

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC II-Sem

L	T/P/D	C
3	1/-	3

(58066) MEMS DESIGN

UNIT – I

Introduction, Integrated Circuits, MEMS, Micro sensors, Microactuators, Microelectronics Fabrication, Micromachining, Mechanical MEMS, Thermal MEMS, MOEMS, Magnetic MEMS, RF MEMS, Microfluid systems, Bio and Chemo-devices, Nanotechnology, Modeling and Simulation.

UNIT – II

Micromachining: Introduction, Photolithography, Structural and sacrificial Materials, other Lithography methods, Thin film deposition, Impurity doping, Etching, Problems with bulk Micro machining, Surface Micromachining, Bulk Vs. Surface micromachining.

UNIT – III

System Modeling and Properties of Material: Introduction, Need for modeling, system types, Basic Modeling elements in mechanical systems, Electrical systems, Fluid systems and Thermal systems, Translational pure mechanical system with spring, damper and mass-Rotational pure mechanical system with spring, damper and mass

UNIT – IV

Passive components and systems: Introduction, System-on-a-chip, Passive electronic systems, Passive mechanical systems

UNIT – V

Mechanical Sensors and Actuators: Introduction, Principles of sensing and actuation, Beam and cantilever, Micro plates, Capacitive Effects, Piezo electric material as sensing and actuating elements, strain measurement, pressure measurement, Flow measurement using Integrated paddle-cantilever structure.

UNIT – VI

Thermal Sensors and Actuators: Introduction, Thermal energy basics and heat transfer processes, Thermistors, Thermo devices, Thermocouple, Micromachined thermocouple probe, Peltier effect heat pumps, Thermal flow sensors, Micro hot plate gas sensors, Shape memory Alloys, U-shaped horizontal and vertical Electrothermal Actuator, Thermally activated MEMS Relay.

UNIT – VII

Micro-opto-Electromechanical systems: Introduction, fundamental principle of MOEMS Technology, Review on properties of Light, Light modulators, Beam Splitter, Microlens, Micro mirrors, Digital micro mirror device, Light detectors, Grating Light valve, Optical switch, Waveguide and tuning, Shear – Stress measurement. Magnetic Sensors and Actuators

UNIT – VIII

Radio frequency MEMS: Introduction, Review of RF-based communication systems, RF, MEMS, MEMS Inductors, Varactors, Tuner / Filter, Resonator, Clarification of Tuner, Filter, Resonator, MEMS Switches, Phase Shifter, Microfluidic Systems, Introduction, Applications.

TEXT BOOKS:

1. MEMS, Nitaigour Premchand Mahalik, TMH
2. MEMS & MICRO SYSTEMS Design and Manufacture, Tai-Ran HSU, TMH, 2006

REFERENCES:

1. Mechatronics Systems Fundamentals – Rolf Isermann – Springer International Edition
2. The Science and Engineering of Micro electronic Fabrication, 2nd Ed. By S.A. Cambell, Published by Oxford University Press (2001)
3. Fundamentals of Micro Fabrication : The science of Miniaturization, 2nd Edition by M.J. Madou, published by CRC press (2002)
4. Introductory MEMS: Fabrication and Applications by Adams, Thomas M, Layton Richard A., 1st Edition , 2010 IBNL 978-0-387-09510-3, Springer

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC II-Sem

L	T/P/D	C
3	1/-	3

**(58067) AUTOMATION IN MANUFACTURING
(ELECTIVE – III)**

UNIT – I

Introduction: Automation Principles and Strategies: Manufacturing industries, products and operations: Product variety and quantity relationship; Automation and control technologies and levels in the production system

UNIT – II

Automated Production lines: System Configurations, Workpart transfer mechanisms, Storage buffers, control of production line, Applications, Analysis with and without internal buffer storage.

UNIT – III

Automated Assembly systems: System Configurations, parts delivery at Workstations, Applications, Quantitative analysis of assembly systems.

UNIT – IV

Assembly system and line balancing: Assembly process and systems assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT – V

Automated material handling: Types of equipment, functions, analysis and design of material handling systems conveyor systems, automated guided vehicle systems.

UNIT – VI

Automated storage systems: Automated storage and retrieval systems; work in process storage, interfacing handling and storage with manufacturing.

UNIT – VII

Adaptive control systems: Introduction, adaptive control with optimization, Adaptive control with constraints, Application of A.C. in Machining operations. Use of various parameters such as cutting force, Temperatures, vibration and acoustic emission.

UNIT – VIII

Business process Re-engineering: Introduction to BPE logistics, ERP, Software configuration of BPE, concurrent Engineering, Techniques of Rapid Proto typing.

TEXT BOOK:

1. Automation, Production Systems and Computer Integrated Manufacturing : M.P. Groover./ PE/PHI

REFERENCES:

1. Computer control of Manufacturing Systems by Yoram Coreom.
2. CAD / CAM/ CIM by Radhakrishnan.
3. Automation by W. Buekinsham.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC II-Sem

L	T/P/D	C
3	1/-/	3

**(58015) PRODUCTION PLANNING AND CONTROL
(ELECTIVE – III)**

UNIT – I

Introduction : Definition – Objectives of production Planning and Control – Functions of production planning and control – Elements of production control – Types of production – Organization of production planning and control department – Internal organization of department.

UNIT – II

Forecasting – Importance of forecasting – Types of forecasting, their uses – General principles of forecasting – Forecasting techniques – qualitative methods and quantitative methods.

UNIT – III

Inventory management – Functions of inventories – relevant inventory costs – ABC analysis – VED analysis – EOQ model – Inventory control systems – P-Systems and Q-Systems –

UNIT – IV

Introduction to MRP & ERP, LOB (Line of Balance), JIT inventory, and Japanese concepts.

UNIT – V

Routing – Definition – Routing procedure –Route sheets – Bill of material – Factors affecting routing procedure. Schedule –definition – Difference with loading

UNIT – VI

Scheduling Policies – Techniques, Standard scheduling methods,

UNIT – VII

Line Balancing, Aggregate planning, Chase planning, Expediting, controlling aspects.

UNIT – VIII

Dispatching – Activities of dispatcher – Dispatching procedure – followup – definition – Reason for existence of functions – types of followup, applications of computer in production planning and control.

TEXT BOOKS:

1. Production Planning and control – M. Mahajan-Dhanpati rai & Co.
2. Production Planning and control – Jain & Jain – Khanna Publications

REFERENCE BOOKS :

1. Production Planning and control – Text & cases * SK Mukhopadhyaya, PHI.
2. Production and Operation Management – R.Panneer Selvam – PHI
3. Operations Management by chase / PHI
4. Management Science – A R Aryasri - 4e - TMH
5. Operations Management – Heizer - Pearson

(58068) CONCURRENT ENGINEERING

(ELECTIVE – III)

UNIT – I

Introduction : Development of Concurrent Engineering. The mean and activity concepts and principles. Examples.

UNIT – II

Concurrent Engineering Tools and Technologies: Changes in to Technologies, Tasks, Talents and times into well managed resources product developments.

UNIT – III

Research in Engineering design and manufacturing: Theory applications using the concurrent Engineering concepts and Principles.

UNIT-IV

Simultaneous design and all related processes of a product.

UNIT – V

The mission and vision of C.E: Computer optimized manufacturing (COM). The next generation of computer integrated manufacturing (CIM).

UNIT-VI

Global competitiveness and development of high quality product. Offline reliability

UNIT – VII

Managing the concurrent Engineering: Contemporary Issues a modern Tools and methods. Use of Computers and decision making. Reengineering concepts

UNIT-VIII

Automated Quality Control Application of CMM, Basic concepts, Zero defect, 6 sigma concept, Tolerancing, Examples, DFMA, Rapid Prototyping

TEXT BOOK:

1. Concurrent Engineering: Tools and Technologies for Mechanic Systems Design – Edward, J. Haug.

REFERENCES :

1. Research in Engineering Design : Theory, applications, and concurrent engineering : Vol. 7, No. 1, 1995.
2. Managing Concurrent Engineering. – Jon Turino

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:

HYDERABAD (A.P.)

IV Year B.Tech. MC II-Sem

L	T/P/D	C
3	1/-/-	3

(58069) PLANT ENGINEERING AND MAINTENANCE

(ELECTIVE – III)

UNIT – I:

Introduction: Need for maintenance, Facts and Figures, modern maintenance, problem and maintenance strategy for the 21st century, Engineering maintenance objectives and maintenance in equipment Life cycle, Terms and definitions.

UNIT II:

Maintenance Management and control: Maintenance Manual, Maintenance, Facility evaluation, Functions of Effective Maintenance Management, Maintenance project control Methods, Maintenance Management control Indices.

UNIT – III

Types of maintenance: Preventive Maintenance, Elements of Preventive, Maintenance Program, Establishing Preventive Maintenance program, PM program Evaluation and Improvement, PM measures, PM models, Corrective Maintenance, Corrective Maintenance types, Corrective Maintenance steps and downtime components, Corrective Maintenance measures, Corrective Maintenance models.

UNIT IV:

Inventory control in Maintenance: Inventory control objectives and basic inventory decisions, ABC Inventory control method, Inventory control models Two bi Inventory control and safety stock, Spares determination factors, spares calculation methods.

UNIT – V

Quality and Safety in Maintenance: Needs for quality Maintenance processes, Maintenance work quality, use of quality control charts in Maintenance work sampling, post Maintenance testing, reasons for safety problems in Maintenance, guidelines to improve safety in Maintenance work, safety officer's role in Maintenance work, protection of Maintenance workers.

UNIT VI:

Maintenance costing: reasons for Maintenance costing, Maintenance budget preparation methods and steps, Maintenance labor cost estimation, material cost estimation, equipment life cycle Maintenance cost estimation, Maintenance cost estimation models.

UNIT – VII

Reliability, Reliability centered Maintenance: RCM goals and principles, RCM process and Associated Questions, RCM Program components Effectiveness Measurement indicators, RCM benefits and Reasons for its failures, Reliability versus Maintenance and Reliability in support phase, Bathtub Hazard Rate Concept, Reliability Measures and Formulas, Reliability Networks, Reliability Analysis Techniques.

UNIT – VIII

Maintainability: Maintainability Importance and objective, Maintainability in systems Life cycle, Maintainability Design characteristics, Maintainability functions and measures, common Maintainability design errors.

TEXT BOOKS:

1. Engineering Maintenance a modern approach B.S. Dhallon 2002 C.R.R. Publichers
2. Maintenance Engineering and management – K. Venkataraman - PHI

REFERENCE BOOKS:

1. Reliability Engineering – Balaguruswamy
2. Reliability Engineering – L.S. Srinath
3. Industrial Safety Management – L.M. Deshmukh – TMH

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. MC II-Sem

L	T/P/D	C
3	1/-/	3

**(58016) ARTIFICIAL NEURAL NETWORKS
(ELECTIVE – IV)**

Unit – I:

Introduction, what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed graphs, Network Architecture, Knowledge Representation, Artificial Intelligence and Neural networks.

Unit- II:

Learning Process – Error Correction Learning, Memory based Learning, Hebbian Learning, Competitive Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process,

Unit-III:

Single Layer Perceptrons: Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, Least mean square algorithm, learning curves, learning rate annealing techniques, perceptron, convergence theorem, Relation between perception and bayes classifier for a Gaussian Environment.

Unit- IV:

Multilayer Perceptron: Back propagation algorithm XOR Problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection.

Unit V:

Back Propagation- Back propagation and differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning techniques, virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

Unit – VI:

Self Organization Maps – Two basic feature mapping models, self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, adaptive patten classification.

UNIT VII:

Neuro dynamics, Dynamical systems, stability of equilibrium states attractors, neuro dynamical models, manipulation of attractors as a recurrent network pradigm

UNIT VIII:

Hopfield Models, Hopfield models, computer experiment.

TEXT BOOK:

1. Neural Networks A comprehensive foundations, Simon Hhaykin, PHI Edition

REFERENCE BOOKS:

1. Artificial Neural networks - B. Vegnanarayana Prentice Hall of India P. Ltd, 2005.
2. Neural Networks in computer Intelligence, LiMinFu, TMH 2003
3. Neural Netowrks James A Freeman David MS Kapura Pearson education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY:
HYDERABAD (A.P.)**

IV Year B.Tech. MC II-Sem

L	T/P/D	C
3	1/-/-	3

**(58070) MATHEMATICAL MODELING AND SIMULATION
(ELECTIVE – IV)**

Unit – I:

Art of Modeling, Types of models, mathematical models – solution methods – analytical, Numerical and Heuristic. L.P.P. – Formulation – Graphical Method, simplex method, dual simplex method and application.

Unit – II:

Transportation models – Assignment models, Integer programming, Non-linear programming.

Unit – III:

Deterministic Inventory models – General Inventory model, Static E.O.Q. Models, Dynamic Inventory model, Probabilistic Inventory models, continuous Review models, single period model and multiple period model.

Unit – IV:

Selective Inventory control – ABC, VED, FSN Analysis. Inventory systems – Fixed order quantity system, two bin system, periodic review systems, Optional Replenishment system and M R P.

Unit – V:

Queuing Theory – Basic Structure of Queuing Models, Role of Exponential Distribution, Birth-and-Death Process, Queuing Models Based on the Birth-and- Death Process, Queuing Models involving Non-exponential Distributions, Priority-Discipline Queuing Models and Queuing Networks. Applications of Queuing Theory – Decision Making, Formulation of Waiting – Cost Function and Decision Models.

Unit – VI:

CPM and PERT – Network Representation, Critical path calculation, construction of Time schedule.

Unit – VII:

Simulation – Introduction, General principles, Random-Number Generation, Random-Variate Generation, Simulation Software.

Unit – VIII:

Input modeling, verification and validation of simulation models, Output Analysis for a single model, Comparison and Evaluation of Alternative System Designs, Simulation of Computer Systems.

TEXT BOOKS:

1. Introduction to Operations Research, Frederick S Hiller and Gerald J Lieberman, 7th Edition, Tata McGrawHill, 2001 (Chapters 17 and 18 for Unit-III).
2. Discrete-Event System Simulation, Jerry Banks, John S Carson II, Barry L. Nelson and David M. Nicol, 3rd edition, PHI/Pearson Education (Chapters 1,3,4,7 and 8 for Unit-IV; Chapters 9,10,11,12 and 14 for Unit-V).
3. Operations Research – An Introduction, 7th edition, Prentice-Hall of India, 1999 (Chapter 1 to 5 for Unit-I and Chapters 11 and 16 for Unit II, Section 6.7 for Unit-IV).

REFERENCE BOOKS:

1. Operation Research – S.K.Jain and D. M. Mehta, Galgotia.
2. Introductory Operations Research: Theory & Applications, Kasana, Springer.
3. Applied Simulation Modelling – Seila, Ceric and Tadikamalla
4. Simulation Modeling and Analysis – Averil M Law – TMH
5. Operation Research – An Introduction 7th Edition, Prentice Hall of india, 1999 (Chapter 1 to 5 for Unit – I and Chapters 11 and 16 for Unit II, Section 6,7 for Unit – IV)

(58071) PRINCIPLES OF ENTREPRENEURSHIP
(ELECTIVE-IV)

Unit I

Introduction to Entrepreneurship – The Entrepreneurial Process, What is Entrepreneurship, Why Become an Entrepreneur, Entrepreneurship importance, Economic impact of Entrepreneurial firms, Recognizing Opportunities and Generating ideas, Techniques for generating Ideas, Encouraging and protecting New ideas

Unit II

Feasibility Analysis – Industry / Market Feasibility Analysis, Organizational Feasibility Analysis, Financial Feasibility Analysis, Importance of Industry and firm – Specific Factors, Developing effective business models – partnering of success.

Unit III

Moving from an idea to an Entrepreneurial firm – building a new venture team, Assessing a new venture's financial strength and viability, Financial statements and forecasts, pro forma financial statements, preparing the proper ethical and legal foundation, choosing a form of business organization, the legal environment of the internet, procedure for SSI registration.

Unit IV

Writing a Business Plan, What is Business Plan, why Business Plan is important, Outline of Business Plan, Business Planning process, Implementing Business Plans, Marketing plan, financial plan and the organizational plan.

Unit V

Sources of Finance, Sources of Equity funding, Sources of debt Financing, Creative sources of financing and funding, Capital Structure, venture capital industry – an overview

Unit VI

Institutional Frame Work: Small Industries Development Bank of India(SIDBI), The National Institute of Entrepreneurship and Small Business Development (NISBUD), National Small Industries Corporation (NSIC), Entrepreneurship Development Institute of India, National Bank for Agricultural & rural Development (NABARD), The Indian Institute of Entrepreneurship (IIE), Small Scale Industries Board, Industrial Development Bank of India, Khadi and village Industries Commission, National Institute of Micro, Small & Medium Enterprises (NIMSME)

Unit VII :

Organizing and Management, Working Capital Management, Purchasing and Inventory Management, Production and Operation Management, Issues in Small Business Marketing, Channels of Distribution, Profit Planning and Budgeting

Unit VIII

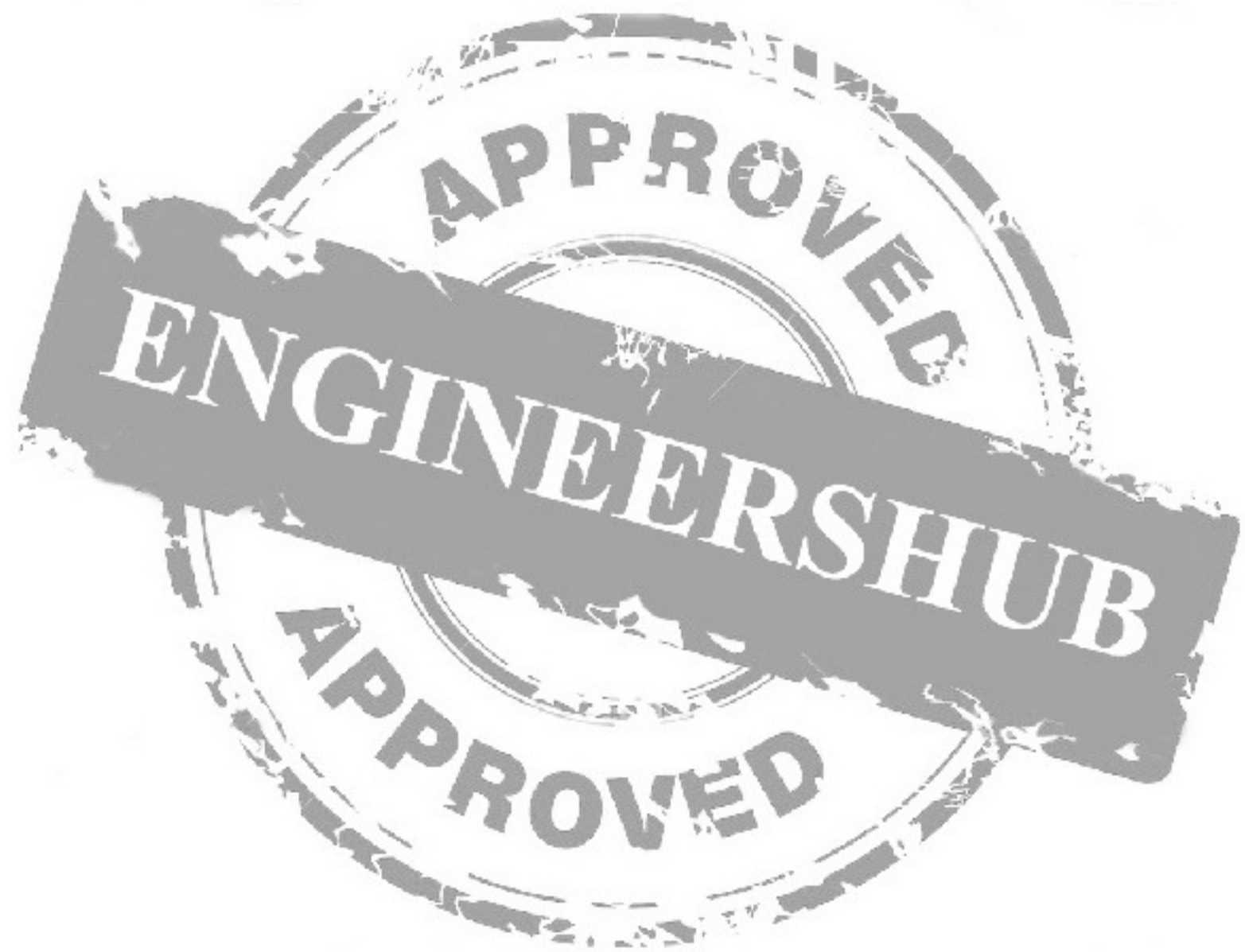
Labour legislation, Salient Provision under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and payment of Bonus Act.

TEXT BOOKS:

1. Bruce R. Barringer, Entrepreneurship, Pearson Education, 2009
2. Madhurima Lall Shikha Sahai, Entrepreneurship, Excel Books, 2nd Edition, 2008

REFERENCES:

1. Vasant Desai: Fundamentals of Entrepreneurship and small business management, Himalaya Publishing House, 2010.
2. K. Ramachandran, Entrepreneurship Development, TMH 2010
3. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2009.
4. Robert D Hisrich, & Michael P Peters, Dean A Shepherd, Entrepreneurship, TMH, 6th Edition, 2009
5. Poornima M Charantimath, Entrepreneurship Development Small Business Enterprises, Pearson Education, Fourth Impression 2009
6. A Sahay & V. Sharma, Entrepreneurship and New Venture creation, Excel Books, 2008
7. Agarwal :Indian Economy , Wishwa Prakashan 2010.
8. Dutt & Sundaram : Indian Economy. S. Chand, 2010.
9. Srivastava: Industrial Relations & Labour Laws, Vikas, 2009



(58072) OPERATING SYSTEM CONCEPTS

(ELECTIVE – IV)

UNIT I :

Operating System Overview: Operating systems functions, Overview of computer operating systems, protection and security distributed systems, special purpose systems, operating systems, structures – operating system services and systems calls, system programs, operating systems structure, operating systems generation.

UNIT II :

Process Management – Process concepts threads, scheduling-criteria algorithms, their evaluation, Thread scheduling, case study of UNIX, Linux, Windows

UNIT III :

Concurrency : Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case study of UNIX, Linux, Windows.

UNIT IV :

Memory Management : Swapping, contiguous memory allocation, paging, structure of the page table , segmentation, virtual memory, demand paging, page-Replacement, algorithms, Allocation of frames, Thrashing, case study of UNIX, Linux, Windows

UNIT V :

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,

UNIT VI :

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, file system implementation, directory implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case study of UNIX, Linux, Windows

UNIT VII :

Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure. **I/O** systems, Hardware, application interface, kernel I/O subsystem, Transforming I/O requests Hardware operation, STREAMS, performance.

UNIT VIII :

Protection: Protection, Goals of Protection, Principles of Protection, Domain of Protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability-based systems, Language – Based Protection.

Security: The Security problem, program threats, system and network threats cryptography as a security tool, User authentication, Implementing security defenses, firewalling to protect systems and networks, computer-security classifications, case study of UNIX, Linux, Windows

TEXT BOOKS:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH

REFERENCES:

1. Operating Systems' – Internal and Design Principles Stallings, sixth edition–2009, Pearson education/PHI
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI.
3. Principles of Operating Systems, B.L. Stuart, Cengage Learning, India Edition
4. Operating System A.S.God bole, 2nd Edition , TMH
5. An introduction to Operating Systems P.C.P. Bhatt, PHI
6. Operating Systems, G Nutt, N. Chaki and S. Neogy, 3rd Edition, Pearson Education
7. Operating Systems. R. Elmasri, A.G. Carrick and D. Levine, Mc. Graw Hill
8. Operating Systems, S. Haldar, A.A. Aravind, Pearson Education