

# DEPARTMENT OF TECHNOLOGY MANAGEMENT

## M. Tech in Technology Management

### Semester I

Sl. No.	Course Code	Course	Contact Hours/week		Credits
			L	T/P	
1	TM601	Introduction to Technology Management	3	1	4
2	TM602	R&D Management	3	1	4
3	TM603	Project Management	3	1	4
4	TM604	Strategic Management for Technology	3	1	4
5	TM605	Management of Innovation and Intellectual Property	3	1	4
6	TM615	Human Resource Management for Technology intensive organisations	3	1	4
		<b>Total</b>	<b>18</b>	<b>6</b>	<b>24</b>

### Semester II

Sl. No.	Course Code	Course	Contact hours/week		Credits
			L	T/P	
1	TM610	Leadership & Organisational Behaviour	3	1	4
2	TM612	Quality Management	3	1	4
3	AM634	Applied statistics for Management	3	1	4
4	TM617	Logistics and Supply Chain Management	3	1	4
5		Elective ó I	3	1	4
6		Elective ó II	3	1	4
		<b>Total</b>	<b>18</b>	<b>6</b>	<b>24</b>

Note: 04 weeks Practice school during summer vacation for scholarship students.

### Semester III

Sl. No.	Course Code	Course	Contact Hours /week		Credits
			L	T/P	
1	TM651	M.Tech. Dissertation Phase I			14
		<b>Total</b>			<b>14</b>

### Semester IV

Sl. No.	Course Code	Course	Contact Hours /week		Credits
			L	T/P	
1	TM652	M.Tech. Dissertation Phase II			14
		<b>Total</b>			<b>14</b>

## LIST OF ELECTIVES

Sl. No.	Course Code	Course Name
<b>Elective I, II, III, IV, V &amp; VI</b>		
<b>ELECTIVES FROM DEPARTMENT (Semester 2)</b>		
1	TM607	Management of Manufacturing and Integration
2	TM608	Knowledge Management
3	TM609	System Engineering for Managers
4	TM611	Software Projects Management
5	TM613	Value Engineering
6	TM614	Design Management
7	TM616	Introduction to variables of Nation Building
8	TM618	Operations Management
9	TM619	Advanced Project Management Techniques
10	TM620	Accounting and Finance for Technologists
11	TM621	Artificial Intelligence (AI) for Managers
<b>ELECTIVES FROM OTHER DEPARTMENT</b>		
11		Open Electives from other departments
<p style="text-align: center;">* 1 Credit in Theory/Tutorial means 1 contact hour and 1 credit in practice/Project Thesis means 2 contact hours in a week</p>		

## **SEMESTER 1 : INTRODUCTION TO TECHNOLOGY MANAGEMENT (TM601)**

**Unit I:** Introduction to technology, History of managing tech in India, Managing in today's high tech environment and mgmt. Tech's scope and focus, The Role of Technology in the Creation of Wealth, Critical Factors In Managing Technology, Management of Technology: The New Paradigms, Technology Life Cycles, Tech life cycle and product life cycles, Tech maturation and tech substitution, Integrating tech and strategic planning, Core competencies for tech development,

**Unit II:** Understanding the Dynamics of Technology & Product development Environment, Technology Search Mechanisms, Technology Assessment Models, Technology selection criteria, In-sourcing & Out-sourcing decisions in Technology development, Competitiveness, Business Strategy and Technology Strategy,

**Unit III:** Technology Planning, Acquisition and Exploitation of Technology, Managing risk in high technology, Transfer of tech from lab to land. ,Technology Transfer, Manufacturing and Service Industries, Design of Organizations, Changing Game of Management, Case Studies (How the World Does It).

### **Text Books:**

1. Tareek Khalil and Ravi Shankar, Management of Technology: the key to Competitiveness and Wealth Creation, Second Edition, McGraw-Hill Publishing Company Ltd, New Delhi (2012).
2. Thahaman H.J., Management of Technology, New Jersey: John Wiley & Sons, 2005.

### **Reference Books:**

1. BETZ Frederick, Strategic Technology Management, New York: McGraw Hill, 1994.
2. Steele, Lowell W. Managing technology: the strategic view. New York: McGraw-Hill, 1989.

## **SEMESTER 1 : R & D MANAGEMENT (TM 602)**

**Unit I :** Introduction to R&D function, The Strategic Aspects of R&D Management, Project Planning and Budgeting, R & D Road mapping, Project Selection, Project Evaluation. R&D-Marketing interface, Emerging Perspectives in Industrial R&D, External Technology Acquisition

**Unit II :** Human Resource Management in R&D, HR Planning, Attraction and Retention of Talent in R&D, Creativity in R&D Organizations, Interpersonal Relationships, Teams and Team building, Reward System, Performance Appraisal system and Career Management System

**Unit III :** New Product Development: What is New Product Development and why is it so important, The new Product Development Process Principles of Success, Phases of New Product Development, Idea Generation, Opportunity identification/selection Techniques, The New Product Process: The Stage-Gate, Frameworks for stakeholder involvement in NPD, Concurrent Engineering, Brand/value creation, Product Launch.

### **Text Books:**

1. Hawthorne E.P., Management of Technology, McGraw-Hill, 1978.
2. Akhilesh KB, R&D Management, Springer, 2013

### **Reference Books:**

1. Beattle C.J. & Reader R.D., Quantitative Management in R&D, Chapman and Hall, 1971.
2. Gibson J.E., Managing Research and Development, Wiley & Sons Inc., New York, 1983

## **SEMESTER 1 : PROJECT MANAGEMENT (TM 603)**

**Unit I:** Project Systems Management: a life cycle approach, stage-gate model, project characteristics; project life cycle phases: conception, definition, planning and organising, implementation and project clean up, Management of projects. Organization Strategy and Project Selection. Project feasibility analysis, The project manager: role and responsibilities, Tools and techniques for project management, Environmental impact analysis of a project.

**Unit II:** Managing Risks, Network techniques for project management-PERT and CPM Accounting for risk, uncertainty and fuzziness. Time cost tradeoffs and crashing procedures. Multi project planning and scheduling with limited resources.

**Unit III:** Projects financing, performance budgeting and control. Project materials management. Pricing, estimating, and Contract Administration and Management, Building and Bid evaluation and analysis. Project implementation and monitoring, Project management information and control systems. Project systems management performance indices. Software Packages application for Project Systems Management. Case studies.

### **Text Books:**

1. Iyer, P.P., Engineering Project Management with Case Studies, Vikas Publishing, New Delhi, 2009.
2. J.R., and Mantel, S.J. Jr., Project Management: A Managerial Approach, John Wiley and Sons, NY, 1995.

### **Reference Books:**

1. John M. Nicholas and Herman Steyn, Project Management for Business, Engineering, and Technology: Principles and Practices (Third Edition), Elsevier (2008).
2. Clifford F. Gray, Erik W. Larson and Gautam V. Desai, Project management: The Managerial Process (Sixth Edition), Mc Graw Hill Education (2014).
3. Project Management Institute, USA. A Guide to the Project Management Body of Knowledge. Newton Square, PA. 1996.

## **SEMESTER 1 : STRATEGIC MANAGEMENT FOR TECHNOLOGY (TM604)**

**Unit I :** Strategic Management Process; Challenge of Globalization; Strategic Planning in India; Corporate Governance; Board of Directors; Role and functions of Top Management, Environmental scanning: Industry Analysis, Internal Scanning: Organizational Analysis

**Unit II :** Strategy Formulation: Situation Analysis and Business Strategy, Corporate Strategy, Functional Strategy, Strategy Implementation and Control, Strategic Alternatives; Diversification, Mergers and Acquisitions.

**Unit III :** Case Studies in Strategic Management: Strategic initiatives of Govt. of India, FDI in defence, start-ups, 'Make in India' for document of cutting edge technology coming from abroad-offset policies, Freedom to operate, strategic aspects of Technology Management.

### **Texts Books:**

1. R. Srinivasan, Strategic Management ó The Indian Context, Prentice-Hall of India, 3rd Edition, 2008

### **Reference Books:**

1. Azhar Kazmi, Business Policy and Strategic Management, 2e. Tata McGraw Hill Education.
2. R. Srinivasan, Case Studies in Marketing ó The Indian Context, Prentice-Hall of India, 4th Edition, 2002

**SEMESTER 1: MANAGEMENT OF INNOVATION AND INTELLECTUAL PROPERTY**  
**(TM605)**

**Unit I:** *Organizational and technological innovation* : role of organizational design and processes in managing inventions and innovations, introduction to intellectual property rights, strategic role of intellectual property protection in technological innovations case studies, role of open source, the use of patent information, the R&D value chain, stage gates , differences in priority with the R&D value chain

**Unit II:** *The Process of Technological Innovation*, Need for innovation in business: measuring innovative performance, Characteristics of innovative work environment, Stimulating Innovation, Promoting break through innovation, Open innovation and Knowledge Markets

**Unit III:** *Innovative inventions*: Commercial potential, management of processes to enhance innovative patents and technological know-how transfer, incubators, assessing patent value implications on managing the R&D value chain for corporate R&D, designing innovation and intellectual property divisions, and information technology support systems in managing innovation and intellectual property.

**Texts/References:**

1. Trott, P., Innovation Management and New Product Development, Financial Times, Pitman Publishing, GB, 1998.

**SEMESTER 1: HUMAN RESOURCE MANAGEMENT FOR TECHNOLOGY**  
**INTENSIVE ORGANISATIONS (TM 615)**

**Unit I:** Introduction, Personnel Management & HRM, elements & model, functions, challenges; Balanced Scorecard: history, perspectives, BSC & Strategy, Competency Management: Concept, need, competence & competency, framework.

**Unit II:** Cross Culture: nature, Hofstede's cultural dimensions, strategy; HR Audit: need, concept, strategy, structure, role of HRD audit, functions, methodology; Human capital and performance: elements, significance, measurement, reporting.

**Unit III:** Management of change: The nature of change, Eight steps to successful change, Change management and organizational structure, Change strategies, Change resistance, Effective communication, Effective leadership, Emotional Intelligence.

**Text Books:**

1. Aswathappa, Human Resource Management: Text and Cases.
2. V. S. P. Rao, Human Resource Management, 2010.
3. Palmer et al. (2009): Managing Organizational Change: A Multiple Perspectives Approach, McGraw-Hill 6
4. Bridges (2009): Managing Transitions: Making the Most of Change, Da Capo Press

**References Books:**

1. Gary Dessler, Human Resource Management 12 Edition (Old Edition), 2011.
2. Dessler/Varkkey, Human Resource Management 14e(4 Color), Pearson, 2015
3. P. Jyothi & D.N. Venkatesh, Human Resource Management (Oxford Higher Education), 2012.
4. Kotter (1996): Leading Change, Harvard Business School Press
5. Linstead et al. (2009): Management and Organization: A Critical Text, Palgrave

## **SEMESTER 2 : LEADERSHIP & ORGANISATIONAL BEHAVIOUR (TM610)**

**Unit I:** Organisation: context, structure, processes, Theories of organisation, organisation and its environment, organisational analysis: Individual and Group, Organisational change and development.

**Unit II:** Functions of Human Resource Management, Recruitment, Selection, Performance Management, Reward and Compensation Management, Training and development, administration wage and salary, labour legislations and Industrial Relations.

**Unit III:** Basics of Human Behaviour, Leadership, Competing for the future through leadership management, career management and leadership pipeline, succession planning and change management.

### **Text Books:**

1. Paul Hersey, Kenneth H Blanchard & Dewey Johnson, Management of Organisational Behavior PHI
2. John W Newstrom & Keith Davis, Organizational Behavior: Human Behavior at work, Tata McGraw Hill
3. Fred Luthans, Organizational Behavior, McGraw Hill

### **References Books:**

1. Paul Hersey & Kenneth H Blanchard, Management of Organisational Behavior: utilizing Human behaviour, PHI
2. Stephen P Robbins, Organizational Behavior: Concepts, controversies and applications, PHI

## **SEMESTER 2 : QUALITY MANAGEMENT (TM 612)**

**Unit I: Introduction to TQM and Six Sigma:** Customer Orientation, Continuous Improvement, Quality, Productivity and Flexibility, Approaches and philosophies of TQM, Quality Awards, Strategic Quality Management, TQM and corporate culture, Total Quality Control; Basic Analytical tools-Check Sheets; Histograms; Pareto charts, Cause and Effect diagrams; Flow charts, Quality assurance, OC curve.

**Unit II: Statistical Process Control; Advanced Analytical tools:** Statistical Design of Experiments; Taguchi Approach; Cost of Quality; Reliability and failure analysis. FMEA, Six Sigma tools and techniques for DMAIC phases, Quality Function Deployment.

**Unit III: Quality Teams, Employee practices in TQM organisations:** Leadership, delegation; empowerment and motivation; role of communication in Total Quality, Quality Circles; Total Employee Involvement; Problem Solving in TQM- Brain storming; Nominal Group Technique Team process; Kaizen and Innovation; Measurement and audit for TQM; Quality Information Systems, ISO 9000 series of Quality Standards; TQM and Six Sigma case studies implementation.

### **Text Books:**

1. O.N. Pandey Bhupesh Aneja, Quality Management, Katson Books.
2. Besterfield, Total Quality Management, 4th edition, Pearson.
3. R. Panneerselvam, p. Sivasankaran, Quality Management, PHI Publication.

### **Reference Books:**

1. James R. Evans & William M. Lindsay, Managing for Quality and Performance Excellence, Seventh Edition, Cengage learning (2008)
2. John S Oakland, TQM: Text with Cases, Taylor and Francis Culley, William C. Environmental and quality systems integration, CRC Press Company (2004)
3. V. K. Khanna, PremVrat, B. S. Sahay and Ravi Shankar (2008): Total Quality Management: Planning Design and Implementation, New Age International Publication, New Delhi.

## **SEMESTER 2 : APPLIED STATISTICS FOR MANAGEMENT (AM634)**

**Unit I:** *Nature and role of statistics for management:* Types of data, data measurement scales, Descriptive Statistics: Measures of Central Tendency, Measures of Dispersion, Introduction to probability theory. Probability Theory: Preliminary concepts in Probability, Basic Theorems and rules for dependent/independent events, Random Variable, Probability distributions, Sampling Techniques, Sampling distributions.

**Unit II:** *Hypothesis testing:* Z-test, t-test, Basic Two-Level Factorial Experiments, Additional Tools for Design and Analysis of Two Level Factorials, Correlation and Regression analysis, Multiple and Partial Correlation, ANOVA, Chi-square tests.

**Unit III:** Factor Analysis, Time Series Analysis and Business Forecasting, Non-Parametric Methods, SPSS and their use for statistical modeling, applications and case studies in data analysis, Excel, Minitab, R.

### **Text Books:**

1. Levin Richard, I., Rubin David, S., Sanjay Rastogi and Masood Husain, S., Statistics for Management, Seventh Edition, Pearson Education India (2012).
2. S C Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons (2014)
3. Andy Field, Discovering Statistics Using SPSS, Third Edition, Sage Publications Ltd, London (2009)

### **Reference Books:**

1. Lawson, J. and Erjavec, J., Modern Statistics for Engineering and Quality Improvement, First Edition, Duxbury Press (2000).
2. Anderson, Sweeney, Williams Camm and Cochran, Statistics for Business and Economics, Twelfth Edition, Cengage Learning (2014)

## **SEMESTER 2 : LOGISTICS AND SUPPLY CHAIN MANAGEMENT (TM617)**

**Unit I:** *Introduction to Logistics and supply chain management (LSCM):* Concept and objectives of logistics management and supply chain management (SCM), Flow in supply chain, Decision phases in supply chain, Push-pull supply chains, Supply chain integration, Process view of a supply chain, Lead time management, Cold chains, Reverse logistics, Uncertainties in supply chain, supply chain drivers. Demand management in SCM; *Sourcing and Procurement:* Vendor development, Outsourcing benefit, Vendor evaluation and rating, supply contracts, competitive bidding and Negotiation, E-Procurement, Vendor managed inventory (VMI); *Purchasing:* Objectives, Relations with other departments, centralised and decentralised purchasing, Purchasing procedure in government organisations in India, Types of orders, Tender buying, purchasing department records, Computer-based systems/EDI, Stores management.

**Unit II :** *Inventory Management in SCM:* Introduction of inventory system, EOQ model, ABC-VED Analysis, Service-level management, Risk pooling and postponement strategies, Lean, Agile and Leagile supply chain, Designing lean supply chain; *Distribution Management in Supply Chain:* Different distribution strategies in supply chain, warehousing and cross- locking, Network planning and design, 3PL and 4PL

**Unit III:** *Managing Information flow in supply chain:* Bullwhip effect- cause and remedy. Role of Information technology in SCM; *Performance management in a supply chain:* Balance scorecard and SCOR Framework. Sustainable and low-carbon supply chains. Sustainable freight transportation. Supply chain risk management.

**Text Books:**

1. Simchi-Levi, D., Kaminsky, P., Simchi-Levi, E., and Ravi Shankar, Designing & Managing the Supply Chain: Concepts, Strategies & Case Studies, Third Edition, McGraw-Hill Publishing Company Ltd, New Delhi (2008)
2. Richard B. Chase, Ravi Shankar, and F. Robert Jacobs: Operations & Supply Chain Management (14th Edition), McGraw-Hill Publishing Company Ltd, New Delhi (2014)

**Reference Books:**

1. Chopra, S., Meindl, P. and Kalra DV, Supply chain Management: Strategy, Planning and Operations. Sixth Edition, Pearson Education (2016)
2. Tersine, R.J. Principles of Inventory and Materials Management, 4<sup>th</sup> edition, Prentice-Hall Inc., New Jersey, (1994)

**ELECTIVES FROM DEPARTMENT****MANAGEMENT OF MANUFACTURING AND INTEGRATION (TM 607)**

**Unit I :** Introduction to Manufacturing, Concepts of Total Quality Management (TQM) and Six Sigma, Benchmarking and Business Process reengineering, The continuous process improvement cycle.

**Unit II:** Lean Manufacturing, Design for Manufacturing. Rapid Prototyping, 3D printing, IT for Manufacturing: Digital and Smart Factory, Virtual Product Creation, Interface between R&D and Manufacturing, Product Lifecycle Management, Concurrent and Simultaneous Engineering, cellular manufacturing system, design planning and implementation.

**Unit III:** Flexible Manufacturing System: Automation of Manufacturing Processes ó an overview, Flexible Automation, Integrated Manufacturing Modelling and FMS, Hardware Components, Control Components, System Planning and Design Problems, Production Planning, Process Planning, Scheduling, Economic and Technological Aspects, Automation / Mechatronics / Robotics, Manufacturing 4.0

**Text Books:**

1. Partik Jonsson and Stig-Arne Mattsson, óManufacturing, planning and controlö, McGraw-Hill, 2011
2. K. L. S. Sharma, óOverview of Industrial Process Automationö, Elsevier, 2011.
3. Kuldeep Sareen and Chandandeep Grewal, öCAD/CAMö, S. Chand and Company Ltd., 2009
4. H. D. Ramachandra, öMechatronicsö, Sudha Publication, 2006

**References Books:**

1. Michael Grieves, öProduct lifecycle managementö, McGraw-Hill, 2006
2. Tien-Chien Chang, Richard A. Wysk and Hsu-Pin Wang, öComputer-Aided Manufacturingö, Pearson, 2009
3. Mark W. Spong, Seth Hutchinson and M. Vidyasagar, öRobot Modelling and controlö, Wiley, 2006
4. Mikell P. Groover, öPrinciples of modern manufacturingö, Wiley, 2014
5. Chris Anderson, öMakers: The New Industrial Revolutionö, Cornerstone Digital, 2013

**KNOWLEDGE MANAGEMENT (TM 608)**

**Unit I:** Data Information Knowledge wisdom, Knowledge cycle, Basics of Knowledge Management: Knowledge capture, storage, use and reuse learning organisations.

**Unit II:** Intellectual capital and its measurements, Performance management systems in Knowledge Management, Knowledge transfer in organisations, knowledge mapping, knowledge



ownership, knowledge losses, knowledge management for new product development, Human aspects of knowledge management, design and implementation of effective knowledge management systems

**Unit III:** Knowledge Management in the Fourth Industrial Revolution, Theoretical and Practical Considerations in Cyber Physical Production Systems, the future of Knowledge Management

**Text Books:**

1. Harvard Business Review on Knowledge Management by Peter Ferdinand Drucker, David Garvin, Dorothy Leonard, Susan Straus, John Seely Brown
2. Knowledge Management: Concepts and Best Practices by Kai Mertins (Editor), Peter Heisig (Editor), Jens Vorbeck (Editor)

**References Books:**

1. If Only We Knew What We Know: The Transfer of Internal Knowledge and Best Practice by Carla O'Neil, C. Jackson Grayson

**SYSTEMS ENGINEERING FOR MANAGERS (TM 609)**

**Unit I : SYSTEMS ENGINEERING AND THE WORLD OF MODERN SYSTEMS**

- What Is Systems Engineering?
- Origins of Systems Engineering
- The Power of Systems Engineering
- Examples of Systems Requiring Systems Engineering

**Unit 2 : STRUCTURE OF COMPLEX SYSTEMS**

- System Building Blocks and Interfaces
- Hierarchy of Complex Systems
- System Building Blocks
- The System Environment
- Interfaces and Interactions
- Complexity in Modern Systems
- Examples of Complex Systems

**Unit 3: THE SYSTEM DEVELOPMENT PROCESS**

- Systems Engineering through the System Life Cycle
- System Life Cycle
- Evolutionary Characteristics of the Development Process
- The Systems Engineering Method
- Testing throughout System Development
- Development process examples

**Unit 4: SYSTEMS ENGINEERING MANAGEMENT**

- Managing System Development and Risks
- WBS
- SEMP
- Risk Management

**Text Books:**

1. B.Dennis M.Buede, The Engineering Design of Systems: Models and Methods, John Wiley & Sons, 2011
2. A.Kossiakoff, W.N.Sweet, S.J.Seymour & S.M.Biemer, Systems Engineering: Principles and Practice, Wiley, 2011
3. D.J.E.Kasser, A Framework for Understanding Systems Engineering, Book/Surge Publishing, 2007

### **References Books:**

1. George,A. Hazelrigg, Systems Engineering: An Approach to Information-Based Design, Prentice Hall NJ, 1996.
2. Benjamin, A., Blanchard, and Walter,J. Fabrycky, Systems Engineering and Analysis, 3rd Ed., Prentice Hall International Series, Industrial & Systems Engg., 1998
3. B.S.Blanchard, Systems Engineering Management,Wiley,1998

### **SOFTWARE PROJECTS MANAGEMENT (TM611)**

**Unit I :** *Introduction to Software Project Management:* Software projects versus other types of project, Activities Covered by software project management, Some ways of categorizing software projects, Stakeholders, Project success and failure.; *Project Evaluation and Programing Management:* Project portfolio management, Evaluation of individual projects, Cost-benefits Evaluations techniques, Risk Evaluation, Programme management, managing the Allocation of Resources within programmes, Aids to programme management; *An overview of Project Planning:* Introduction Step wise project planning; *Selection of an Appropriate Project Approach:* Build or Buy?, Choosing Methodologies and Technologies , Software processes and process Models , Choices of process Models , Structure versus speed of Delivery , The waterfall Model , The Spiral Model , Software prototyping , Other Ways of Categorizing Prototypes ,incremental Delivery , Atern/ Dynamic systems development methods , Rapid application development , Agile methods , Extreme programming (XP), Scrum , Managing Iterative processes , Selecting the most appropriate process Model.

**Unit II :** *Software Effort Estimation:* The basis for software estimating, Software effort estimation techniques , Bottom up estimating, the top-down Approach and parametric models ,Expert Judgement , estimating by analogy ,Albrecht function point analysis, COSMIC full function points , COCOMO II : A parametric productivity Model , cost estimation; *Activity Planning:* Sequencing and Scheduling Activities, Network planning Models, Formulating a Network Model, Identifying the Critical path; *Risk Management:* Categories of risk, Risk identification , Risk assessment , Risk planning, Risk management , Evaluating risks to the schedule , Monte carlo simulation; *Resource Allocation:* The nature of Resources ,Identifying Resource Requirements, Scheduling resources , Counting the cost ,Being specific , Cost schedules;

**Unit III:** *Monitoring And Control:* Creating the framework, visualizing progress, cost monitoring, earned value analysis, prioritizing monitoring, Getting the project Back to target, Software Configuration management (SCM); *Managing Contracts:* Stages in contract placement, typical

terms of a contract, Contract management, Acceptance; *Working In Teams:* Becoming a team, Decision making , Organization and team strictures , Dispersed and virtual teams , Communication plans; *Software Quality:* Defining software Quality, ISO 9126, Product and process metrics, , Quality management systems, process capability models , techniques to Help Enhance software Quality , software reliability.

### **Text Books:**

1. Ravi Chopra, Software Project Management, Katson Books.
2. Sanjay Mohapatra, Software Project Management, Cengage Learning.
3. Rishabh Anand, Software Project Management, Katson Books.

### **References Books:**

1. Pankaj Jalote:Software Project Management in Practice, Pearson
2. Bob Hughes, Mike Cotterell, Rajib Mall: SOFTWARE PROJECT MANAGEMENT (5<sup>th</sup> edition),-McGraw Hill Education. 2016
3. Taylor James:Managing Information Technology Projects: Applying Project Management Strategies To Software, Hardware, And Integration Initiatives 1st Edition, AMACOM
4. Gunther Ruhe &Claes Wohlin:Software Project Management in a Changing World, Springer
5. Hughes, Software Project Management, 5th edition, SIE Publication.
6. Royce, Software Project Management: A Unified Framework, 1e, Pearson Publication.

## **VALUE ENGINEERING (TM 613)**

**Unit I:** Introduction to Value Engineering and Value Analysis, Methodology of V.E., Quantitative definition of value, Use value and prestige value, Estimation of product quality/performance, Classification of functions, functional cost and functional worth, Effect of value improvement on profitability.

**Unit II:** Introduction to V.E. job plan / Functional approach to value improvement, Various phases and techniques of the job plan, Life Cycle Costing for managing the total value of a product, Cash flow diagrams, Concepts in LCC, Present Value concept, Annuity cost concept, Net Present Value, Pay Back period, Internal rate of return on investment (IRR), Continuous discounting, Examples and illustrations.

**Unit III:** Creative thinking and creative judgment, False material, labor and overhead saving, System reliability, Reliability elements in series and in parallel, Decision Matrix, Evaluation of value alternatives, Estimation of weights and efficiencies, Sensitivity analysis, Utility transformation functions, Fast diagramming, Critical path of functions, DARSIRI method of value analysis.

### **Text Books:**

1. Anil Kumar Mukhopadhyaya, Value Engineering: Concepts, Techniques and Applications, Sage Publication.
2. Zimmerman L., Value Engineering Paperback ó 2010.

### **References Books:**

1. Del I. Younker, Value Engineering: Analysis And Methodology,
2. J. Paul Guyer, Value Engineering (Engineering Sound Bites) Kindle Edition

## **DESIGN MANAGEMENT (TM 614)**

**Unit I:** Introduction; Designer's view; Philosophical and psychological issues in design; Fostering creativity and innovation; cognition: Action selection, memory, decision making; Perception: Auditory & Visual, errors. Design and Competitiveness: Oligopoly, Monopoly

**Unit II:** Requirement elicitation and analysis: QFD, HOQ; Anthropometrics, Human factors & Ergonomics; Environmental design; Industrial design management; basics of work study: time study, motion study; Economic analysis: Break even analysis, profit, Taguchi function.

**Unit III:** Collaboration and conflict management; concept of value analysis and value engineering- design perspective; role of computer in design; rapid prototyping; designer as an entrepreneur, designer's knowledge on Intellectual Property Rights

### **Text Books:**

1. Oakley, M. (Ed), Design Management ó A Handbook of Issues and Methods, Blackwell Publication.
2. Kathryn Best, Design Management: Managing Design Strategy, Process and Implementation
3. Brigitte Borja de Mozota, Design Management: Using Design to Build Brand Value and Corporate Innovation

### **References Books:**

1. Michel Farr, Design Management.
2. Rachel Cooper, Sabine Junginger and Thomas Lockwood, Design Management.

## **INTRODUCTION TO VARIABLES OF NATION BUILDING (TM 616)**

**Unit I:** *Introduction and Basic Concepts of National Service Scheme (NSS):* History, philosophy, aims & objectives of NSS, Emblem, flag, motto, song, badge etc., Organizational structure, roles and responsibilities of various NSS functionaries.

**Unit II:** *Life competencies & Disaster Management:* Definition and importance of life competencies, Communication, Inter Personal, Problem-solving and decision-making, Introduction to Disaster Management, classification of disasters, Role of youth in Disaster Management.

**Unit III:** *Entrepreneurship Development:* Definition & Meaning, Qualities of good entrepreneur, Steps/ways in opening an enterprise, Role of financial and support service Institutions.

### **Text Books:**

1. Disaster Management, Harsh k Gupta
2. Management of natural disasters in developing countries, H N Srivastava
3. Entrepreneurship Development, S Anil Kumar

### **References Books:**

1. Chhatrapati Shahu ó The Pillar of Social Democracy, Ed. P.B. Salukhe.
2. National Service scheme Manual, Govt. of India.
3. Training Programme on National programme scheme, TISS.
4. Orientation courses for N.S.S. programme officers, TISS.
5. Case material as Training Aid for field workers, Gurmeet Hans

## **OPERATIONS MANAGEMENT (TM618)**

**Unit I:** Managing operations; planning and design of production and operations systems. Service characteristics. Facilities planning location, layout and movement of materials. Line balancing. Analytical tools and techniques for facilities planning and design.

**Unit II:** Production forecasting. Aggregate planning and operations scheduling, Production Planning and Control. Purchasing, Materials Management and Inventory control and JIT Material Requirements Planning. MRPII, ERP, Optimization techniques applications.

**Unit III:** Work Study, Value Engineering, Total quality & statistical process control. Maintenance management and equipment policies. Network planning and control. Line of Balance, World class manufacturing and factories of the future, Case studies.

### **Text Books:**

1. Operations Management: Theory and Practices, B. Mahadevan; 3rd edition, Pearson.
2. Production and Operations Management; R. Paneerselvam, 3rd edition, PHI.

### **Reference Books:**

1. Richard B. Chase, Ravi Shankar, and F. Robert Jacobs: Operations & Supply Chain Management (14th Edition), McGraw-Hill Publishing Company Ltd, New Delhi (2014)
2. Operations Management; J. Heizer and B. Render; 11th edition, Pearson.
3. Operations Management; Russell and Taylor; 7th edition, Wiley.

## **ADVANCED PROJECT MANAGEMENT TECHNIQUES (TM619)**

**Unit I:** Advanced concepts in Project Management: Agile PM, Capability Maturity Model (CMM), Earned Value Analysis (EVA) and Earned Duration Analysis (EDA)

**Unit II:** Software Project Management: Software testing and quality Management, Effort estimating and scheduling, Project Monitoring and control, Reviews, Risk Management, Tools for software project such as MS project.

**Unit III:** Applications and case studies in Project Management, Management of multiple projects

**Unit IV:** Collaborative Product Development: Integrated Product Design, User Experience Design, Internal & External Collaborations, Integrated Process & Product Development.

### **Text Books:**

1. Ravi Chopra, Software Project Management, Katson Books.
2. Sanjay Mohapatra, Software Project Management, Cengage Learning.
3. Rishabh Anand, Software Project Management, Katson Books.

### **References Books:**

1. John M. Nicholas and Herman Steyn, Project Management for Business, Engineering, and Technology: Principles and Practices (Third Edition), Elsevier (2008).
2. Pankaj Jalote: Software Project Management in Practice, Pearson
3. Bob Hughes, Mike Cotterell, Rajib Mall: SOFTWARE PROJECT MANAGEMENT (5<sup>th</sup> edition), -McGraw Hill Education. 2016
4. Taylor James: Managing Information Technology Projects: Applying Project Management Strategies To Software, Hardware, And Integration Initiatives 1st Edition, AMACOM

## **ACCOUNTING AND FINANCE FOR TECHNOLOGISTS (TM 620)**

**Unit I:** Introduction to accounting, accountability, transparency, responsibility; Basic accounting concepts and financial statements, sources and use of finance, Basics of Project finance in Public domain, feasibility study, Asset Funding.

**Unit II:** Social cost benefit analysis; Return on Investment, Cost of Capital, Audit and control; Cost concepts and profit centers and responsibility accounting; costing and profitability analysis; Good costs vs. Bad costs.

**Unit III:** Basics of contracts, Cost escalation clause in contracts and consequences, Planning and budgeting; Basic concepts of working capital, Basics of financing of imports, exchange rate risk in capital expenditure decisions

### **Text Books:**

1. Anthony, Robert N (1984): Management accounting, Text and Cases, Richard D. Irwin, Inc. Illinois
2. Ernest, W. Walker (1976): Essentials of Financing Management, Prentice Hall, New Delhi.
3. Gestenberg, Charles W. (1962): Financial Organisation and Management of Business Asia Publishing, Sultan Chand and Sons
4. Pandey, I.M. (1983): Financial Management, Vikas Publishing House Pvt. Ltd., New Delhi.
5. Jain S P ,Narang K L , Cost and Management Accounting, Kalyani Publishers
6. Khan a, Jain, Financial Management, Tata McGraw Hill
7. Dr. V K Goyal, Financial Accounting, Excel Books

### **Reference Books:**

1. Van, Home James C. (1971): Fundamentals of Financial Management Prentice Hall Inc. Englewood Cliffs, New Jersey.
2. Vyas, J.N. (1983): Financing and Industrial, N.K. Vyas, Family trust, Ahmedabad.
3. Walker, Ernest, W (1976): Essentials of Financing Management, → Prentice Hall of India Ltd., New Delhi.

## **ARTIFICIAL INTELLIGENCE (AI) FOR MANAGERS (TM621)**

**Unit I:** Information Systems, Introduction, Management of Information Systems, Types of Information Systems, Role of Data mining, Designing & Induction Challenges

**Unit II:** Artificial Intelligence Concepts, Different Types of AI ó Narrow AI, General AI, Super AI, Building Blocks of AI, Basic Terminologies in AI&ML, Difference between AI, ML, DL, RL, BDA; *Fields of AI* ó Computer Vision, Speech Analytics, Natural Language Processing  
*AI Learning Models* ó Supervised, Unsupervised, Reinforcement

**Unit III:**

***(A) Data and Algorithm***

- i. Problems and required Algorithms
- ii. Artificial Neural Network
- iii. Big Data Analytics and AI

***(B) Develop AI & ML Models without writing code***

***(C) AI Applications***

- i. Computer Vision
- ii. Natural Language Processing
- iii. Voice AI

**Unit IV:** Developing Use Cases; Common Mis-conceptions about AI&ML  
Case studies/Tutorial on Application of AI for Management Decision

**Text Books:**

1. Artificial Intelligence: A Modern Approach, Prentice-Hall, Third Edition (2009) Stuart Russell & Peter Norvig
2. Applied artificial intelligence: a handbook for business leaders by Mariya Yao, Adelyn Zhou, Marlene Jia
3. Artificial Intelligence and Machine Learning by Finlay, Steven
4. Artificial Intelligence Basics A Non-Technical Introduction by Tom Taulli

**Reference Books:**

1. AI for People and Business: A Framework for Better Human Experiences and Business Success 1st Edition by Alex Castrounis
2. Machine Learning For Absolute Beginners: A Plain English Introduction (Second Edition) (Machine Learning From Scratch Book by Oliver Theobald
3. Fundamentals of Machine Learning for Predictive Data Analytics Algorithms, Worked Examples, and Case Studies By John D. Kelleher, Brian Mac Namee and Aoife D'Arcy
4. Artificial Intelligence and Machine Learning for Business: A No-Nonsense Guide to Data Driven Technologies by Steven Finlay
5. Artificial Intelligence: What Everyone Needs to Know by Jerry Kaplan
6. The Future of Leadership: Rise of Automation, Robotics and Artificial Intelligence by Brigitte Tasha Hyacinth