Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)- MEI 501

Degree	Course Name	Course Code	Marks:100
M. Tech. Ind. Engg. & Management	Manufacturing & Enterprise Resource Planning	MEI 501	SM+MT+ET 25+25+50
Semester	Credits	L-T-P	Exam.
I	3	3-0-0	3 Hours

Unit - I

Introduction: An Overview of ERP and enterprise; Benefits of ERP; ERP and related technologies; Business process reengineering (BPR); Data warehousing; Data mining; OLAP; Supply chain management (SCM); Customer relationship management (CRM).   **(07 Hours)**

Unit - II

ERP Modules and their Selection Method: Eevolution of enterprise systems - from internally focused client/server systems to externally focused e-business; Historical development; Modules of ERP.   **(07 Hours)**

Unit - III

Business modules: Business modules in an ERP package; Finance; Manufacturing; Human resources; Plant maintenance; Materials management; Quality management; Sales and distribution.   **(07 Hours)**

Unit - IV

ERP Implementation: Installation; Training; ERP and supply chains; ERP security; Trends in ERP; Business intelligence and ERP systems; Trends in ERP; Business process redesign and best practices.   **(08 Hours)**

Unit - V

Commercial Vendors of ERP: ERP market place; SAP AG; People soft; Baan; JD Edwards; Oracle; QAD; SSA; MS project.   **(08 Hours)**

Unit - VI

ERP – Present and Future: Turbo charge the ERP system; EIA; ERP and e-Commerce; ERP and internet; Future directions.   **(08 Hours)**

Recommended Books:

1. ERP Demystified; Alexis Leon; Tata McGraw Hill; New Delhi; 2000
2. Managerial Issues of Enterprise Resource Planning Systems; by L. David Olson; McGraw Hill Higher Education; 2004.
3. Why ERP? A primer on SAP Implementation; by F. Robert Jacobs and D. Clay Whybark; McGraw Hill Higher Education; 2000.
4. The Leadership Moment—Nine True Stories of Triumph and Disasters and Their Lessons for Us All; by Michael Useem; Three Rivers Press; 1998
5. Concepts in Enterprise Resource Planning; Joseph A Brady; Ellen F Monk; Bret Wagner; Thompson Course Technology; USA; 2001.
6. Enterprise Resource Planning – Concepts and Practice; Vinod Kumar Garg and N. K. Venkitakrishnan; Prentice Hall of India; New Delhi; 2003
7. Concepts in Enterprise Resource Planning; Third Edition (Paperback) by Ellen Monk; Bret Wagner Publisher: Course Technology (2008).
8. Mission Critical: Realizing the Promise of Enterprise Systems by Thomas H. Davenport; Hardcover - (2000) Harvard Business School Press.
9. E-Business & ERP: Transforming the Enterprise Norris; Grant; Hurley; R. James; K. M. Hartley; John R. Dunleavy; and John D. Balls; Hardcover; Wiley; John & Sons; Incorporated.

Degree	Course Name	Course Code	Marks:100
M. Tech.	Production & Operations Management	MEI 503 / MEE 607	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
I / III	3	3-0-0	3 Hours

Unit - I

Introduction: Necessity of planning and control; Functions of production control dept; Factors determining control procedure; Types of controls.

(05 Hours)

Unit - II

Demand Forecasting: Importance of forecasting; Fields for forecasting: techniques for forecasting sales; Conventional and statistical techniques; Regression or Co-relation analysis; Short term and long term trends in business; Forecasting demand for spare parts; Stock forecast. **(10 Hours)**

Unit - III

Operational Planning: Adjustments in forecasting; Planning for making and buying; Types of plans; Mathematical planning techniques; Quantity standards; Frequency standards; Financial aspects of planning; Analysis of machine capacity; Planning for labor. **(10 Hours)**

Unit - IV

Scheduling and Material Requirement Planning: Routing; Definition; Routing procedures including bill of materials; Route file; Routing for two or more items; Standard route charts; Recent techniques of routing; Progress reporting and expediting methods; Master schedule; Departmental and shop schedule charts for scheduling; Gnatt Charts- loading and scheduling; Sched-U-graph; Boards for scheduling; Application of computers in production planning and control activities; Material requirement planning (MRP); Manufacturing resource planning (MRP II). **(10 Hours)**

Unit – V

Just-in-time and Lean Production: Basic elements of JIT; Cellular layouts; The pull system; Kanban production control system; Total productive maintenance. **(05 Hours)**

Unit – VI

Human Resources in Operations Management: Human resources in strategic planning; Limitations of scientific management; Behavioral influences on job design; Contemporary trends in human resources; Responsibility and empowerment. **(05 Hours)**

Recommended Books:

1. Production Planning Control and Industrial Management; K. C. Jain & N. L. Aggarwal; Khanna Publishers

2. Operations Management; Russel and Taylor; PHI.
3. Modern Production/Operations Management; E. S. Buffa and R. K. Sarin; John Wiley & Sons

School of Engineering (Mechanical Engineering)- MEE 505

Degree	Course Name	Course Code	Marks:100
M. Tech.	Operation Research	MEE 505	SM+MT+ET 25+25+50
Semester	Credits	L-T-P	Exam.
I / II	4	3-1-0	3 Hours

Unit - I

Linear programming; Graphical and simplex method; Sensitivity analysis in linear programming; Computer application in linear programming.   **(07 Hours)**

Unit - II

Network analysis; Transportation models; Transshipment models; Maximal flow model; Shortest route model; Minimum spanning tree; Project management; Computer application in network analysis.   **(08 Hours)**

Unit - III

Advanced topic in linear programming: Duality and its application; Parametric programming; Integer programming; Linear fractional programming; Goal programming; Sensitivity analysis.   **(08 Hours)**

Unit - IV

Dynamic programming: Basic concept; Development of dynamic; Programming; continuous state dynamic programming; Multiple state variable; stochastic system.   **(08 Hours)**

Unit - V

Non linear programming: Unconstrained optimization; Constrained optimization with equality constraints; Constrained optimization with inequality constraints; Optimization by cutting plane method; Optimization by geometric programming.

(08 Hours)

Unit - VI

Genetic algorithm; Taboo search; Simulating Annealing. **(06 Hours)**

Recommended Books:

1. Operation Research; Ravindran; Phillips & Solberg; Wiley India Edition.
2. Operation Research; Hira & Gupta; S. Chand & Company Ltd.
3. Operation Research; A. M. Natrajan; P. Balasubramani; A. Tamilarasi; Pearson Prentice.
4. Operation Research; S. D. Sharma; Prentice Hall of India.

School of Engineering (Mechanical Engineering)- MEM 507

Degree	Course Name	Course Code	Marks:100
M. Tech.	Industrial Automation & Robotics	MEM 507	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
I	3	3-0-0	3 Hours

Unit - I

Introduction: Automation in production system; Principles and strategies of automation; Basic elements of an automated system; Advanced automation functions; Levels of automations; Introduction to automation productivity; Automation strategies; Mechanical; Electrical; Hydraulic and pneumatic automation devices and controls; Sensors; Actuators and other control system components; Converters AC to DC and vice-versa. **(10 Hours)**

Unit - II

High Volume Manufacturing Systems: Classification and type of automatic transfer machines; Automation in part handling and feeding; Analysis of automated flow lines; Design of single model; Multi-model and mixed model production lines.   **(07 Hours)**

Unit - III

Assembly Automation Systems: Assembly systems; Automatic transfer; Feeding and orienting devices; Flexible assembly systems; Performance evaluation and economics of assembly systems; Economics of automation.

(07 Hours)

Unit – IV

Fundamentals of Robotics – Wrists design; End effectors; Actuators; Modular robots. Robot and its peripherals; Sensors; Machine vision; Image processing & analysis; Application of artificial intelligence; Voice communication; Robot control units; Motion controls.   **(07 Hours)**

Unit – V

Robot Kinematics: Homogeneous transformations; Forward & inverse kinematics; Problems of dynamics; Differential relationships; Motion trajectories; Dynamics of a robot control of single & multiple link robot; Static force analysis; Robot programming; Different languages; Expert systems.   **(07 Hours)**

Unit – VI

Robot Applications in Manufacturing: Material transfer & machine loading/unloading; Processing operations; Inspection; Automation;Robot cell design; Control; Recent developments and special applications. **(07 Hours)**

Recommended Books:

1. Automation; Production Systems and Computer Integrated Manufacturing; M.P. Groover; Pearson Education.
2. Industrial Automation : W.P. David; John Wiley and Sons.
3. Manufacturing assembly Handbook:- Bruno Lotter
4. Robotic Engineering – An Integrated Approach; Richard D Klafter; Thomas A Chmielewski & Michael Negin; Prentice Hall; 1994.
5. Robotic Technology and Flexible Automation; S. R. Deb; Tata McGraw Hill; 1994.
6. Industrial Robotics; Fu & Gonzales; Tata McGraw Hill; 1988.
7. Handbook of design; manufacturing and Automation : R.C. Dorf; John Wiley and Sons.
8. Anatomy of Automation; G. H. Amber & P. S. Amber; Prentice Hall.
9. A Robot Engineering Textbook; Mohsen Shahinpoor; Harper & Row Publishers; New York.
10. Robotics; control vision and intelligence; Fu; Lee and Gonzalez. McGraw Hill International.
11. Introduction to Robotics; John Craig; Addison Wesley Publishing.
12. Robotics for Engineers ; Yoram Koren; McGraw Hill International.
13. Industrial Robotics; Groover; Weiss; Nagel; McGraw Hill International.
14. Robot Technology Fundaments; Keramas; Thomson Vikas Publication House Company.
15. Fundamentals of Robotics Analysis and Control; Schilling; PHI.
16. Introduction to Robotics; Niku; Pearson Education; Asia.

Degree	Course Name	Course Code	Marks:100
M. Tech. Ind. Engg. & Management	Modeling & Simulation	MEE 508	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
I	4	3-1-0	3 Hours

Unit - I

Introduction to simulation; Systems; Models; Data collection and analysis; Monte carlo simulation; Types of system simulation; Decision making with simulation; Areas of simulation application. **(06 Hours)**

Unit - II

Queuing models; Characteristics of queuing systems; Queuing notions; Long run measures of performance of queuing systems; Steady state behavior of Markovian models (M/G/1; M/M/1; M/M/c); Overview of finite capacity and finite calling population models; Network of queues; Monte carlo simulation and its applications in queuing and inventory models. **(06 Hours)**

Unit - III

Generation of (Pseudo) random numbers; Probability distributions and probability densities; Sampling from probability distribution: Inverse method; Convolution method; Acceptance rejection method. **(08 Hours)**

Unit - IV

Discrete simulation; Continuous simulation; Combined simulation; Problem formulation; Mechanics of discrete simulation- discrete events; Representation of time; Generation of arrival pattern; Simulation examples; Simulation programming tasks; Gathering statistics; Measuring utilization and occupancy recording distributions and transit times. **(08 Hours)**

Unit - V

Steps to build a useful model of input data; Data collection; Verification of simulation models; Validation process; Simulation software; Classification of simulation software and desirable software features; Comparison of simulation packages with programming languages; General purpose simulation packages; Object oriented packages; Case studies. **(11 Hours)**

Unit - VI

Analysis of simulation output; Importance of the variance of the sample mean; Procedure for estimating variance; Subinterval method; Replication method; Regenerative method; Variance reduction techniques; Start up policies; Stopping rules; Statistical inferences; Design of experiments. **(06 Hours)**

Recommended Books:

1. Discrete Event System Simulation; Banks; Pearson's Education
2. Simulation Modeling and Analysis; 3rd edition; A. M. Law and W. D. Kelton; McGraw Hill.
3. System Simulation 2nd edition; G. Gordon; PHI Learning.
1. Probability and Statistics with Reliability; Queuing; and Computer Science Applications; K. S. Trivedi; Prentice Hall of India.
2. Introduction to Probability and Random Variables; G. P. Wadsworth and J. G. Bryan; McGraw Hill.
3. Theory of Modeling and Simulation; Bernard.
4. Performance Modeling of Automated Manufacturing Systems; N. Viswandhan and Y. Narhari; Prentice Hall of India.
5. Simulation Model Design and Execution; P. Fishwick; Prentice Hall.
6. Simulation; S. Ross; Academic Press.

Degree	Course Name	Course Code	Marks:100
M. Tech. Ind. Engg. & Management	Total Quality Management	MEI 509	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
I	3	3-0-0	3 Hours

Unit – I

Introduction: Definition of Quality; Dimensions of quality; Quality planning; Quality costs; Analysis techniques for quality costs; Basic concepts of total quality management; Historical review; Principles of TQM; Leadership – Concepts; Role of senior management; Quality council; Quality statements; Strategic planning; Deming philosophy; Barriers to TQM implementation.

(06 Hours)

Unit – II

TQM Principles: Customer satisfaction – Customer perception of quality; customer complaints; Service quality; Customer retention; Employee involvement – motivation. **(04 Hours)**

Unit – III

TQM Strategies: Empowerment; Teams; Recognition and reward; Performance appraisal; Benefits; Continuous process improvement – Juran Trilogy; PDSA Cycle; 5S; Kaizen; Supplier partnership – Partnering; Sourcing; Supplier selection; Supplier rating; Relationship development; Performance measures; Basic concepts; Strategy; Performance measures. **(06 Hours)**

Unit - IV

Statistical Process Control (SPC): The seven tools of quality; Statistical fundamentals; Measures of central tendency and dispersion; Population and sample; Normal curve; Control charts for variables and attributes; Process capability; Concept of six sigma; New seven quality tools.   **(12 Hours)**

Unit - V

TQM Tools: Benchmarking – Reasons to benchmark; Benchmarking process; Quality function deployment (QFD) – House of quality; QFD process; Benefits; Taguchi quality loss function; Total productive maintenance (TPM), Concept; Improvement; Needs; FMEA - Stages of FMEA.   **(12 Hours)**

Unit - VI

Quality Systems: Need for ISO 9000 and other quality systems; ISO 9000:2000 quality system; Elements; Implementation of quality system; Documentation; Quality auditing; TS 16949; ISO 14000 – Concept; Requirements and benefits.   **(05 Hours)**

Recommended Books:

1. Total Quality Management; Pearson Education; Dale H. Besterfield; et al.; Inc. 2003. (India reprint 2004).
2. The Management and Control of Quality (5th Edition); James R. Evans & William M. Lidasy; South-Western (Thomson Learning); 2002.
3. Total Quality Management; A. V. Feigenbaum; McGraw-Hill; 1990.
4. Total quality Management Butterworth; J. S. Oakland; Hcinemann Ltd.; Oxford. 1989.
5. Quality Management – Concepts and Tasks; V. Narayana and N. S. Sreenivasan; New Age International 1996.
6. Total Quality Management for Engineers; Zeiri; Wood Head Publishers; 1991.
7. Quality Management: Creating & Sustaining Organisatioinal Effectiveness; 2nd Ed.; Summers; Prentice Hall of Inidia Learning.