

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

IV Year B.Tech. M.P.-II Sem

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**(A80527) ARTIFICIAL NEURAL NETWORKS**

(Elective – III)

[www.universityupdates.in](http://www.universityupdates.in)**UNIT- I**

Introduction - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

**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- II**

**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- 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 perceptron and Bayes classifier for a Gaussian Environment

**Multilayer Perceptron** – Back-propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection.

[www.universityupdates.in](http://www.universityupdates.in)**UNIT- IV**

**Self Organization Maps:** Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive pattern classification.

**UNIT- V**

**Neuro Dynamics:** Dynamical systems, stability of equilibrium states, attractors, neuro dynamical models, manipulation of attractors as a recurrent network paradigm

**Hopfield Models** – Hopfield models, computer experiment

**TEXT BOOK:**

1. Neural networks: A comprehensive foundation/ Simon Haykin/ PHI.

**REFERENCES:**

1. Artificial neural networks/ B.Vegnanarayana/PHI
2. Neural networks in Computer intelligence/ Li Min Fu/ TMH/2003
3. Neural networks/ James A Freeman David M S kapura/ Pearson education/2004
4. Introduction to Artificial Neural Systems/Jacek M. Zurada/JAICO Publishing House Ed. 2006.

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## (A80241) RELIABILITY ENGINEERING

(Elective – III)

## Unit - I

**Basic Concepts of Reliability:** Introduction, Reliability and quality, Failures and failure modes, Causes of failures and reliability, Maintainability and availability, History of reliability, reliability literature.

## Unit-II

**Reliability Mathematics:** Introduction, Random experiment, Probability, Random variables, Distribution functions, Discrete distribution, Continuous distribution, Numerical characteristics of random variables, Laplace transform.

**Component Reliability and Hazard Models:** Introduction, Component reliability from test data, Mean time to failure, Time – dependent hazard models, Stress- Dependent hazard models, Derivation of reliability function using Markov, Treatment of field data.

## Unit-III

**System Reliability Models:** Introduction - Systems with series components - Systems with parallel components - k-out-of-m systems - Non series parallel systems - Systems with mixed mode failures - Fault- tree technique

## Unit-IV

**Maintainability and Availability Concepts:** Introduction - Maintainability function - Availability function - Frequency of failures - Two-unit parallel systems with repair - k-out-of-m systems - Preventive maintenance.

**Reliability Improvement:** Introduction - Improvement components - Redundancy - Element redundancy - Unit redundancy - Stand by redundancy - Optimization - Reliability – cost trade – off.

## Unit-V

**Economics of Reliability Engineering:** Economic issues -Manufacturer's cost- Customer's cost - Reliability achievement cost - models - Reliability utility cost models - Depreciation cost models - Availability – cost – model of parallel systems.

**Reliability Management:** Reliability programming - Management policies and decision - Reliability management by objectives - Reliability group - Reliability data: Acquisition and analysis - Managing people for reliability

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**TEXT BOOKS ;**

1. Reliability Evaluation of Engineering Systems. R. Billington, RN Allan, BS Publications 2007.
2. Reliability, Maintenance and safety Engineering - Dr. A.K. Gupta, Laxmi Publications

**REFERENCE BOOKS:**

1. Reliability Engineering- Patrick DTO-Wiley India
2. Reliability Engineering and life testing –Naikan-PHI
3. Engineering Maintenance a Modern Approach, B.S. Dhillon,2002 CRR Publications..
4. Maintenance Engineering and Management – RC Misra, PHI
5. Reliability Engineering – Balaguruswamy-TMH
6. Reliability Engineering- L.S.Srinath

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**(A80363) MAINTENANCE AND SAFETY ENGINEERING****(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.

**Maintenance Management and Control:** Maintenance Manual, Maintenance, Facility Evaluation, Functions of Effective Maintenance Management, Maintenance Project Control Methods, Maintenance Management Control Indices.

**UNIT-II**[www.universityupdates.in](http://www.universityupdates.in)

**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.

**Inventory Control in Maintenance:** Inventory Control Objectives and Basic Inventory Decisions, ABC Inventory Control Method, Inventory Control Models Two-Bin Inventory Control and Safety Stock, Spares Determination Factors Spares Calculation Methods

**UNIT- III**

**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.

**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-IV**[www.universityupdates.in](http://www.universityupdates.in)

**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-V

**Maintainability:** Maintainability Importance and Objective, Maintainability in Systems Life Cycle, Maintainability Design Characteristics, Maintainability Functions and Measures, Common Maintainability Design Errors.

### TEXT BOOKS

1. Reliability, Maintenance and Safety Engineering/ Dr. A.K.Guptha/ Laxmi Publications.
2. Industrial Safety Management/ L.M. Derani/TMH

[www.universityupdates.in](http://www.universityupdates.in)

### REFERENCES:

1. Maintenance Engineering & Management / R.C.Mishra/ PHI
2. Reliability Engineering / Elsayed/ Pearson
3. Engineering Maintenance a modern approach/ B.S Dhallon/ C.R.R Publishers
4. A Text Book of Reliability and Maintenance Engineering/Alakesh Manna/IK International Publishing House
5. Plant Maintenance and Reliability Engineering/NVS Raju/Cengage Learning

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**(A80365) PLANT LAYOUT AND MATERIAL HANDLING****(Elective - III)**[www.universityupdates.in](http://www.universityupdates.in)**UNIT – I**

Introduction- Classification of Layout, Advantages and Limitations of different layouts, Layout design procedures, Overview of the plant layout

Process layout & Product layout: Selection, specification, Implementation and follow up, comparison of product and process layout

**UNIT – II**

Heuristics for Plant layout – ALDEP, CORELAP, CRAFT, Group Layout, Fixed position layout- Quadratic assignment model. Branch and bound method

**UNIT – III**

Introduction, Material Handling systems, Material Handling principles, Classification of Material Handling Equipment, Relationship of material handling to plant layout.

**UNIT – IV**

Basic Material Handling systems: Selection, Material Handling method- path, Equipment, function oriented systems.

**UNIT – V**

Methods to minimize cost of material handling- Maintenance of Material Handling Equipments, Safety in handling Ergonomics of Material Handling equipment. Design, Miscellaneous equipments

**TEXT BOOKS:**

1. Operations Management/ PB Mahapatra/ PHI
2. Aspects of Material handling/ Dr. KC Arora & Shinde/ Lakshmi Publications

[www.universityupdates.in](http://www.universityupdates.in)**REFERENCES:**

1. Facility Layout & Location an analytical approach/ RL Francis/ LF Mc Linnis Jr, White/ PHI
2. Production and Operations Management/ R Panneerselvam/ PHI
3. Introduction to Material handling/ Ray, Siddhartha/ New Age
4. Plant Layout and Material Handling/ RB Chowdary/ Khanna Publishers
5. Plant Maintenance and Reliability Engineering/ NVS Raju/ Cengage Learning

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**(A80347) MECHANICS OF COMPOSITE MATERIALS**  
**(Elective-III)**

**UNIT-I**

**Introduction to Composite Materials:** Introduction, Classification Polymer Matrix Composites, Metal Matrix Composites, Ceramic Matrix Composites, Carbon–Carbon Composites, Fiber-Reinforced Composites and nature-made composites, and applications .

**UNIT-II**

**Reinforcements:** Fibers- Glass, Silica, Kevlar, carbon, boron, silicon carbide, and boron carbide fibers. Particulate composites, Polymer composites, Thermoplastics, Thermosets, Metal matrix and ceramic composites.

**UNIT-III**

**Macro Mechanical Analysis of a Lamina:** Introduction, Definitions Stress, Strain, Elastic Moduli, Strain Energy. Hooke's Law for Different Types of Materials, Hooke's Law for a Two-Dimensional Unidirectional Lamina, Plane Stress Assumption, Relationship of Compliance and Stiffness Matrix to Engineering Elastic Constants of a Lamina.

**UNIT-IV**

**Macro Mechanical Analysis of Laminates:** Introduction, Laminate Code, Stress–Strain Relations for a Laminate, In-Plane and Flexural Modulus.

**UNIT-V**

**Failure Analysis of Laminates:** Introduction, Special Cases of Laminates, Applications, Failure Criterion for a Laminate.

**TEXT BOOKS:**

1. Mechanics of Composite Materials/ R. M. Jones/ Mc Graw Hill Company, New York, 1975.
2. Engineering Mechanics of Composite Materials/Isaac and M Daniel/ Oxford University Press, 1994.

**REFERENCES:**

1. Analysis and performance of fibre Composites/ B. D. Agarwal and L. J. Broutman/ Wiley- Inter science, New York, 1980.



2. Mechanics of Composite Materials/ Second Edition (Mechanical Engineering)/ Autar K. Kaw/Publisher: CRC
3. Analysis of Laminated Composite Structures/ L. R. Calcote/ Van Nostrand Rainfold, New York, 1969.
4. Advanced Mechanics of Composite Materials/ Vasiliev & Morozov/ Elsevier/Second Edition



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**(A80341) FLEXIBLE MANUFACTURING SYSTEM****(Elective - IV)****UNIT – I**

**Introduction:** Types of production, characteristics, applications, Flexibility in Machining systems, need for FMS, Flexible Automation, where to apply FMS technology.

**UNIT – II**

**Flexible Manufacturing Cell:** Characteristics, Flexible Machining systems, achieving flexibility in machining systems, Machine cell design.

**UNIT – III**

**Components of FMS:** FMS layout configurations, Planning the FMS, FMS's Work- stations, Material Handling systems, Automatic Guided vehicle systems, Automated storage and retrieval systems, and Computer control systems.

**Unit – IV**

**Implementing FMS:** FMS Layout configurations, Quantitative Analysis methods for FMS , Applications and benefits of FMS.

**Unit-V**

**Computer aided quality control and testing:** Coordinate measuring machines, over view, contact and non contact inspection principles, Part programming coordinate measuring machines, In-cycle gauging.

**TEXT BOOKS:**

1. Automation, Production systems and Computer Integrated Manufacturing System – Mikell P. Groover
2. The design and operation of FMS –Dr. Paul Ranky Nort –Holland Publishers

[www.universityupdates.in](http://www.universityupdates.in)**REFERENCES:**

1. Flexible Manufacturing systems in practice by Joseph talvage and roger G. Hannam, Marcel Dekker Inc., New york
2. Hand book of FMS – Nand Jha .K.
3. FMS and control of machine tools - V. Batmirov, MIR publications
4. Flexible Manufacturing – David J. Parrish

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**Objectives:**

- To understand the need of Flexible Manufacturing Systems in an Automated Industry.
- To know various configurations of FMS layouts and Cell formations for different production environments.
- To study the usage of AGVS and AS/RS systems in FMS environment.



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**(A80129) PRINCIPLES OF ENTREPRENEURSHIP****(Elective -IV)****Unit I:**

Introduction to Entrepreneurship: Definition of Entrepreneur Entrepreneurial Traits. Entrepreneur vs. Manager, Creating and Starting the venture: Sources of new ideas, methods of generating ideas, creative problem solving - Writing Business Plan, Evaluating Business Plans. Launching formalities.

**Unit II:**

Financing and Managing the new venture: Sources of capital, Record keeping, recruitment, motivating and leading teams, financial controls. Marketing and sales controls. E-commerce and entrepreneurship, Internet advertising- New venture Expansion Strategies and Issues.

**Unit III:**

Institutional/financial support: Schemes and functions of Directorate of Industries, District Industries Centres (DICs), Industrial Development Corporation (IDC), State Financial Corporation (SFCs), Small Scale Industries Development Corporations (SSIDCs), Khadi and Village Industries Commission (KVIC), Technical Consultancy Organisation (TCO), Small Industries Service Institute (SISI), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI).

**Unit IV:**

Production and Marketing Management: Thrust areas of production management, Selection of production Techniques, Plant utilization and maintenance, Designing the work place, Inventory control, material handling and quality control. Marketing functions, market segmentation, market research and channels of distribution, Sales promotion and product pricing.

**Unit V :**

Labour legislation, Salient Provisions of Health, Safety, and Welfare under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and Payment of Bonus Act.

**TEXT BOOKS:**

1. Robert Hisrich, & Michael Peters: Entrepreneurship, TMH,2009.
2. Dollinger: Entrepreneurship, Pearson,2009.

**REFERENCE BOOKS:**[www.universityupdates.in](http://www.universityupdates.in)

1. Vasant Desai, Dynamics of Entrepreneurial Development and

Management, Himalaya Publishing House, 2009.

2. Harvard Business Review on Entrepreneurship, HBR Paper Back.
3. Robert J. Calvin: Entrepreneurial Management, TMH, 2009.
4. Gurmeet Naroola: The entrepreneurial Connection, TMH, 2009
5. Bolton & Thompson: Entrepreneurs—Talent, Temperament and Techniques, Butterworth Heinemann, 2009.
6. Agarwal: Indian Economy, Wishwa Prakashan 2009.
7. Dutt & Sundaram: Indian Economy, S. Chand, 2009
8. B D Singh, :Industrial Relations & Labour Laws, Excel, 2009.
9. Aruna Kaulgud: Entrepreneurship Management by, Vikas publishing house, 2009.
10. Essential of entrepreneurship and small business management by Thomas W. Zimmerer & Norman M. Scarborough, PHI-2009
11. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2009.

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**(A80367) TOTAL QUALITY MANAGEMENT****(Elective - IV)** [www.universityupdates.in](http://www.universityupdates.in)**UNIT - I**

Introduction, The concept of TQM, Quality and Business performance, attitude and involvement of top management, communication, culture and management systems.

Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

**UNIT - II**

**Customer Focus and Satisfaction:** Process Vs. Customer, internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships.

**Bench Marking:** Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the bench marking procedure, pitfalls of bench marketing.

**UNIT- III**

**Organizing for TQM:** The systems approach, Organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM: Stratification, check sheet, Scatter diagram, Ishikawa diagram, paneto diagram, Kepner & Tregoe Methodology.

**UNIT- IV**

**The Cost of Quality:** Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

**UNIT - V**

**ISO9000:** Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQC Q- 90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

**TEXT BOOK:**[www.universityupdates.in](http://www.universityupdates.in)

1. Total Quality Management / Joel E.Ross/Taylor and Franscis Limited
2. Total Quality Management/P.N.Mukherjee/PHI

[www.universityupdates.in](http://www.universityupdates.in)

**REFERENCE BOOKS:**

1. Beyond TQM / Robert L.Flood
2. Statistical Quality Control / E.L. Grant.
3. Total Quality Management:A Practical Approach/H. Lal
4. Quality Management/Kanishka Bedi/Oxford University Press/2011
5. Total Engineering Quality Management/Sunil Sharma/Macmillan



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**(AS2006) PRODUCT DESIGN AND DEVELOPMENT****(Elective -IV)****Objectives:**

- To understand the need of product design and development, identifying the opportunities.
- To know the customer requirement for customization of product design.
- To make standard product design and development of products for manufacturability.
- To understand the robust product design and control factors which impact design process.

**UNIT - I**

**Introduction:** Need for IPPD – strategic importance of product development – integration of customer, designer, material supplier and process planner, Competitor and customer – behaviour analysis. Product planning process, Identify opportunities, Evaluate projects, Allocate resources and time, Reflect results and processes

**UNIT - II**

Understanding customer – promoting customer understanding – involve customer in development and managing requirements – Organization – process management and improvement – Plan and establish product specification

**UNIT - III**

**Concept Generation and Selection:** Task – Structured approaches – Clarification – Search – Externally and internally – explore systematically – reflect on the solutions and processes – concept selection – methodology – benefits

[www.universityupdates.in](http://www.universityupdates.in)**UNIT -IV**

**Product Architecture:** Implications – Product change – variety – component standardization – product performance – manufacturability

Product Development Management – establishing the architecture – creation – clustering – geometric layout development – fundamental and incidental interactions – related system level design issues – secondary systems – architecture of the chunks – creating detailed interface specifications.



**UNIT - V**

**Industrial Design:** Integrate process design – Managing costs – Robust design- Control factors–Need for industrial design – impact – design process.

Investigation of customer needs – conceptualization – refinement – management of the industrial design process – technology driven products – user – driven products – assessing the quality of industrial design.

**TEXT BOOK:**

1. Product Design and Development - Kari T. Ulrich and Steven, D. Eppinger , TMH, 2009.

**REFERENCES:**

1. Tool Design- Integrated Methodds - Successful Product Engineering- Stuart Pugh, Addison Wesley Publishing, Newyork, NY, 1991, ISBN 0-202-41639-5.
2. Effective Product Design and Development - Stephen Rosenthal, Business One Orwin, Homewood, 1992, ISBN, 1-55623-603-4.

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**(A80087) INDUSTRY ORIENTED MINI PROJECT**[www.universityupdates.in](http://www.universityupdates.in)**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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**(A80089) SEMINAR****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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**(A80088) PROJECT WORK****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

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**(A80090) COMPREHENSIVE VIVA**[www.universityupdates.in](http://www.universityupdates.in)