# Scheme of Teaching and Examination for M.Tech.-Master of Engineering Management (MEM)

## I Semester

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Name of the Subject</th>
<th>Teaching hours/week</th>
<th>Duration of Exam in Hours</th>
<th>Marks for</th>
<th>Total Marks</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 MEM 11</td>
<td>Marketing Management</td>
<td>4 2 3 50 100 150</td>
<td>4</td>
<td>150</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>14 MEM 12</td>
<td>Quantitative techniques in Decision Making</td>
<td>4 2 3 50 100 150</td>
<td>4</td>
<td>150</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>14 MEM 13</td>
<td>Operation Management</td>
<td>4 2 3 50 100 150</td>
<td>4</td>
<td>150</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>14 MEM 14</td>
<td>Financial Management</td>
<td>4 2 3 50 100 150</td>
<td>4</td>
<td>150</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>14 MEM 15x</td>
<td>Elective - I</td>
<td>4 2 3 50 100 150</td>
<td>4</td>
<td>150</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>14 MEM 16</td>
<td>Lab Component</td>
<td>-- 3 25 50 75 2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 MEM 17</td>
<td>Seminar</td>
<td>-- 3 25 -- 25 1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>20 13 15 300 550 850</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Elective - I

<table>
<thead>
<tr>
<th>Sub. Code</th>
<th>Name of the Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 MEM 151</td>
<td>Lean Manufacturing</td>
</tr>
<tr>
<td>14 MEM 152</td>
<td>Managerial Economics</td>
</tr>
<tr>
<td>14 MEM 153</td>
<td>Industrial Relations</td>
</tr>
<tr>
<td>14 MEM 154</td>
<td>Management Information Systems</td>
</tr>
</tbody>
</table>
### II Semester

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Name of the Subject</th>
<th>Teaching hours/week</th>
<th>Duration of Exam in Hours</th>
<th>Marks for</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Practical / Field Work / Assignment / Tutorials</td>
<td>I.A.</td>
<td>Exam</td>
</tr>
<tr>
<td>14 MEM 21</td>
<td>Applied Probability and Statistics</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>14 MEM 22</td>
<td>Organizational Behavior</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>14 MEM 23</td>
<td>Total Quality Management</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>14 MEM 24</td>
<td>Project Management</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>14 MEM 25x</td>
<td>Elective-II</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>14 MEM 26</td>
<td>Lab Component</td>
<td></td>
<td>3</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>14 MEM 27</td>
<td>Seminar</td>
<td>--</td>
<td>3</td>
<td>--</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>**Project Phase-I(6 week Duration)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>20</td>
<td>13</td>
<td>15</td>
<td>300</td>
</tr>
</tbody>
</table>

**Elective – II**

<table>
<thead>
<tr>
<th>Sub. Code</th>
<th>Name of the Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 MEM 251</td>
<td>Simulation Modeling and Analysis</td>
</tr>
<tr>
<td>14 MEM 252</td>
<td>Product Lifecycle Management</td>
</tr>
<tr>
<td>14 MEM 253</td>
<td>Advanced Manufacturing Practices</td>
</tr>
<tr>
<td>14 MEM 254</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>14 MEM 255</td>
<td>Product Data Management</td>
</tr>
</tbody>
</table>

** Between the II Semester and III Semester, after availing a vocation of 2 weeks.
### VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
### SCHEME OF TEACHING AND EXAMINATION FOR
### M.TECH.-MASTER OF ENGINEERING MANAGEMENT (MEM)

#### III Semester: INTERNSHIP

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject</th>
<th>No. of Hrs./Week</th>
<th>Duration of the Exam in Hours</th>
<th>Marks for Total Marks</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>14MEM31</td>
<td>Seminar / Presentation on Internship (After 8 weeks from the date of commencement)</td>
<td>-</td>
<td>-</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>14MEM32</td>
<td>Report on Internship</td>
<td>-</td>
<td>-</td>
<td>75</td>
<td>15</td>
</tr>
<tr>
<td>14MEM33</td>
<td>Evaluation and Viva-voce</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>-</td>
<td>-</td>
<td><strong>25</strong></td>
<td><strong>20</strong></td>
</tr>
<tr>
<td>Subject Code</td>
<td>Subject</td>
<td>No. of Hrs./Week</td>
<td>Duration of Exam in Hours</td>
<td>Marks for Total Marks</td>
<td>CREDITS</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------</td>
<td>-----------------</td>
<td>---------------------------</td>
<td>-----------------------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Field Work / Assignment / Tutorials</td>
<td>I.A.</td>
<td>Exam</td>
</tr>
<tr>
<td>14MEM41</td>
<td>Human Resource Management</td>
<td>4</td>
<td>--</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>14MEM42</td>
<td>Elective-III</td>
<td>4</td>
<td>-</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>14MEM43</td>
<td>Evaluation of Project Phase-II</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td>14MEM44</td>
<td>Evaluation of Project Phase-III</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td>14MEM45</td>
<td>Evaluation of Project Work and Viva-voce</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12</td>
<td>07</td>
<td>09</td>
<td>150</td>
</tr>
</tbody>
</table>

Grand Total (I to IV Sem.) : 2400 Marks; 94 Credits

<table>
<thead>
<tr>
<th>Sub. Code</th>
<th>Name of the Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 MEM 421</td>
<td>Industrial Marketing</td>
</tr>
<tr>
<td>14 MEM 422</td>
<td>Robust Design</td>
</tr>
<tr>
<td>14 MEM 423</td>
<td>Modern Trends in Management</td>
</tr>
<tr>
<td>14 MEM 424</td>
<td>Advertisement and Publicity</td>
</tr>
</tbody>
</table>
Note:

1) Project Phase – I: 6 weeks duration shall be carried out between II and III Semesters. Candidates in consultation with the guides shall carry out literature survey / visit to Industries to finalise the topic of dissertation.

2) Project Phase – II: 16 weeks duration. 3 days for project work in a week during III Semester. Evaluation shall be taken during the first two weeks of the IV Semester. Total Marks shall be 25.


Marks of Evaluation of Project:

- The I.A. Marks of Project Phase – II & III shall be sent to the University along with Project Work report at the end of the Semester.

4) During the final viva, students have to submit all the reports.

5) The Project Valuation and Viva-Voce will be conducted by a committee consisting of the following:

   a) Head of the Department (Chairman)
   b) Guide
   c) Two Examiners appointed by the university. (out of two external examiners at least one should be present).
**MARKETING MANAGEMENT**

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>14 MEM 11</th>
<th>IA Marks</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Lecture Hrs/week</td>
<td>04</td>
<td>Exam Hours</td>
<td>03</td>
</tr>
<tr>
<td>Total Lecture Hrs</td>
<td>52</td>
<td>Exam Marks</td>
<td>100</td>
</tr>
</tbody>
</table>

**Introduction:** Role of marketing in today’s organizations – core concepts of marketing – management – the evolution of marketing management concept.

**Marketing Environment** – Marketing system – actors in the company’s Micro and Macro Environment.

**Consumer Markets and Buying Behaviors** – a Model of consumer behavior – Major factors influencing consumer behavior – the buying decision process.

**Organizational Markets and Buying Behavior** – the industrial market – the reseller market – the government market.

**Market Segmentation** – Market testing – market positioning – the marketing plan.

Concept of Product life cycle and new development process.

Pricing Decisions and Channel decisions.

Product branding, packing and service, advertisement and media management

Communication and promotion mix decision.

**REFERENCE BOOKS:**

**Introduction:** Statistics and managerial decisions, statistical data and Operations Research techniques.

**Fundamentals of Statistics, probability and probability distributions:** Measures of central tendency and location, Measure of dispersion, skewness and kurtosis, Probability and rules of probability, Random variables and probability distributions - Binomial, Poisson, Hyper geometric and Normal.

**Decision Making under Uncertainty:** Alternative criteria for decision under uncertainty, Bayesian approach and Incremental analysis.


**Transportation and Assignment Problems:** Structure of transportation problem and various methods to find LB.F.S., Optimality test of transportation problems by MODI method, Solution of degeneracy and unbalanced transportation problems, Assignment problems and solution by Hungarian method and Traveling Salesman problem.

**Theory of Games:** Two person zero sum game, Minimax & maximin strategies, Solution of game by dominance rules, arithmetic and algebraic methods, Solution of game by graphical method and method of matrices, Solution of game by Linear programming approach and approximate method to solve game problems.

**Network Analysis:** PERT and CPM, Network construction and determination of critical path, Calculation of ES, EF, LS, LF, TF, FF and IF, Crashing of a project, Scheduling of a project and resource leveling.

**Waiting Line:** Basic structure of queuing systems and characteristics, Expressions for M/M/1 queuing model.

**Simulation of Management systems:** Simulation and Monte Carlo method, Waiting line and inventory simulation models

**Text Books:**

**REFERENCE BOOKS:**
OPERATIONS MANAGEMENT

Sub Code : 14 MEM 13
IA Marks : 50
No. of Lecture Hrs/week : 04
Exam Hours : 03
Total Lecture Hrs : 52
Exam Marks : 100


System Design and Capacity: Introduction, Manufacturing and service systems, Design and systems capacity, Capacity planning.

Forecasting Demand: Forecasting objectives and uses, Forecasting variables, Opinion and Judgmental methods, Time series methods, Moving Average methods, Exponential smoothing, Trend adjusted Exponential Smoothing, Regression and correlation methods, Application and control of forecasts-Mean Absolute Deviation, BIAS, Tracking Signal.

Aggregate Planning and Master Scheduling: Introduction- planning and scheduling, Objectives of aggregate planning, Three Pure Strategies, Aggregate planning methods, Master scheduling objectives, Master scheduling methods.

Material and Capacity Requirements Planning: Overview: MRP and CRP, MRP: Underlying concepts, System parameters, MRP logic, System refinements, Capacity management, CRP activities.

Scheduling and Controlling Production Activities: Introduction, PAC, Objectives and Data requirements, Loading –Finite and Infinite Scheduling methodology, priority sequencing, capacity control.

Single Machine Scheduling: Concept, measures of performance, SPT rule, Weighted SPT rule, EDD rule.

Flow –Shop Scheduling: Introduction, Johnson’s rule for ‘n’ jobs on 2 and 3 machines, CDS heuristic.
Job-Shop Scheduling: Types of schedules, Heuristic procedure, scheduling 2 jobs on ‘m’ machines.

Text Books:
2. Productions & operations management by Adam & Ebert.
3. Pannerselvam. R., Production and Operations Management, PHI.

References:

Indian Financial System: Financial Markets – money market, capital market, Govt., Securities market, All India Financial Institutions DBI, IFCI, ICICI, IRBI, EXIM Bank, SFCs, SIDCs Investment Institutions – LID, GIC, VTI, mutual funds Commercial banks: NBFCs.

Time Value of money: Future value of a single cost flow, multiple flows and annuity, present value of a single cash flow.

Risk & Return: Risk & Return concepts, risk in a portfolio, context, relationship between risk & return.

Valuation of Securities: Concept of valuation, equity valuation Dividend: Dividend capitalization approach & ratio approach.

Financial Statement Analysis: Ratio analysis, time series analysis, Du pont analysis, funds flow analysis.

Leverage: Concept of leverage, opening leverage, financial leverage, total leverage.

Sources of long term finance: Equity capital & preference capital, Debenture capital, term loan & deferred credit, Govt Subsidies, Sales Tax Deferments & Exception, leasing and hire purchase.


Dividend Policy: Traditional position, water model, golden model, Miller and Modigliani position, rational expectations model.

Estimation of working capital – Objectives of working capital (Conservative Vs Aggressive policies) static Vs Dynamic view of W.C. Factors affecting the composition of W.C., interdependence among Components of W.C., operating cycle approach to W.C.

REFERENCE BOOKS:

Laboratory Exercises
14MEM16

1. Introduction to OR Packages

2. Building Linear Programming Models (Formulation of LPP) and performing sensitivity analysis.


4. Exercise on Assignment and Traveling salesman problems.

5. Building network models
   - Construction of PERT/CPM networks
   - CPM - Determination of critical path, Time duration and floats
   - PERT - Determination of project duration and variance.

6. Building simulation model for
   - Inventory
   - Layout
   - Banking transactions
   - Simple manufacturing system.

Suggested Software Packages:
LINDO / Quantitative System Analysis (QSA)/ TORA software / M.S. Projects/ARENA
LEAN MANUFACTURING SYSTEMS

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>: 14MEM 151</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Lecture Hrs/week</td>
<td>: 04</td>
</tr>
<tr>
<td>Total Lecture Hrs</td>
<td>: 52</td>
</tr>
<tr>
<td>IA Marks</td>
<td>: 50</td>
</tr>
<tr>
<td>Exam Hours</td>
<td>: 03</td>
</tr>
<tr>
<td>Exam Marks</td>
<td>: 100</td>
</tr>
</tbody>
</table>

**Just in time production system.** JIT Logic - Pull system Japanese approach to production elimination of waste - JIT implementation requirements JIT application for job shops, Case studies

**Kanban system:** Kanban rules supplier Kanban and sequence schedule used by supplier. Monthly information & daily information. Later replenish system by Kanban sequenced withdrawal P system by sequence schedule table - problems & counter measures in applying Kanban system to subcontractors - Supplier Kanban circulation in the paternal manufacturer - structure of supplier Kanban sorting office. The rise & fall of Mass Production Mass production, work force, organization, tools, product – logical limits of mass production, Sloan as a necessary compliment to Ford. Case study: - Rouge Production Plant.

**The rise of lean production:** - Birth place, concrete example, company as community, Final assembly plant, product development and engineering. Changing customer demand, dealing with the customer, future of lean production.

**Shortening of production lead times** - reduction of setup times, practical procedures for reducing setup time.

**Standardization of operations.** Machine layout, multi function workers and job rotation. Improvement activities to reduce work force and increase worker morale - foundation for improvements.

**Elements of lean production viz G M Framingham** - Toyota Takaoka Mass Production V/s lean production, diffusing lean production.

**Managing lean enterprise:** Finance, Career ladders, geographic spread and advantages of global enterprise.

**Prospects for catching up.** Simplicity in the natural state - institutional factors - life time employment - educational commodities - quality & productivity in full circle.

**An action plan:** Getting started - Creating an organization to channel your streams. Install business system to encourage lean thinking. The inevitable results of 5 year commitment.

**REFERENCE BOOKS:**


**Straight talk on design of experiments** - Launshy and Weese
MANAGERIAL ECONOMICS

Sub Code: 14MEM 152
IA Marks: 50
No. of Lecture Hrs/week: 04
Exam Hours: 03
Total Lecture Hrs: 52
Exam Marks: 100


Market Structures: Perfect Competition: Meaning characteristics and importance, price and output determination in the short run and long run. Derived demand for inputs, shortcomings of perfect competition.

Monopoly: Meaning, characteristics and importance, comparison with perfect competition, short run and long run analysis evaluation.

Monopolistic Competition: Meaning, Characteristics and Importance short run and long run analysis.

Oligopoly: Meaning, characteristics and importance, Non-Collusive Oligopoly and the Kinked demand curve, Collusive Oligopoly, efficiency implications of oligopoly.

Pricing in Practice: Cost-plus pricing, Evaluation of cost plus pricing Incremental Analysis in pricing.

Capital Budgeting: Meaning and Importance, Protecting Cash Flows, Present Value and Internal Rate of Return, Comparison of NPV and IRR.

Economic Growth, Development and planning economic aggregates and economic relationships.

REFERENCE BOOKS:


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 – Evolution of IR.


REFERENCE BOOKS:

MANAGEMENT INFORMATION SYSTEMS

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>14 MEM 154</th>
<th>IA Marks : 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Lecture Hrs/week</td>
<td>04</td>
<td>Exam Hours : 03</td>
</tr>
<tr>
<td>Total Lecture Hrs</td>
<td>52</td>
<td>Exam Marks : 100</td>
</tr>
</tbody>
</table>

**Introduction:** Definition, importance, evolution, computers and MIS organizational structures, Logical foundation, future of MIS.

**Organizational Systems:** Nature and Characteristics of organizations.

**Information Systems and Organizations,** Organizational and information system structures, information, data information, management and information systems. Information support for functional areas, impact of business and information systems, organizing information systems, absorption of MIS in organizations.

**Communication Technology:** Telecommunications, Computer networking

**Database Technology:** Database and enterprise management, File processing systems and data base systems, Database Approach and its architecture, DBMS, Models, RDBMS, SQL, 4GL, Data Administration, Current development in databases.

**Decision Support Systems:** DSS issues, Structure Constructions – approaches, generators, tools, software and cost benefits and simple examples of applications.

**Expert Systems:** Basic Concepts, Structure development, Benefits and Limitations.

**Computer and Information System:** Evolution of Computer hardware and software

**REFERENCE BOOKS:**

**Introduction to statistics:** Statistical Thinking, Collecting data, Statistical Modeling Framework, measure of central tendency and variance, Importance of Data summary and Display, Tabular and Graphical display.

**Discrete Random Variables and Probability Distribution:** Discrete Random variables, Probability distributions and Probability mass functions, Cumulative distribution functions, Mean and Variance of a discrete random variable, discrete uniform distribution, Binomial distribution, Hyper Geometric distribution, Poisson distribution, Applications.

**Continuous Random Variables and Probability Distributions:** Continuous random variables, Probability distributions and probability density functions, cumulative distribution functions, Mean and Variance of a continuous random variable, uniform distribution, Normal distribution, Normal approximation to Binominal and Poisson distribution, Exponential distribution.

**Testing of Hypothesis:** Estimation theory, Hypothesis testing, Inference on the mean of a population (variance known and unknown), Inference on the variance of a normal population, Inference on a population proportion, Testing for Goodness of Fit, Inference for a difference in Means, Variances known, Inference for a difference in means of two normal distributions, Variances unknown, Inference on the Variances of two normal populations, Inference on two population proportions.

**Simple Linear Regressions and Correlation:** Simple Linear Regression, Properties of Least square Estimators and Estimation of variances, Transformations to a straight line, Correlation. Multiple linear regressions model, least square estimation of parameters, Matrix approach to multiple linear regression, properties of least square estimators and estimation of variance.

Introduction to DOE: Completely Randomised Block Design (CBD) and Randomised Block Design(RBD)

**REFERENCE BOOKS:**


**Probability and Statistics** - Walpol
ORGANIZATIONAL BEHAVIOUR

Sub Code : 14 MEM 22  
IA Marks : 50
No. of Lecture Hrs/week : 04  
Exam Hours : 03
Total Lecture Hrs : 52  
Exam Marks : 100


Organization Culture: Organizational Change – Organizational Development Organizational Climate – Work Stress.

REFERENCE BOOKS:

   Organizational Psychology – Robin, Kolb, etc – 1996
TOTAL QUALITY MANAGEMENT

Introduction: BUSINESS EVOLUTION
Developing a Unique Organizational Capability: Four Practical Revolutions in Management, Evolution of Our Understanding, Four Levels of Practice

The First Revolution: CUSTOMER FOCUS
Change in the Work Concept: Market-in, Customers, Philosophy-in and Philosophy-out
Evolution of Customer Focus and Its Challenges: Three Stages of Customer Focus, Customer Concerns, Integration of Concerns, Individualizing Customers

The Second Revolution: CONTINUOUS IMPROVEMENT
Improvement as a Problem-Solving Process: Management by Process, WV Model of Continuous Improvement, Continuous Improvement of Processes for All Types of Work,
Continuous Improvement and the Scientific Method
Managing Existing Processes
Process Discovery and Management: Thinking In Terms of Process, Process Discovery
Process Control and Variation: A Typical Example of (Mishandling) Variation, Making the Most of Variation, Process Control and Process Improvement
Reactive Improvement and the 7 Steps Method; Identifying the Problem, Standard Steps and Tools, The 7 Steps: A Case Study, The 7 QC Tools
Management Diagnosis of the 7 Steps of Reactive Improvement: General Guidelines for Managers
Diagnosing a QI Story, Step-by-Step Guidelines for Managers Diagnosing a QI Story, Case Study for Diagnosis of the 7 Steps, Run PDCA and Develop Skill
Planning Projects or Tasks: The 9 Steps Compared with the 7 Steps, The 9 Steps Mobilization at Teradyne, A Teradyne Illustration of the 9 Steps Use, Relationship of the 9 Steps to Other Methods

Proactive Improvement: Collecting Data for Proactive Improvement, Language Data and Use of Semantics, Toward Standard Tools and Steps for Proactive Improvement, Customer Visitation as a Method of Collecting Proactive Improvement Data
Applying Proactive Improvement to Develop New Products; Develop Understanding of Customers’ Needs and Environment, Convert Understanding Into Requirements, Operationally Define Requirements for Downstream Development, Generating Concepts and Selecting the Concept, Expanding View of WV Model and Proactive Improvement

The Third Revolution: TOTAL PARTICIPATION
Engagement and Alignment of Organization Members: Engaged Employees for a Rapidly Changing World, Explicit Joining of Improvement and Routine Work, Processes and People

Coordinating Behavior; Societal Networking Case Study of the CQM Study Group on Conversation, Expansion of the Principles of Semantics, Some Types and Models of Conversations

Leading Change: Technical Skill, Human Skill, Conceptual Skill

Self-Development: Lessons from the Non-business World, Local Improvement in Absence of a Supportive Environment, The Bottom Line

Team Skill Development: Teamwork Skill, Some Fundamentals, Some Types of Teams substantially, Models for Team Development

Initiation Strategies; CEO Involvement, Case Study: Teradyne Strategy for Introduction

Infrastructure for Mobilization: Create Explicit Structures for Mobilization, A General Model for Mobilization: The 7 Infrastructures

Phase-In: Orientation Phase, Empowerment Phase, Alignment Phase, Evolution of the Parallel Organization, Common Patterns of Phase-In

U.S. Focused Strategies for Phase-In: Benchmarking, Six Sigma, Cycle-Time Reduction

Hoshin Management: Hoshin Management and Its Parts, Management by Objectives and Conventional Business Planning, Hoshin Management at Analog Devices

Leading Process Improvement: Modeling Personal Improvement, Employee Development at NIMS, Company Strategies, Individual Practice of CAPD by Managers’ case studies

The Practice of Breakthrough; Process versus Business Breakthrough, Case Studies and a Model of Business Breakthrough, Biggest Obstacle to Business Breakthrough, Integration of Ideas

The Fourth Revolution: SOCIETAL NETWORKING

Networking and Societal Diffusion: Regional and National Networking, The Japanese Model, Taking a Lesson from Japan—CQM, Comparison of National Methods, Use of Indirect Influence

Ongoing Integration of Methods: Applying Idealized Design to Hoshin Management, Structural Process Improvement Case Study, SerVend Case Study

Reference Books:


### Introduction

### Means of Financing
Profitability and Breakeven Analysis – Cash Flows of Projects – Tax factor in investment Analysis – Interest – Compounding and Discounting.

### Appraisal Criteria and Selection of Investment

### Manpower Management in Projects

### Networks Technique in Project Management
PERT/CPM Analysis – Administrative aspects of Capital Investment.

### REFERENCE BOOKS:
3. **Project Management** – Dennis lock.
**Introduction to Simulation:** Appropriateness of simulation tool, Advantages, Disadvantages and Application areas of simulation, System and System Environment, Components of a system, Discrete and continuous systems, Model of a system, Types of models, Steps in a simulation study.

**Discrete Event Simulation:** Concepts in discrete-event simulation, Event-driven hand simulation – Examples on single channel queue, two server queue, and inventory systems.

**Statistical Models in Simulation:** Terminology and concepts, Useful statistical models, Discrete distributions, Continuous distributions.

**Random Number Generation:** Properties of random numbers, Techniques for generating random numbers- Linear congruential method –Combined linear congruential method ; Tests for random numbers -The Kolmogorov-Smirnov test, the Chi-square test.

**Random Variate Generation:** Inverse Transforms technique-Exponential distribution, Uniform distribution, Weibull distribution, Triangular distribution, Empirical continuous distributions, Continuous distribution without a closed-form inverse, Discrete distribution, Generating approximate normal variate - Erlang distribution.

**Empirical Discrete Distribution:** Acceptance -Rejection technique - Poisson distribution, Gamma distribution.

**Design and Evaluation of Simulation Experiments:** Variance reduction techniques -antithetic variables, Verification and validation of simulation models.

**Simulation Software:** Need for simulation software, Selection of simulation software, Simulation packages (a brief note of software packages such as ARENA, AutoMod, Extend, Flexsim, WITNESS, ProMODEL, etc.).

**REFERENCE BOOKS:**

### PRODUCT LIFE CYCLE MANAGEMENT

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>A Marks</th>
<th>No. of Lecture Hours/Week</th>
<th>Exam Hours</th>
<th>Total No. of Lecture Hours</th>
<th>Exam Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>14MEM252</td>
<td>50</td>
<td>04</td>
<td>03</td>
<td>52</td>
<td>100</td>
</tr>
</tbody>
</table>

**Product life cycle management** – Need for PLM, Components of PLM, Product Data and Product workflow, Drivers for Change,

The PLM Strategy, Developing a PLM Strategy, A Five-step Process


Change Management for PLM, Configuration management, cost of design changes, schemes for concurrent engineering,

Design for manufacturing and assembly, robust design, failure mode and effect-analysis

Modeling, Current concepts, part design, sketching, use of datum's construction features, free ovulation, pattering, copying, and modifying features, reference standards for datum specification, Standards for Engineering data exchange

Tolerance mass property calculations, rapid prototyping and tooling, finite modeling and analysis, general procedure, analysis techniques,

Finite element modeling. Applicability of FEM, Static analysis, thermal analysis, dynamic analysis.

**REFERENCE BOOKS:**

ADVANCED MANUFACTURING PRACTICE

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>10MEM 253</th>
<th>A Marks</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Lecture Hrs/week</td>
<td>04</td>
<td>Exam Hours</td>
<td>03</td>
</tr>
<tr>
<td>Total Lecture Hrs</td>
<td>52</td>
<td>Exam Marks</td>
<td>100</td>
</tr>
</tbody>
</table>

JIT – Introduction – The spread of JIT Movement, some definitions of JIT, core Japanese practices of JIT, Creating continuous Flow Manufacture, Enabling JIT to occur, Basic elements of JIT, Benefits of JIT.

Just in Time Production – Primary purpose, profit through cost reduction, Elimination of over production, Quality control, Quality Assurance, Respect for Humanity, Flexible work Force, JIT Production Adapting to changing production Quantities, process layout for shortened lead Times, Standardization of operation, Automation.

Sequence and scheduling used by suppliers: Monthly and daily Information. Sequenced withdrawal system by sequenced schedule table, problems and counter measures in applying the Kanban system to sub contractors.

Toyota Production System- The philosophy of TPS, Basic Frame work of TPS, Kanban, Determining the Number of Kanban in Toyota Production System.

- Kanban Number under Constant Quantity Withdrawal System.
- Constant Cycle, Non-constant Quantity Withdrawal System.Supplier Kanban and the Sequence Schedule for Use by Suppliers.
- Later Replenishment System by Kanban.
- Sequenced Withdrawal System.
- Circulation of the Supplier Kanban within Toyota.

Production Smoothing in TPS, Production Planning, Production Smoothing Adaptability to Demand Fluctuations, Sequencing Method for the Mixed Model Assembly Line to Realize Smoothed Production of Goal.

Just-in-Time Production with Total Quality Control just in time concept, cutting lot sizes, cutting set-up times, cutting purchase order costs, the JIT cause-Effect chain, Scrap/Quality Improvements, Motivational effects, Responsibility effects, small Group improvement Activities, withdrawal of Buffer Inventory, the total Quality Control Concept.

Total Quality Control-Introduction-Total Quality Control concepts, responsibility, learning from the west, TQC concepts categorized, Goals, Habit of improvement, perfection, Basics, process control, Easy to see Quality control as facilitator, small lot sizes, Housekeeping, Less than full capacity scheduling, Daily machine checking, Techniques and Aids, Exposure of problems, Fool proof Devices, Tools of Analysis, QC Circles, TQC in Japanese-owned US Electronics plant, TQC in Japanese-owned Automotive plants.

Plant Configurations: Introduction-ultimate plant configuration, job shop Fabrication, Frame Welding, Forming Frame parts from Tubing, Dedicated production lines, overlapped production, the daily schedule, Forward Linkage by means of Kanban, physical merger of processes, Adjacency, mixed Models, Automated production Lines, Pseudo Robots, Robots, CAD and Manufacturing, Conveyors and stacker Cranes, Automatic Quality Monitoring.

REFERENCE BOOKS:
2. **Toyota Production system – An integrated approach to just in time** – Yasuhiro Monden
3. **Lean Thinking** – By James Womack.
5. **Just in time manufacturing** – Kargoanker
6. **Wind-chill reference manual.**
SUPPLY CHAIN MANAGEMENT

Sub Code : 14MEM 254
IA Marks : 50
No. of Lecture Hrs/week : 04
Exam Hours : 03
Total Lecture Hrs : 52
Exam Marks : 100


Planning and Managing Inventories in a Supply Chain: Review of inventory concepts. Trade promotions, Managing multi-echelon cycle inventory, safety inventory determination. Impact of supply uncertainty aggregation and replenishment policies on safety inventory. Optimum level of product availability; importance factors. Managerial levers to improve supply chain profitability.

Sourcing, Transportation and Pricing Products: Role of sourcing, supplier – scoring & assessment, selection and contracts. Design collaboration.


Coordination and Technology in the Supply Chain: Co-ordination in a supply chain: Bullwhip effect. Obstacles to coordination. Managerial levers to achieve co-ordination, Building strategic partnerships.

Coordination and Technology in the Supply Chain: The role of IT supply Chain, The Supply Chain IT framework, CRM, Internal SCM, SRM. The role of E-business in a supply chain, The E-business framework, E-business in practice. Case discussion.

Emerging Concepts: Reverse Logistics; Reasons, Activities, Role. RFID Systems; Components, applications, implementation. Lean supply chains, Implementation of Six Sigma in Supply Chains.

REFERENCE BOOKS:

5. Going Backwards Reverse Logistics Trends and Practices -Dr. Dale S. Rogers,Dr. Ronald S. Tibben-Lembke,University of Nevada, Reno, Center for Logistics Management.
PRODUCT DATA MANAGEMENT

Sub Code : 14 MEM 255
IA Marks : 50
No. of Lecture Hrs/week : 04
Exam Hours : 03
Total Lecture Hrs : 52
Exam Marks : 100

Centralized systems: Client Server Systems, Parallel Systems, Distributed Systems, Network Types, Parallel Database, Distributed Database, Security and Integrity, Standardization views
Product Data Management, Product life cycle, Complexity in Product Development,
General Description of PDM

Basic functionality of PDM : Information architecture, PDM System architecture, Applications used in PDM systems. Trends in PDM


Creating Product Structures: Part centric approach, CAD centric approach, Product Structure configuration, Managing Product Structures

PDM Tools: Matrix One, TeamCenter, Windchill.Enovia, PDM resources on the Internet


REFERENCE BOOKS:

1. Implementing and Integrating Product Data Management and Software Configuration Management - Ivica Cmkovic Ulf Asklund, Annita Persson Dahlqvist - Archtech House Publishers
1 Generating bill of materials for various engineering design.

2 Creation of Item masters for various engineering design

3 Creation of purchase order for items

1. Inventory and cost transactions

2. Accounts payable/receivable

3. Creation of dispatch instruction for items.

4. Generating various reports for confirmed orders and Exception Reporting.

**Suggested Software packages:**

Sixth sense/Ofbiz/ other ERP packages
HUMAN RESOURCE MANAGEMENT

Sub Code : 14 MEM 41 IA Marks : 50
No. of Lecture Hrs/week : 04 Exam Hours : 03
Total Lecture Hrs : 52 Exam Marks : 100

Introduction to Human Resources: Importance of Human Resources – Human Resource Planning, Job Analysis and Methods

Recruitment – Recruiting Sources: Recruiting Efforts with possible constraint – ability to attract incumbents.


REFERENCE BOOKS:
2. Personnel principles and policies for modern manpower – Yoder Prentice Hall India.
Introduction: The Industrial Marketing Concept Marketing System: Participant, Channels, Contracts of Sale, Franchise Agreements Loyalty, Confidence and Reciprocity.


Industrial Customer: Buyer Motives: The core variables, Quality, Service, Price, Savings assurance of supply and buyer temperament, Buyer characteristics, Customer types.

Marketing Strategy: The concept of strategy Mission Strategy, Operating, plans, Organizational Plan and logistical plans; choice of strategy components.


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 and cash discounts. Legal considerations and pricing methods.

The Promotional Component: Advertising functions, motivating distributions sales and message case of advertising agencies. Sales promotion and public relations promotional letters and novelties personal selling and selling support.


TEXT BOOKS:

1. Industrial Marketing -Richard M. Hill.Ralph. S. Alexander and James S. Cross. Published by AITBS, New Delhi.
2. Industrial Marketing - Phadtare, PHI Pvt., Ltd.
**ROBUST DESIGN**

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>: 14 MEM 422</th>
<th>IA Marks : 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Lecture Hrs/week</td>
<td>: 04</td>
<td>Exam Hours : 03</td>
</tr>
<tr>
<td>Total Lecture Hrs</td>
<td>: 52</td>
<td>Exam Marks : 100</td>
</tr>
</tbody>
</table>

**Quality by Experimental Design:** Quality, western and Taguchi quality philosophy, Elements of cost, Noise factors causes of variation, Quadratic loss function and variation of quadratic loss functions. **Robust Design:** Steps in robust design: parameter design and tolerance design, reliability improvement through experiments, illustration through numerical examples.

**Experimental Design:** Classical experiments: factorial experiments, terminology, factors. Levels, Interactions, Treatment combination, randomization, 2-level experimental design for two factors and three factors. 3-level experiment deigns for two factors and three factors, factor effects, factor interactions, Fractional factorial design, Saturated design, Central composite designs, Illustration through numerical examples.

**Measures of Variability:** Measures of variability, Concept of confidence level, Statistical distributions: normal, log normal and Weibull distributions. Hipothesis testing, Probability plots, choice of sample size illustration through numerical examples.

**Analysis and interpretation of experimental data:** Measures of variability, Ranking method, column effect method and ploting method, Analysis of variance (ANOVA), in factorial experiments: YATE’s algorithm for ANOVA, Regression analysis, Mathematical models from experimental data, illustration through numerical examples.

**Taguchi’s Orthogonal Arrays:** Types orthogonal arrays, Selection of standard orthogonal arrays, Linear graphs and interaction assignment, dummy level technique, Compound factor method, modification of linear graphs, Column merging method, Branching design, Strategies for constructing orthogonal arrays.

**Signal to Noise ratio (S-N Ratios):** Evaluation of sensitivity to noise, Signal to noise ratios for static problems, Smaller – the – better types, Nominal – the – better – type, larger – the- better – type. Signal to noise ratios for dynamic problems, Illustrations through numerical examples.

**Parameter Design and Tolerance Design:** Parameter and tolerance design concepts, Taguchi’s inner and outer arrays, Parameter design strategy, Tolerance deign strategy, Illustrations through numerical examples.

**Reliability Improvement Through Robust Design:** Role of S-N ratios in reliability improvement; Case study; Illustrating the reliability improvement of routing process of a printed wiring boards using robust design concepts.

**TEXT BOOKS:**


**REFERENCE BOOKS:**

### MODERN TRENDS IN MANAGEMENT

<table>
<thead>
<tr>
<th>Sub Code</th>
<th>14 MPM 423</th>
<th>IA Marks</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Lecture Hrs/week</td>
<td>04</td>
<td>Exam Hours</td>
<td>03</td>
</tr>
<tr>
<td>Total Lecture Hrs</td>
<td>52</td>
<td>Exam Marks</td>
<td>100</td>
</tr>
</tbody>
</table>


**Implementing a Program for continuous Improvement:** Japanese concept of continuous Improvement. (KAIZEN mean continuous Improvement), Innovation concept of Improvement, Need for continuous improvement, Steps in implementing continuous improvement.

**Quality Circles:** Definition of quality circles, Quality circles as a tool for problem solving, Q.C. as a group oriented KAIZEN.

**Kanban System:** Definition of KANBAN, Difference between PULL & PUSH Systems of Material Control, KANBAN as a Push System, KANBAN as JIT concept.

**Concurrent Engineering:** Definition of Concurrent Engineering. Design for Manufacturing and Assembly (DFMA), Concurrent Engineering, Team, Advantages of concurrent Engineering.

**REFERENCE BOOKS:**

ADVERTISEMENT & PUBLICITY

Sub Code : 14MEM 424          IA Marks : 50
No. of Lecture Hrs/week : 04          Exam Hours : 03
Total Lecture Hrs : 52          Exam Marks : 100

Need, Importance and Scope: Advertisibility, advertisibility goals, legal, ethical and social aspects of advertising and public relations.

Types of advertising and communications in advertising.

Advertisement Design: Copy Design, mechanics of copy preparations, essentials of a good copy, layout design and visualization effects, advertising theme.

Media Decisions: Types of media, Media mix decisions, Criteria for evaluation of media effectiveness.

Rural Advertising: Characteristics, Problems and Prospects.

Advertising Aids: Trade Marks, Slogan package, point of purchase, displays etc.

Measurement of Advertising Effectiveness: Methods and problems.

Advertising Agency: Functions and Usefulness, Types, Dealing with agency, advertising Agency versus own, advertising department, advertising agencies in India.

Industrial and consumer goods and services advertising.

Advertising Planning: Timing and Scheduling, Advertisement Budget, Types and sizes. Approaches to determining advertising budgets, limitations, advertising research.

REFERENCE BOOKS:

2. The Systematic Approach to Advertising Creativity – Bake.