

**NATIONAL INSTITUTE OF TECHNOLOGY
TIRUCHIRAPPALLI - 620 015**

**M.Tech. DEGREE
in
Industrial Engineering and Management**

**SYLLABUS
FOR
CREDIT BASED CURRICULUM
OPERATIVE FOR STUDENTS OF 2013 -2014 ADMISSION
4 SEMESTER PROGRAMME
CODE : PR**



**DEPARTMENT OF PRODUCTION ENGINEERING
JUNE 2013**

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI
DEPARTMENT OF PRODUCTION ENGINEERING
M. Tech (Industrial Engineering & Management)
Total Credits: 66
(operative for students of 2013-2014 admission)

CODE	Semester 1	L	T	P	C	CODE	Semester 2	L	T	P	C
MA611	Data Analytics	3	1	0	4	PR652	Quality & Reliability Engineering	3	0	0	3
PR 651	Advanced Operations Research	2	1	0	3	PR654	Modeling and Simulation	2	1	0	3
PR 653	Analysis and Control of Manufacturing Systems	3	0	0	3	PR656	Supply Chain Management	3	0	0	3
PR 655	Systems Engineering	3	0	0	3	PR658	Project Management	2	1	0	3
	Elective I	3	0	0	3		Elective II	3	0	0	3
	Elective II	3	0	0	3		Elective III	3	0	0	3
PR 657	Data Analytics Lab	0	0	3	2	PR660	Simulation Lab	0	0	3	2
PR 659	Operations Management Lab	0	0	3	2	PR680	Supply Chain Management Lab	0	0	3	2
		17	2	6	23			16	2	6	22

CODE	Semester 3	L	T	P	C	CODE	Semester 4	L	T	P	C
PR697	Project Work-Phase-I	0	0	24	9	PR 698	Project Work-Phase-II	0	0	24	12
		0	0	24	9			0	0	24	12

LIST OF ELECTIVES

CODE	INDUSTRIAL ENGINEERING STREAM	L	T	P	C	CODE	MANAGEMENT STREAM	L	T	P	C
PR661	Intelligent Manufacturing Systems	3	0	0	3	PR671	Financial Management	3	0	0	3
PR662	Research Methodology	3	0	0	3	PR672	Marketing Management	3	0	0	3
PR 663	Design and Analysis of Experiments	3	0	0	3	PR673	Total Quality Management	3	0	0	3
PR 664	Enterprise Resource Planning	3	0	0	3	PR 674	Human Resource Management	3	0	0	3
PR 665	Lean and Agile Manufacturing	3	0	0	3	PR675	Decision Support Systems	3	0	0	3
PR 666	Facilities Planning and Design	3	0	0	3	PR676	Knowledge Management	3	0	0	3
PR 667	Production Management Systems	3	0	0	3	PR677	Product Life Cycle Management	3	0	0	3
PR 668	Advanced optimization techniques	3	0	0	3	PR678	Technology Management	3	0	0	3
PR 669	Work Design and Ergonomics	3	0	0	3	PR679	Multi-Criteria Decision Making Techniques	3	0	0	3
PR670	Sustainable Manufacturing	3	0	0	3						

Semester 1

MA611 Data Analytics

L 3 T 1 P 0

Credits 4

Data modeling and its role in planning and policy analysis. Review of probability, linear algebra, matrix manipulations and fundamental concepts in statistics. Introduction to SYSTAT, exploratory data analysis. Introduction to simple and multiple regression. Multiple regression and regression diagnostics. Model fitting and measures of fit. Gauss-Markov Condition. Testing and General Linear Hypothesis. Indicator Variables; Analysis of Variance. Heteroscedasticity and weighting. Outlier Detection. Polynomial Models, splines, broken line regression, transformations including Box-Cox/Box-Tidwell transformations Nonlinear Least Squares Multicollinearity. Principal Components, Factor Analysis and ANOVA. Qualitative, Limited Dependent Variable and Count models. Understanding statistical concepts, Analysis of data.

References:

1. Richard Johnson, Miller & Freund's Probability and statistics for Engineers, 7th Edition, Prentice –Hall of India, Private Ltd., New Delhi (2007).
2. Richard A. Johnson and Dean W. Wichern, Applied Multivariate Statistical Analysis, 5th Edition, Pearson Education, Asia (2002).
3. Gupta, S.C and Kapoor, V.K. "Fundamentals of Mathematical Statistics, Sultan and Sons, New Delhi (2001).
4. Richard I Levin, Statistics for Management, PHI (2000)

PR651 Advanced Operations Research

L 2 T 1 P 0

Credits 3

Linear programming- methods- Simplex method – Big M method – Two phase method – Special cases - Goal programming. Duality analysis-sensitivity analysis-changes in right- hand side constants of constraints- changes in objective function co-efficient-adding a new constraints-adding a new variable. Dual simplex method- Cutting plane algorithm- Branch and Bound technique-Zero-one implicit enumeration algorithm - applications of dynamic programming – Cargo loading model – Work force size model – Equipment replacement model – Inventory model. Shortest path model – Maximal flow problem - Crashing of project network – Resource leveling & Resource allocation technique. Unconstrained nonlinear algorithms-Constrained algorithms- Separable programming -Quadratic programming-Geometric programming-Stochastic programming.

References:

1. Handy M.Taha, Operations research, an introduction, 7th edition, PHI, 2003.
2. Don T. Phillips, A.Ravindran & James Solberg, Operations Research: Principles and practice, John Wiley, India, 2006.
3. G.Srinivasan , Operations Research Principles and Applications, ,PHI 2008
4. Panneerselvam ,R, "Operations Research", Prentice – Hall of India, New Delhi,2002

PR653 Analysis and Control of Manufacturing Systems

L 3 T 0 P 0

Credits 3

Production system –Forecasting and its types – Forecasting errors and tracking signals - Inventory costs Terminology of Inventory systems – Inventory policies –Analysis of Static Deterministic Inventory Models-Aggregate Production Planning - Value stream management for lean office Introduction to material requirements planning - Lot sizing – MRP Versus MRP II – Re planning frequency in MRP Introduction to Job Sequencing – n Jobs, One machine – n Jobs, Two machines – n Jobs, Three machines – n jobs - Two Jobs , M Machines – n jobs, M Machines – sequencing Jobs on Parallel Machines – Minimization of Setup costs - Travelling Salesman problem –Job shop scheduling – Assembly line balancing

References:

1. Elsayed A. Elsayed and Thomas O. Boucher , " Analysis and Control of Production Systems,Printice Hall Publ., 1994.
2. Monks J.G., " Operations Management, John Wiley, 1992.

3. *Buffa, E.S. and Sarin, R.K., "Modern production /Operations Management", John Wiley & Sons, 1994.*
4. *Panneerselvam, R. Production and operations management, PHI, 2005.*

PR 655 Systems Engineering

L 3 T 0 P 0

Credits 3

Systems theory, Life-Cycle phases, Systems Engineering processes, Seven-phase and twenty-two phase life cycle for systems acquisition. Problem or Issue identification, Formulation of issues with an example

–Requirements statement, Generation of Alternatives or System synthesis, Feasibility studies. Analysis of systems with uncertain and imperfect information, structural modeling – trees, Economic models, Reliability models, discrete event simulation models. Formal Decisions – prescriptive and normative decision assessments, Methods for systems Engineering Management –Enterprise resource planning – BPR –Decision support system – Manufacturing support system – MCDM tools for system science.

References:

1. *Introduction to Systems Engineering, Andrew P Sage and James E Armstrong, Wiley Series (2000)*
2. *George J Klir, Facets of Systems Science, Kluwer Publishers, 2001*
3. *Analysis and Design of Information systems, Arthur M. Langer, Springer 2001*
4. *Systems Analysis and Design, Kendall and Kendall, Prentice hall, 2004*
5. *Analysis and Design of Information systems, V. Rajaraman, PHI, 2006*

PR 657 Data Analytics Lab

L 0 T 0 P 3

Credits 2

The objective of this lab is to enable students to have exposure on Data Analytics using SYSTAT, SPSS and GaBi.

1. Linear Regression and Correlation
2. Testing of Hypothesis – I & II
3. Analysis of Variance (ANOVA)
4. Factor analysis
5. Life Cycle Assessment of products
6. Cluster Analysis
7. Performance Measurement of Industrial systems

PR 659 Operations Management Lab

L 0 T 0 P 3

Credits 2

The objective of this lab is to have practical exposure on operations management packages like OM Expert, CPLEX, LINDO, GAMS, TORA extra and also to study on the ergonomic aspects of human evaluation.

1. Forecasting Models
2. Linear Programming Problem
3. Transportation Model
4. Inventory Models
5. Scheduling Case studies
6. Material Requirements Planning
7. Project management
8. Facilities layout
9. Ergonomics Study
 - a. Performance rating using stop watch
 - b. Peg board experiment
 - c. Time study trainer

- d. Fitness study using treadmill
- e. Fitness study using ergo cycle

Semester 2

PR 652 Quality & Reliability Engineering

L 3 T 0 P 0

Credits 3

Basics of quality – process capability analysis – quality gurus and their philosophies – Quality standards – ISO 9000 series and 14000 series Design of experiments – Anova analysis – Reliability – MTBF – MTTR- Markov models for reliability Acceptance sampling by variables and attributes – ASN – ATI – AOQL - IS2500 plans – MIL STD 105E Control charts for variables and attributes - Taguchi methods, cases Concurrent engineering Quality function deployment – FMEA – Quality circles - Total quality management –Kaizen

References:

1. Douglas, C. Montgomery, *Introduction to Statistical Quality Control, 11nd Edition, John Wiley & Sons, 2001.*
2. Smith, D.J. “*Reliability Maintainability and Risk; Practical methods for engineers*”, Butterworth-Heinemann, New Delhi, 2001
3. Grant, E.L. and Leavenworth, R.S., *Statistical Quality Control, TMH, 2000.*

PR654 Modeling and Simulation

L 2 T 1 P 0

Credits 3

Introduction to systems and modeling - discrete and continuous system - Monte Carlo Simulation. Random number generation Random variable generation – Testing -Analysis of simulation data - Input modeling – verification and validation of simulation models – output analysis for a single model. Simulation languages and packages-Case studies-Simulation based optimization

References:

1. Jerry Banks and John S.Carson, Barry L Nelson, David M.Nicol, P.Shahabudeen, *Discrete event system simulation, Pearson Education, 2007.*
2. Law A.M, *Simulation Modelling and Analysis, Tata Mc Graw Hill,2008*
3. Thomas J.Schriber, *Simulation using GPSS, John Wiley, 1991.*
4. Kelton, W. David, *Simulation with Arena ,McGraw-Hill,2006*

PR656 Supply Chain Management

L 3 T 0 P 0

Credits 3

Introduction to supply chain - Supply process – distribution management – factors of supply chain – Product life cycle management in SC – supply chain redesign. Logistics organization-logistics information systems-topology of SC. Collaborative product commerce – supply chain optimization-Decision making in SC. Introduction to logistics – factors affecting logistics-network design. Applications of SCM – ware house management system – product data management – E –Commerce – Reverse logistics – Case studies.

References:

1. *Supply Chain Management, Strategy, Planning, and operation – Sunil Chopra and Peter Meindl- PHI, Second edition, 2007*
2. *Logistics, David J.Bloomberg, Stephen Lemay and Joe B.Hanna, PHI 2002*
3. *Logistics and Supply Chain Management –Strategies for Reducing Cost and Improving Service. Martin Christopher, Pearson Education Asia, Second Edition*
4. *Modeling the supply chain, Jeremy F.Shapiro, Thomson Duxbury, 2002*

PR658 Project Management

L 2 T 1 P 0

Credits 3

Project Management Concepts Project Organizational Structures- Project life cycle, project appraisal market, technical appraisal, Financial appraisal, Cost Estimating and Budgeting Project Performance Measurement and Control MILP modeling for project selection Evaluation using simulation, Risks in project management, Resource Leveling, Crashing and HR issues.

References:

1. Prasanna Chandra, „*Projects Planning, analysis, Financing , Implementation and ReviewManagement, V Edition Tata McGraw Hill, 2004.*
2. Choudhury, S.,*Project management*”, Tata McGraw Hill, 27th reprint 2007.

3. *Project Management – A Managerial Approach*, by Jack R. Meredith, and Samuel J. Mantel Jr., John Wiley and Sons, 2006
4. *Project Management – A Systems Approach to Planning, Scheduling and Controlling*, by Harold Kerzner, John Wiley and Sons, 2006

PR 660 Simulation Lab

L O T O P 3

Credits 2

(*Packages: ARENA, Flexsim, QUEST, Simquick & Witness and other emerging packages, Programming in C and Matlab*)

LIST OF EXERCISES

- Random Number Generation approaches
- Random Variate Generation
- Simulation of Manufacturing Shop
- Simulation of Multiple Servers Queuing System
- Simulation of Supply Chain Inventory System
- Simulation of Batch Production System
- Simulation of Multi Machine Assignment System
- Simulation of Manufacturing and Material Handling Systems
- Simulation of a Shop Floor
- Simulation of Material Handling Systems

PR 680 Supply Chain Management Lab

L O T O P 3

Credits 2

The objective of this lab is to enable students to understand the practical applications of Supply Chain Management concepts.

1. Network design and operations
2. Designing and planning transportation networks
3. Designing and planning distribution networks
4. Value Stream Mapping – Development of Current State Map and Future State Map
5. Decision Making in Supply Chains
6. Lean, agile and leagile supply chains
7. Supply chain restructuring
8. Supply chain performance measures
9. Inventory optimization in supply chain
10. Forecasting models in supply chain

Electives

Industrial Engineering stream

PR661 Intelligent Manufacturing Systems

L 3 T 0 P 0

Credits 3

Basic concepts of Artificial intelligence and expert systems - System Components - System architecture and Data flow – System Operations. Knowledge based systems - knowledge representation – knowledge acquisition and optimization - Knowledge based approaches to design mechanical parts and mechanisms and design for automated assembly. Knowledge based system for material selection – Intelligent process planning system. Intelligent system for equipment selection - Intelligent system for project management & factory monitoring. Scheduling in manufacturing – scheduling the shop floor – Diagnosis & trouble shooting. The role of Artificial Intelligence in the factory of the future – Intelligent systems.

References:

1. *Kenneth R. Baker, "Introduction to sequencing and scheduling", John Wiley & Sons, New York, 2000.*
2. *Richard W. Conway, William L. Maxwell and Louis W. Miller, "Theory of Scheduling", Dover Publications, 2003.*

PR662 Research methodology

L 3 T 0 P 0

Credits 3

Introduction- Hypothesis Testing, Multi criteria decision making-Simple Additive Weighting (SAW) Method-Weighted Product Method (WPM)- Analytic Hierarchy Process (AHP) Method-Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) Method-(VIKOR)-OUTRANKING – PROMETHEE-ELECTRE- optimization traditional, non-traditional- multi objective optimization-classical weighted sum, goal programming-non traditional-Multi objective GA, MOPSO, Intelligent decision making tools ANN, Fuzzy-Introduction to Matlab, C++

References:

1. *Etter, D. Kuncicky, M, Hull, D. Introduction to Matlab7 Prentice Hall, 2004*
2. *Donald H. McBurney, Research Methods, Thomson Asia Pvt. Ltd, Singapore , 2002*
3. *Belton, V., Stewart, T.J. 2003. Multiple Criteria Decision Analysis: An Integrated Approach, Kluwer Academic Publishers, Dordrecht.*
4. *Deb. K. Multi objective optimization using evolutionary algorithms Wiley , 2001*

PR663 Design and Analysis of Experiments

L 3 T 0 P 0

Credits 3

Steps –Single Factor Experiments- ANOVA- Factorial Experiments- 2^k designs with Two and Three factors- Confounding, blocking, nested, Fractional factorial designs - Taguchi Techniques- Quality Loss function, orthogonal designs, application to Process and Parameter design.

References:

1. *Montgomery, D.C., Design and Analysis of experiments, John Wiley and Sons, 2003.*
2. *Nicolo Belavendram, Quality by Design; Taguchi techniques for industrial experimentation, Prentice Hall, 1995.*
3. *Phillip J. Rose, Taguchi techniques for quality engineering, McGraw Hill, 1996.*

PR664 Enterprise Resource Planning

L 3 T 0 P 0

Credits 3

ERP: An Overview - Benefits of ERP - ERP and Related Technologies - Business Process Reengineering (BPR), Data Warehousing - Data Mining, ERP Implementation - ERP Implementation Lifecycle, Business Modules in an ERP Package - ERP Market, Enterprise Integration Applications (EIA) - ERP and E-Commerce - ERP and Internet - Future Directions in ERP.

References:

1. Alexis Leon, *ERP Demystified*, Tata McGraw–Hill Publishing company limited, New Delhi, 2002
2. Brady, *Enterprise Resource Planning*, Thomson Learning, 2001
3. S.Sadagopan, *ERP: A managerial Perspective*, Tata McGraw-Hill publishing company Limited, New Delhi 1999.

PR665 Lean and Agile Manufacturing

L 3 T 0 P 0

Credits 3

Introduction to Lean and Agile Manufacturing – Lean Principles – Types of Wastes – Process Mapping and Value Stream Mapping, 5S, Work Cells, Total Productive Maintenance - Secondary Lean Tools – Lean rules – Training and Implementation for lean systems – Six Sigma, Lean Six Sigma - Agile Principles – Conceptual models of Agile Manufacturing – Product Development Strategies for agility – Managing People in agile organizations – Information Technology applications in Agile Manufacturing – Assessment of leanness and agility – Activity Based Costing - Application Case studies on Lean and Agile Manufacturing.

References:

1. Montgomery, J.C and Levine, L. O., “The transition to agile manufacturing” – *Staying flexible for competitive advantage*, ASQC Quality Press, Wisconsin., 1996.
2. Gopalakrishnan “Simplified Lean Manufacture – Elements, Rules, Tools and Implementation”, PHI Learning Private Limited, New Delhi, India, 2010.
3. Hobbs, D.P. “Lean Manufacturing Implementation”, Narosa Publisher, 2004.
4. Devadasan, S.R., Sivakumar, V., Mohan Murugesh, R., Shalij, P, R. *Lean and Agile Manufacturing: Theoretical, Practical and Research Futurities*, Prentice Hall India, 2012.

PR666 Facilities planning and design

L 3 T 0 P 0

Credits 3

Facilities requirement - need for layout and its types. Plant location analysis –simple problems in single facility location models, network location problems. Layout design - Design cycle – computer algorithms – ALDEP, CORELAP, and CRAFT. Group technology – Methods of grouping – Line balancing Material handling design - handling equipment types , selection and specification, containers and packaging.

References:

1. Tompkins, J.A. and J.A.White, “Facilities planning”, John Wiley, 2003.
2. Richard Francis.L. and John A.White, “Facilities Layout and location - an analytical approach”, PHI, 2002.
3. James Apple, M.Plant layout and “Material Handling”, John Wiley, 1977.
4. Pannerselvam,R, “Production and Operations Management”, PHI,2007

PR667 Production Management Systems

L 3 T 0 P 0

Credits 3

Productivity-productivity measurement models-role of work study-work measurement techniques-ergonomics-CIM and Production Management Systems- MRP I, MRP II Lot sizing in MRP-Lot for lot, economic order quantity-periodic order quantity-part period balancing-introduction to optimized production technology-KANBAN-types of KANBAN- value engineering (VE) - approaches of value analysis and engineering –Effective organization for value work, function analysis system techniques-FAST

References:

1. Parker,D.E.,” Value Engineering Theory”, Sundaram publishers, 2000.
2. Pannerselvam,R. Production and operations management, PHI, 2005.
3. Miles, L.D., “Techniques of Value Engineering and Analysis”, McGraw Hill Book Co., 2002
4. Tufty Herald, G.”Compendium on Value Engineering”, The Indo American Society, 1st Edn., 1983.

PR668 Advanced Optimization Techniques

L 3 T 0 P 0

Credits 3

Introduction to Optimization - Classical Optimization Techniques- Linear Programming - Nonlinear Programming : One-Dimensional Minimization Methods- Unconstrained Optimization Techniques - Constrained Optimization Techniques- Geometric Programming , Integer

Programming, Stochastic Programming - Optimal Control and Optimality Criteria Methods - Modern Methods of Optimization- Practical Aspects of Optimization.

References:

1. Kalyanmoy Deb, *Optimization for Engineering design – algorithms and examples*. PHI, New Delhi, 1995.
2. Singiresu S.Rao, “*Engineering optimization – Theory and practices*”, John Wiley and Sons, 1998.
3. Garfinkel, R.S. and Nemhauser, G.L., *Integer programming*, John Wiley & Sons, 1972.

PR669 Work Design and Ergonomics

L 3 T 0 P 0

Credits 3

Introduction to work study - productivity measurement models-Kurosawa structural approach, Lawlor’s approach, Gold’s approach Quick Productivity Appraisal approach (QPA), Motion and time study Work methods design Work measurement and its methods Measuring work by physiological methods Introduction work study/ergonomics softwares, Human Factors, Ergonomics practices design of controls and workspace

References:

1. Barnes, Raeph.m., “*Motion and Time Study – Design and Measurement of Work* “, JohnWiley &sons, New York, 1990.
2. Mc.Cormick, E.J., “*Human Factors in Engineering and Design*”, Mc.Graw Hill.
3. ILO, “*Introduction to Work study* “, Geneva, 1974
4. D.J.Sumanth, *Productivity Engineering and Managemn*, Tata Mcgraw hill,1990.

PR670 Sustainable Manufacturing

L 3 T 0 P 0

Credits 3

Concepts of sustainability and sustainable development - Components of sustainability (Social, Economic, Environmental) - Linkages between technology and sustainability - Sustainable Product Development – Various Phases - Tools and Techniques – Environmental Conscious Quality Function Deployment, Life cycle assessment, Design for Environment, R3 and R6 cycles, Design for Disassembly - EIA Methods –CML, EI 95 and 99, ISO 14001 EMS and PAS 2050 standards, Environmental Impact parameters – Renewable Energy - Design for recycling – Eco friendly product design methods – Methods to infuse sustainability in early product design phases – Multi-Criteria Decision Making in Sustainability - Frameworks for measuring sustainability- Indicators of sustainability - Product Sustainability and Risk/Benefit assessment– Corporate Social Responsibility.

References

1. D. Rodick, *Industrial Development for the 21st Century: Sustainable Development Perspectives*, UN New York, 2007.
23. Rogers, P.P., Jalal, K.F. and Boyd, J.A., *An Introduction to Sustainable Development*, Earthscan, London, 2007.
3. Thompson, R., and Thompson, M., *Sustainable Materials, Processes and Production (The Manufacturing Guides)* Thames & Hudson, Limited, 2013.
4. Seliger. G., Jawahir, I.S., Marwan M.K., Khraisheh, *Advances In Sustainable Manufacturing* Springer, 2008.

Electives

Management stream

PR671 Financial Management

L 3 T 0 P 0

Credits 3

Financial management – Nature, Scope, Objectives, Decisions -Management of current asset - Short and intermediate financing-Capital investment and evaluation-Long term financing

References:

1. *Bhattacharya, S.K. and John Deardon, "Accounting for Management – Text and Cases", Vikas Publishing House, New Delhi, 1996.*
2. *Charles, T.Horn Green – "Introduction to Management Accounting", Prentice Hall, New Delhi, 1996.*
3. *James, C.Van Horne, "Fundamental of Financial Management", Pearson Education, 12th Edition, 2002.*
4. *Prasanna chandra, "Financial Management theory and practice", TMH, Vth edition, 2001.*

PR672 Marketing Management

L 3 T 0 P 0

Credits 3

Concepts in Marketing - Marketing Process, Marketing concepts, Environment-Buying Behaviour and Market Segmentation-factors, Motives, Types, Buying Decision, Segmentation factors, Demographic, Psychographic and Geographic Segmentation, Process, Patterns-Product Pricing and Marketing Research- Pricing, Decisions and Pricing Methods, Pricing Management-Marketing Planning and Strategy Formulation-Portfolio Analysis, BCG, GEC Grids-Advertising, Sales Promotion and Distribution-Impact, Goals, Types, Sales Promotion – Point of purchase, Unique Selling propositions, Characteristics, Wholesaling, Retailing, Channel Design, Logistics Modern Trends in Retailing.

References:

1. *Kotler Philip, Kevin Lane Keller 'Marketing Management', 13th Ed., Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2007.*
2. *Zikmund d Amico, "The power of Marketing" , 7th edition, Sowth Western , Thomson Learning Publications, 2006.*
3. *Michael J. Etzel, Bruce J. Walker, William J. Stanton, Ajay Pandit, "marketing – concepts and cases", special Indian edition, McGraw Hill*

PR673 Total Quality Management

L 3 T 0 P 0

Credits 3

Principles of TQM – Quality Gurus and their contributions – Old and New Quality Control tools – Quality Function Deployment – Failure Modes and Effect Analysis – Vendor relations –vendor qualification process – vendor quality surveys – Vendor quality improvement – vendor quality rating and evaluation - ISO 9000 standards – ISO 14000 standards – Quality Costing – Quality Audit – Product and Process audit – Six Sigma – Benchmarking - TQM in Service Sector– Application case studies on TQM.

References:

1. *Dale H.Besterfield, "Total Quality Management", Pearson Education Asia, (Indian reprint 2002)*
2. *Rose, J.E. Total Quality Management, Kogan Page Ltd. 1993.*
3. *John Bank, The essence of total quality management, PHI 1993.*
4. *Greg Bounds, Lyle Yorks et al, Beyond Total Quality Management, McGraw Hill, 1994.*

PR 674 Human Resource Management

L 3 T 0 P 0

Credits 3

Individual Behavior-Personality –Attribute – Perception –Motivation Theories-Group Behavior-Group Dynamics, Group decision making, Inter personal Relations-Dynamics of Organizational Behavior- Organizational Climate–Organizational change –the Change Process & Change Management-Human Resources Planning–HR audit, Recruitment-Selection-Interviews -Human Resources Development-Employee Training -Career Development-Performance Appraisal-Compensation-safety and Health-Employee Relation-Management Development.

References:

1. Stephen R. Robbins, “Organizational Behavior”, PHI, 1998.
2. Gary Dessler “Human resources Management” Prentice Hall of India 9th edn.2003
3. David A. Decenzo & Stephen R. Robbins, “Personnel/Human Resources Management”, PHI, 1997.
4. Fred Lutherans, “Organizational Behavior”, Oxford University Press, 2000.

PR675 Decision Support Systems

L 3 T 0 P 0

Credits 3

DSS components- Data warehousing, access, analysis, mining and visualization-modeling and analysis-DSS development -Group support systems- enterprise DSS- supply chain and DSS-knowledge management methods, technologies and tools-Artificial intelligence and expert systems- Representation in logic and schemas, semantic networks, production rules and frames, inference techniques – DSS applications.

References:

1. Efraim Turban and Jay E Aronson, *Decision Support and Intelligent Systems*, Pearson education Asia, Seventh edition, 2005.
2. Elain Rich and Kevin Knight, *Artificial intelligence*, TMH, 2006.
3. Vicki L. Sauter, *Decision Support Systems for Business Intelligence* John Wiley & Sons. Turban, *Decision Support And Business Intelligence Systems*, 8/E, Pearson Education India, 2011.
4. Frada Burnstein, Clyde W. Holsapple., *Handbook on Decision Support Systems Springer*, 2008.

PR676 Knowledge Management

L 3 T 0 P 0

Credits 3

Knowledge society- Drivers of knowledge management-Intellectual capital- KM and learning organizations-Strategic alignment- Evaluation and strategic alignment-Infrastructural development and deployment- Role of CKO-Analyzing business environment-knowledge audit and analysis – designing KM team, system–Technology components- Intranet and Groupware solutions- tools for collaborative intelligence- Social networking-package choices- knowledge security-Integrating with web -based and internal operational & support systems- change management- reward systems- continuous improvement – Intellectual Property Rights.

References:

1. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, “Knowledge Engineering and Management”, Universities Press, 2004.
2. Elias M.Awad & Hassan M. Ghaziri, “Knowledge Management”, Pearson Education, 2004.

PR677 Product Life Cycle Management

L 3 T 0 P 0

Credits 3

New Product Development, Introduction to PLM, Product Data Management (PDM), Views of PLM, PLM Strategies and its Development, Product Design Modeling and simulation in product design. Integration of PLM with other applications, Technology, Forecasting, Virtual product development tools, Product structures

References:

1. Antti Saaksvuori, Anselmi Immonen, “Product Lifecycle Management”, Springer, 2005
2. John Stark, “Product lifecycle management: 21st century paradigm for product realization”, Springer 2006
3. Michael Grieves, “Product lifecycle management: Driving the next generation of lean thinking”, McGraw-Hill, 2006

PR678 Technology Management

L 3 T 0 P 0

Credits 3

Definition-scope-components -Issues in managing new technology, Life cycle approach to technology management-Approaches to forecasting, Technology performance parameters. Use of Experts in technology forecasting, planning technological process, Morphological analysis of a Technology system-Techno-Economic feasibility study, Application of multi-criteria decision making techniques in technologies evaluation and selection-AHP, fuzzy AHP-Modes of global technology transfer-Technology-Human Interface-Organization structures and Technology Implementation issues in new technology – Technology Management issues in the context of lean, agile and sustainable systems – Intellectual Property Rights.

References:

1. Joseph M. Putti, *Management – A Functional Approach*, McGraw Hill, 1997
2. Kenneth C. Laudon , *MIS: Organisation and Technology*, Prentice Hall, 1995
3. James A.Senn, *Information technology in Business*, Prentice Hall, 1995
4. Ronald J. Jordan, *Security analysis and Portfolio Management*, Prentice Hall, 1995

PR679 Multi-Criteria Decision Making Techniques

L 3 T 0 P 0

Credits 3

Multi-Criteria Decision Making – An Overview – Classification of MCDM methods – Simple Additive Weighting method – Weighted Product method - Network based MCDM methods – Analytic Hierarchy Process – Revised Analytic Hierarchy Process – Analytic Network Process - Outranking MCDM methods – PROMETHEE , ELECTRE , TOPSIS - Compromise Ranking method - VIKOR, ORESTE – DEMATEL - Fuzzy based MCDM methods – Hybrid MCDM methods – Group Decision Making- Graph Theory and Matrix approach – Goal Programming – Balanced Scorecard Approach - MCDM application areas – Case studies on application of MCDM techniques.

References

1. Belton, V., Stewart, T.J. *Multiple Criteria Decision Analysis: An Integrated Approach*, Kluwer Academic Publishers, Dordrecht, 2003.
2. Triantaphyllou, E., *Multi-Criteria Decision Making Methods: A Comparative Study*, Springer, 2010.
3. Pedrycz, W., Ekel, P., Parreiras, R., 2011. *Fuzzy Multi Criteria Decision-Making: Models, Methods and Applications*, John Wiley & Sons, 2011.
4. Kahraman, C., *Fuzzy Multi-criteria Decision Making: Theory and Applications with Recent Developments*, Springer, 2008.