JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	3	1/-/-	3

(58015) PRODUCTION PLANNING AND CONTROL

UNIT-I : Introduction: Definitions – 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 – internal organizations department

UNIT-II : Forecasting – Importance of forecasting – types of forecasting, their uses- general principles of forecasting techniques- Qualitative methods and quantitative methods.

UNIT-III : Inventory management – Functions inventory- Relevant inventory cost- ABC analysis- VED Analysis- EOQ model – Inventory control systems – P- Systems and Q – Systems

UNIT – IV : Introduction to MRP And ERP, LOB(Line of balance), JIT inventory, 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 polices – techniques, standard scheduling methods- job shop, flow shop,.

UNIT-VII : Line balancing, aggregate planning- methods for aggregate planning- Chase planning, expediting, control aspects.

UNIT-VIII : Dispatching – Activities of dispatcher- Dispatching procedure - follow up – definition – reasons for existence of functions – types of follow up, applications of computer in production planning control

TEXT BOOKS:

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

REFRENCE BOOKS :

1. Production Planning and Control- Text & cases/ SK Mukhopadhyaya /PHI.
2. Production and operations Management – R.Panneer Selvam – PHI
3. Operations Management by Chase/PHI
4. Management Science – A R Aryasri- 4e –TMH
5. Operations management – Heizer- Pearson

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -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 Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

UNIT II

Learning Process – error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Asssignment 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 perceptron 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 patter classification

UNIT VII

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

UNIT VIII

Hopfield models – Hopfield models, computer experiment

TEXT BOOK:

1. Neural networks: A comprehensive foundation, Simon Hhaykin, PHI edition.

REFERENCES:

1. Artificial neural networks - B.Vegnanarayana Prentice Hall of India P Ltd 2005
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.

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	3	1/-/-	3

(58017) RELIABILITY ENGINEERING
(ELECTIVE – III)

Unit - I

Basics 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.

Unit-III

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-IV

System reliability models: Introduction - Systems with component with in series - Systems with parallel components - k-out – of- m systems - Non series parallel systems - Systems with - mixed – mode failures - Fault- tree technique

Unit-V

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.

Unit-VI

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

Unit-VII

Economics of reliability engineering : Economic issues - Manufacture's cost - Customer's cost - Reliability achievement cost - models - Reliability utility cost models - Depreciation cost models - Availability – cost – model of parallel systems.

Unit-VIII

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

TEXT BOOKS ;

1. Reliability Engineering – Balaguruswamy- TMHill
2. Reliability Engineering- L.S.Srinath

REFERENCE BOOKS:

1. Reliability Engineering- Patrick DTO-Wiley Conor-India
2. Reliability Engineering and life testing –Naikan-PHI

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	3	1/-/-	3

(58018) 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.

UNIT-II

Maintenance Management And Control: Maintenance Manual, Maintenance, FacilityEvaluation, Functions of Effective Maintenance Management, Maintenance Project Control Methods, Maintenance Management Control Indices.

UNIT-III

Types of maintainance: 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-Bin 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. Reliability, Maintenance and Safety Engineering by Dr. A.K.Guptha/ Laxmi Publications.
2. Industrial Safety Management by L.M. Deshmukh/TMH

REFERENCES:

1. Maintenance Engineering & Management by R.C.Mishra/ PHI
2. Reliability Engineering by Elsayed/ Pearson
3. Engineering Maintenance a modern approach, B.S Dhallon, 2002, C.R.R publishers

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	3	1/-/-	3

(58019) PLANT LAYOUT AND MATERIAL HANDLING

(Elective - III)

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

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

UNIT – III : Heuristics for Plant layout – ALDEP, CORELAP, CRAFT

UNIT – IV : Group Layout, Fixed position layout- Quadratic assignment model, Branch and bound method

UNIT – V : Introduction, Material Handling systems, Material Handling principles, Classification of Material Handling Equipment, Relationship of material handling to plant layout

UNIT – VI : Basic Material Handling systems: Selection, Material Handling method- path, Equipment, function oriented systems

UNIT – VII : Methods to minimize cost of material handling- Maintenance of Material Handling Equipments, Safety in handling

UNIT – VIII : 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

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

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	3	-/-/-	3

(58020) RENEWABLE ENERGY SOURCES

(ELECTIVE - IV)

UNIT – I

PRINCIPLES OF SOLAR RADIATION: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT-III

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-IV

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT-V

BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

UNIT-VI

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential in India.

UNIT-VII

OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-VIII

DIRECT ENERGY CONVERSION Need for DEC, Carnot cycle, limitations,

principles of DEC. Thermo-electric generators, seebeck, peltier and Joule-Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
2. Non-Conventional Energy Sources /G.D. Rai

REFERENCES:

1. Renewable Energy Sources /Twidell & Weir
2. Solar Energy /Sukhatme
3. Solar Power Engineering / B.S Magal Frank Kreith & J.F Kreith.
4. Principles of Solar Energy / Frank Krieth & John F Kreider.
5. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
6. Non-Conventional Energy Systems / K Mittal /Wheeler
7. Renewable Energy Technologies /Ramesh & Kumar /Narosa

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	3	1/-/-	3

(58021) JET PROPULSION AND ROCKET ENGINEERING (ELECTIVE-IV)

UNIT-I : Elements of Gas Turbine theory-Thermo dynamic Cycles, open closed and semi-closed – parameters of performances –cycle modifications for improvement of performance.

UNIT-II : Jet propulsion: Historical sketch-reaction principle –essential features of propulsion devices-Thermal Engines, Classification of –Energy flow thrust, Thrust power and propulsion efficiency-Need for Thermal Jet Engines and applications

UNIT-III : Turboprop and Turbojet-1: Thermo dynamic cycles, plant layout ,essential components, principles of operation –performance evaluation

UNIT-IV : Turboprop and Turbojet-II: Thrust Augmentation and Thrust reversal-Contrasting with piston Engine Propeller plant.

UNIT-V : Ramjet: Thermo dynamic Cycle, plant lay-out, essential components –principle of operation-performance evaluation –comparison among atmospheric thermal jet engines- serqujet and pulse jet, elementary treatment.

UNIT-VI : Rocket Engines: Need for, applications –Basic principles of operation and parameter s of performance –classification ,solid and liquid propellant rocket engines ,advantages, domains of application – propellants –comparison of propulsion systems.

UNIT-VII : Rocket Technology-I: Flight mechanics, Application Thrust profiles, Acceleration –staging of Rockets ,need for –Feed systems, injectors and expansion nozzles –Rocket heat transfer and ablative cooling.

UNIT-VIII : Rocket Technology- II: Testing & instrumentation –Need for Cryogenics –Advanced propulsion Systems, elementary treatment of Electrical Nuclear and plasma Arc propulsion.

TEXT BOOKS:

1. Gas Turbines and propulsive systems-P.Khajuria& S.P.Dubey/ Dhanpatrai pub.
2. Gas Dynamics & Space Propulsion M.C.Ramaswamy / Jaico Publishing House.

REFERENCE BOOKS:

1. Rocket propulsion –Sutton
2. Gas Turbines /Cohen, Rogers & Sarvana Muttoo/Addision Wesley & Longman.
3. Gas Turbines-V.Ganesan /TMH.

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	3	1/-/-	3

(58022) COMPUTATIONAL FLUID DYNAMICS
(ELECTIVE – IV)

UNIT-I : Elementary details in numerical techniques: Number system and errors, representation of integers, fractions, floating point arithmetic, loss of significance and error propagation, condition for instability, computational methods for error estimation, convergence of sequences.

UNIT - II : Applied Numerical Methods: Solution of a system of simultaneous Linear Algebraic Equations, Iterative schemes of Matrix Inversion, Direct Methods for Matrix inversion, Direct Methods for banded matrices.

UNIT - III : Finite Difference Applications in Heat conduction and Convection – Heat conduction, steady heat conduction in a rectangular geometry, transient heat conduction, finite difference application in convective heat transfer, closure.

UNIT - IV : Finite Differences, discretization, consistency, stability, and Fundamentals of fluid flow modeling: Introduction, elementary finite difference quotients, implementation aspects of finite-difference equations, consistency, explicit and implicit methods.

UNIT - V : Introduction to first order wave equation; stability of hyperpolic and elliptic equations, fundamentals of fluid flow modeling, conservative property, the upwind scheme.

UNIT - VI : Review of Equations Governing Fluid Flow and Heat Transfer: Introduction, conservation of mass, Newton's second law of motion, expanded forms of Navier-stokes equations, conservation of energy principle, special forms of the Navier-stokes equations.

UNIT - VII : Steady flow, dimensionless form of Momentum and Energy equations, Stokes equation, conservative body force fields, stream function - Vorticity formulation.

UNIT-VIII : Finite volume method: Approximation of surface integrals, volume integrals, interpolation and differentiation practices, upwind interpolation, linear interpolation and quadratic interpolation.

TEXT BOOKS:

1. Numerical heat transfer and fluid flow / Suhas V. Patankar Hema shava Publishers corporation & Mc Graw Hill.
2. Computational Fluid Flow and Heat Transfer/ Muralidaran- Narosa Publications

REFERENCES:

1. Computational Fluid Dynamics: Basics with applications –John D. Anderson/ Mc Graw Hill
2. Fundamentals of Computational Fluid Dynamics – Tapan K. Sengupta / Universities Press.

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	3	1/-/-	3

(58023) GAS DYNAMICS
(ELECTIVE - IV)

Unit-I : Introduction: Concept of continuum and control volume, continuity equation, momentum equation, streamline, steady, one dimensional dynamic equation of a fluid flow with and without friction, energy equation.

Unit-II : Properties of atmosphere, standard atmosphere, relative pressure, use of air and gas tables. Condition for neglecting compressibility. Compressible flow, acoustic velocity, Mach number, Mach cone, Mach angle.

UNIT-III : Isentropic flow: Stagnation enthalpy, density, pressure and temperature, local acoustic speed, maximum speed, variation of Compressibility with mach number.

UNIT-IV : Variable area flow, criteria for acceleration and deceleration, critical condition, nozzle discharge co-efficient, nozzle efficiency, operation of nozzles under varying backpressures.

UNIT-V : Flow in constant area duct: Adiabatic and isothermal- flow calculation of pressure, temperature, density, Mach number relationships. Limiting length of duct for adiabatic and isothermal flow. Fanno line.

UNIT-VI : Diabatic flow: Flow of perfect gases in constant area duct with heat exchange, density temperature, pressure and mach number relationships. Limiting conditions.Rayleigh line.

UNIT-VII : Wave phenomenon: Pressure disturbances in compressible fluid, type of shock waves – normal, shock. Pressure –density-velocity-temperature and Mach number relations for a plane normal shock.

UNIT-VIII : Shock intensity- Rayleigh- Pilot and Prandtl- Pitot equation for normal shock. Introduction to oblique shockwaves and hypersonic flow.

TEXT BOOKS

1. S.M. Yahya, "Fundamentals of Compressible Flow", New Age International Publishers, 2004.
2. Zoeb Hussain, "Gas dynamics through problems ", WILEY EASTERN LTD.

REFERENCES

1. Gas dynamics- E. Radha Krishnan. P.H.I Publication, 2009.
2. H.W. Lipman and A. Rashkho, " Gas Dynamics", John Wiley, 1963.
3. Cambel and Jennings, "Gas Dynamics", McGraw Hill, 1958.

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	0	-/-/-	2

(58609) INDUSTRY ORIENTED MINI PROJECT

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	0	-/6/-	2

(58610) SEMINAR

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	0	-/15/-	10

(58611) PROJECT WORK

JAWAHAR LAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. ME -II Sem	L	T/P/D	C
	0	-/-/-	2

(58612) COMPREHENSIVE VIVA