Energy Service Companies (ESCOs) Energy Monitoring and Targeting: Defining monitoring & targeting, elements of monitoring & targeting, data and information-analysis, techniques – energy consumption, production, cumulative sum of differences (CUSUM). Energy Management Information Systems (EMIS)

10 Hours

UNIT- 3

Energy Management & Audit: Definition, energy audit, need, types of energy audit. Energy management (audit) approach-understanding energy costs, Bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel and energy substitution, energy audit instruments and metering. **10 Hours**

UNIT- 4

Waste Heat Recovery: Potential, benefit, waste heat recovery equipment's. Space Heating, Ventilation Air Conditioning (HV AC) and water heating of building, Transfer of heat, space heating methods, Ventilation and air conditioning, Heat pumps, Insulation, Cooling load, Electric water heating systems, Electric energy conversation methods. **Industrial Insulation:** Insulation materials, insulation selection, Economical thickness of insulation. **Industrial Heating:** Heating by indirect resistance, direct resistance heating (salt bath furnace)

10 Hours

UNIT- 5

Energy and environment, air pollution, climate change: United Nations Framework Convention on Climate Change (UNFCC), sustainable development, Kyoto Protocol, Conference of Parties (COP), Clean Development Mechanism (CDM), CDM Procedures case of CDM – Bachat Lamp Yojna and industry; Prototype Carbon Fund (PCF). Energy cost and two -part tariff; -Energy Conservation in utility by improving load factor, Load curve analysis, Energy efficient motors, Energy Conservation in illuminating system, Importance of power factor in energy Conservation -Power factor improvement methods, Energy Conservation in industries.

10 Hours

Text Book:

1. Energy Conservation Guide Book, Dale R Patrick, Stephen W Fardo, 2nd Edition, CRC Press

Reference Books:

1. Handbook of Energy Audits, Albert Thumann, 6th Edition, The Fairmont Press
2. Bureau of Energy Efficiency Reference book: No.1, 2, 3 4
3. Energy Management Handbook, W.C. Turner, John Wiley and Sons, A Wiley Inter-science publication

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Apply the knowledge of energy management fundamentals for its conservation and future scenario.
CO2	Apply and analyze the various financial management and energy monitoring systems used in industries.
CO3	Identify and analyze the need for the energy management and audit in optimizing energy requirements.
CO4	Identify and analyze the potential of waste heat recovery from major industrial equipments.
CO5	Analyze and evaluate the energy conservation and effect of climate changes.

ADVANCED OPERATIONS RESEARCH

Subject Code	**MEM251**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To solve an LP problem using Dantzig-Wolfe Decomposition Primal-Dual Algorithm and Goal programming..
2. To solve an LP problem using Branch And Bound Algorithm for Integer Programming, Cutting Plane Algorithm, All Integer Primal Algorithm and All Integer Dual Algorithm.
3. To solve a network problem using the shortest path method and achieve crashing and resource levelling.
4. To solve a TSP using Branch and bound algorithm and Heuristics.
5. To solve a single server and multiple server queuing problems formulate a quadratic programming problem and solve using All integer dual algorithm, Mixed integer LP and Bender's Partitioning algorithm.

Course Content

UNIT- 1

INTRODUCTION TO LINEAR PROGRAMMING: Introduction to applications of operations research in functional areas of management. Development of operation Research, art of modelling, phase of operation Research Study. Linear Programming-formulation, solution by graphical and simplex methods (Primal - Penalty, Two Phase), Special cases. Dual simplex method. Principles of Duality. Sensitivity Analysis.

12 Hours

UNIT- 2

LINEAR PROGRAMMING EXTENSIONS: Transportation Models (Minimising and Maximising Problems) – Balanced and unbalanced Problems – Initial Basic feasible solution by N-W Corner Rule, Least cost and Vogel's approximation methods. Check for optimality. Solution by MODI / Stepping Stone method. Case of Degeneracy. Transhipment Models. Assignment Models (Minimising and Maximising Problems) – Balanced and Unbalanced Problems. Solution by Hungarian and Branch and Bound Algorithms. Travelling Salesman problem. Crew Assignment Models.

10 Hours

UNIT- 3

INTEGER PROGRAMMING AND GAME THEORY: Solution to pure and mixed integer programming problem by Branch and Bound and cutting plane algorithms. Game Theory-Two person Zero sum games-Saddle point, Dominance Rule, Convex Linear Combination (Averages), methods of matrices, graphical and LP solutions.

10 Hours

UNIT- 4

INVENTORY MODELS, SIMULATION AND DECISION THEORY: Inventory Models – EOQ and EBQ Models (With and without shortages), Quantity Discount Models. Decision making under risk – Decision trees – Decision making under uncertainty. Decision theory and games theory. Inventory models with probabilistic demand (Simple cases) queuing models. Queuing theory and embedded Markow chains Introduction to simulation. Monte-Carlo simulation.

10 Hours

UNIT- 5

QUEUING THEORY AND REPLACEMENT MODELS: Queuing Theory - single and Multi-channel models – infinite number of customers and infinite calling source. Replacement Models-Individuals replacement Models (With and without time value of money) – Group Replacement Models.

10 Hours

Text Books:

1. Taha H.A., "Operations Research", Sixth Edition, Prentice Hall of India, 2003

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Reference Books:

1. Shennoy G.V. and Srivastava U.K., "Operation Research for Management", Wiley Eastern, 1994.
2. Bazara M.J., Jarvis and Sherali H., "Linear Programming and Network Flows", John Wiley, 1990.
3. Philip D.T. and Ravindran A., "Operations Research", John Wiley, 1992.
4. Hillier and Libeberman, "Operations Research", Holden Day, 1986

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Solve an LP problem using Dantzig-Wolfe Decomposition Primal-Dual Algorithm and Goal programming.
CO2	Solve an LP problem using Branch And Bound Algorithm for Integer Programming, Cutting Plane Algorithm, All Integer Primal Algorithm and All Integer Dual Algorithm.
CO3	Solve a network problem using the shortest path method and achieve crashing and resource levelling.
CO4	Solve a TSP using Branch and bound algorithm and Heuristics.
CO5	Solve a single server and multiple server queuing problems formulate a quadratic programming problem and solve using All integer dual algorithm, Mixed integer LP and Bender's Partitioning algorithm.

MAINTENANCE ENGINEERING MANAGEMENT

Subject Code	**MEM252**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02(L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To apply knowledge of maintenance engineering management fundamentals to the defined procedures, processes, systems and/or methodologies.
2. To apply and analyze broadly defined maintenance problems and solve them using mathematical and analytical tools.
3. To solve specific problems through standard codes and practices, provide solutions through validated inferences and authenticated documents.
4. To describe functions and responsibilities of a member and a leader, strength of team work in diverse challenges related to engineering and technology areas.
5. To report the findings of the maintenance solutions arrived at, using proper charts, tables and presentation techniques.

Course Content

UNIT- 1

Introduction: Objectives and Functions of maintenance. Factors influencing plant availability, Maintenance control, Maintenance Strategies, Organization for Maintenance. Failure Statistics: Breakdown time distributions, Poisson, Exponential and Normal Distributions., Failure Probability, Survival Probability and age specific failure rates.

12 Hours

UNIT- 2

Maintenance Planning: Establishing maintenance plan and schedule, illustrative examples, Overhaul and Repair: Meaning and difference, optimal overhaul / Repair / Replace maintenance policy for equipment subject to breakdown. Replacement Decisions: Deterministic and stochastic replacement situations, failure and preventive replacement, Optimal Interval between preventive replacement of equipment subject to breakdown, group replacement.

10 Hours

UNIT- 3

Maintenance Systems: Fixed time maintenance, Condition based Maintenance, Operate to failure, Opportunity Maintenance, Design out maintenance, Total Productive Maintenance. Preventive Maintenance: Designing a Technically sound preventive maintenance program, failure data, FCECA, Maintenance to prevent failures, lubrication program development.

10 Hours

UNIT- 4

Inspection Decision: Optimal Inspection frequency (for maximization of profit and minimization of downtime). NUCREC Method of prioritizing maintenance work.

10 Hours

UNIT- 5

Shut down planning using CPM & PERT: Spare Parts Management: Classification of spares, traditional approach to spares inventory, MUSIC-3D Approach to spares inventory, optimum number of spares to satisfy given service level, simulation technique.

10 Hours

Text Book:

1. A KELLY AND M J HARRIS, "Management of Industrial Maintenance", Butterworth's Co, Ltd.

Reference Books:

1. AKS JARDINE, Maintenance, Replacement and Reliability, Pitman publishing Co.
2. A KELLY, Maintenance planning and control, Butterworth Co, Ltd.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Apply knowledge of maintenance engineering management fundamentals to define procedures, processes, systems and/or methodologies.
CO2	Identify and analyze broadly defined maintenance problems and reach out to substantial solutions through mathematical and analytical tools using maintenance engineering management principles and practices.
CO3	Investigate specific problems through relevant standard codes and practices and provide solutions through validated inferences and authenticated documents.
CO4	Acquaint with the functions and responsibilities of role of an individual as a member and also as a leader and understand the coherent strength of team work in diverse challenges related to engineering and technology areas.
CO5	Present the findings of the maintenance solutions arrived at, using proper charts, tables and presentation techniques.

PRODUCT DATA MANAGEMENT

Subject Code	**MEM253**	**No. of Credits**	**4 - 1 - 0**
No. of Lecture Hours / Week	**04 + 02 (L+T)**	**Exam Hours**	**3**
Total No. of Contact Hours	**52 + 26(L+T)**	**Exam Marks**	**100**

Course Objectives:

1. To provide an opportunity to know the concept of the subject products data and its managing ability, life cycle of the product, methods of manufacturing etc.
2. To study the life cycle of the product and its management.
3. To analyze different processes/ terminologies of the change management and its applications.
4. To describe the structure of management and its configuration.
5. To identify different methods of management, such as the concept of agility, enterprise integration and the overview of different resources for creating data.

Course Content

UNIT-1

Introduction: PDM-present market constraints, the need for collaboration- Internet and developments in server-client computing, Components of a typical PDM, set-up hardware and software, document management, creation and viewing of documents, creating parts-version, control of parts and documents, case studies.

10 Hours

UNIT-2

Configuration Management: Software configuration management, Computer hardware configuration management, Maintenance systems, Configuration Management and Engineering Change Control, Configuration Control, Baselines-product structure, configuration management, case studies.

10 Hours

UNIT-3

Product Life Cycle : Life cycle of a product-life cycle management, automating information flow-work flows, Creation of work flow templates, life cycle, work flow integration, case studies.

10 Hours

UNIT-4

Change Management: Change Management- change issue, change request, investigation, change proposal-change activity, Borland Change Management Solutions, Change Management System, Case Studies

10 Hours

UNIT-5

Database and Database Users: Introduction, Building blocks, Data base design, ER Diagram (Entity-relationship model) advantages and implementation of data base approach
Agile Supply Chains Management : Introduction, characteristics of Agile Manufacturing Concept of Agile Manufacturing Strategy of Agile Manufacturing, Methodology of Marketing, Key Issues in Agile Manufacturing, Future of Agile Manufacturing .

12 Hours

Text Books:

1. David Bed worth. Mark Henderson & .Philips Wolfe, "Computer Integrated Design and Manufacturing'", McGraw Hill Inc.,1991.
2. Product Design and Manufacturing, A.C. Chitale and R.C.Gupta, PHI 4th edition 2007.

Reference Books:

1. Terry Quatrain "Visual Modeling with Rational Rose and UML ", Addison Wesley,1998

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Apply the concept of the subject Products Data and its managing ability, Life cycle of the product, methods of manufacturing etc.
CO2	Analyze the life cycle of the product and its management
CO3	Evaluate the methods and processes involved in the change management.
CO4	Configure management and the structure of management.
CO5	Compile and evaluate the methods of data storing and its management.

DATA SYNTHESIS LAB

Subject Code	**MEM26L**	**No. of Credits**	**0 - 0 – 1.5**
No. of Lecture Hours / Week	**3**	**Exam Hours**	**--**
Total No. of Contact Hours	**42**	**Exam Marks**	**--**

Course Objectives:

1. To describe the various hypothesis testing, selection of statistical procedure, checking of the data, null hypothesis, parametric v/s Non parametric statistics, box plots, testing for normality, 'T' tests, ANOVA, correlation, regression, factor and cluster analyses.
2. To apply the above mentioned knowledge of testing and standards in these techniques and suggest the best technique, evaluate, analyze and infer for several case studies using relevant software.

Course Content

Hypothesis testing: Steps in hypothesis testing, Types of hypotheses, Selecting an appropriate statistical procedure, Checking whether the data meets the required assumptions, Deciding whether to reject the Null hypothesis, Parametric v/s Non parametric statistics, Descriptive statistics and Box plots, Testing for normality, Independent sample and paired sample 't' tests, Multivariate analysis: ANOVA, Correlation and regression, Factor analysis, Cluster analysis.

Text Books:

1. Richard I Levin (1990), "Statistics for Management", Prentice Hall of India Pvt. Ltd.

Reference Books:

1. Harper W. Boyd, Ralph Westfall and Stanley F. Stasch (1986), "Marketing Research, Text & cases", V Kumar, Arya publishers, Delhi, India.
2. SPSS (Statistical Package for Social Sciences) manual (1990), SPSS Inc.

Course Outcomes:

At the end of the course the students shall have the abilities to:

CO1	Describe the various hypothesis testing, selection of statistical procedure, checking of the data, null hypothesis, parametric v/s Non parametric statistics, box plots, testing for normality, 'T' tests, ANOVA, correlation, regression, factor and cluster analyses.
CO2	Apply the above mentioned knowledge of testing and standards in these techniques and suggest the best technique, evaluate, analyze and infer for several case studies using relevant software.