INSTITUTE OF TECHNOLOGY
GURU GHASIDAS VISHWAVIDHALAYA
(A CENTRAL UNIVERSITY ESTABLISHED BY THE CENTRAL UNIVERSITY ORDINANCE 2009, NO:3 OF 2009)
DEPARTMENT OF MECHANICAL ENGINEERING
STUDY & EVALUATION SCHEME
W.E.F. SESSION 2012-2013

Year: B.Tech. IV Year
SEMESTER: VIII

Sl. No.	Course No.	SUBJECT	PERIODS			EVALUATION SCHEME			Credits
		(THEORY)	L	T	P	SESSIONAL EXAM / INTERNAL ASSESSMENT	ESE	SUB TOTAL	
1.	ME-481	Power Plant Engineering	3	1	-	40	60	100	4
2.	ME-482	Operation Research	3	1	-	40	60	100	4
3.	ME-483	Auto Mobile Engineering	4	0	-	40	60	100	4
4.	ME-484	Elective-**II***	3	1	-	40	60	100	4
		Total	**13**	**3**	**-**	**160**	**240**	**400**	**16**
	(PRACTICALS)								
5.	ME- 488	Project	-	-	12	120	80	200	8
6.	ME- 489	Comprehensive Viva	-	-	-		50	50	2
		Total				**120**	**130**	**250**	**26**

Elective – II*	
ME - 484 A	Total Quality Management
ME - 484 B	Enterprise Resource Planning
ME - 484 C	Machine Tool Design
ME - 484 D	Robotics

Total Credits: **26**   Total Contact Hour: **28**   Total Marks: **650**

INTERNAL ASSESSMENT- (MSE- Mid Semester Examination of 20 Marks, Two Class Test/Assignment /Quizzes/Group Discussion etc.)
L-LECTURE, T-TUTORIAL, P-PRACTICAL, CT-CLASS TEST, E.S.E – END SEMESTER EXAMINATION

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-VIII Sem	ME-481	POWER-PLANT ENGINEERING	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

ME-481   POWER-PLANT ENGINEERING

UNIT I-

Sources of energy, present power position in India, non-conventional energy and their application, steam power plant.

High-pressure boilers and their classification and working.

Boiler accessories and mountings, condenser and their types.

UNIT II-

Solar Energy: Solar Insulation Calculation, Flat plates and concentrating collectors for liquid and gases, construction.

Collector Area Calculation: heat removal Factor, Efficiency.

Solar System: Power plants, low temperature and high temperature plants, solar dryers, solar cookers, solar refrigeration systems, solar panel.

UNIT III-

Nuclear Energy: Introduction to Nuclear Engineering, Release of Energy by Nuclear Reaction, chain reaction, moderation, components of nuclear reactor, types of reactor, Pressured water reactor, CANDU reactor, Gas cooled reactor, Liquid metal cooled reactor, breeder reactor, Nuclear Materials.

UNIT IV-

Geothermal power plant, tidal power plants.

Wind energy: Type of Rotors, horizontal axis and vertical axis systems, system design and site selection blade material. Wind power scenario in India.

Bio Gas Plant: Types, parameters affecting plant performance, plant design.

UNIT V-

Direct Energy Conversions: fuel Cells, Thermo-electric, Thermo ionic and MHD Systems (Magneto Hydrodynamic system), Economic analysis of Power plant tariffs.

Text Books:

1. Power plant Engineering, Domkundwar & Arora, Dhanpat Rai Publication.
2. Sukhatme, S.P., Solar energy, TMH Publication.
3. Duffie and Beckman, Solar Energy Thermal Processes, John Wiley.
4. P.K.Nag, Power plant Engineering.

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-VIII Sem	ME-482	Operation Research	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

ME-482 Operation Research

UNIT I

Introduction to linear programming, graphically solution to linear programming problem, solving linear problem by simplex method, optimization problem, maximization & minimization function with or without constraints, sack surplus & artificial, variable method, degeneracy problem

UNIT II

Mathematical statement of the transportation problem, the transportation model, method for basic feasible solution, Degeneracy & unbalance problem , Mathematical statement of the assignment problem, solution of assignment problem ,traveling sales-man problem

UNIT III

Game theory rule of game, Method of solving game , graphically & Arithmetic , saddle point & without saddle point , dominance method, mixed strategies 2 X 2game , 2 X N game , M X 2 game , 3 X 3game (Method of matrix's, method of linear programming etc).

Inventory:

Introduction, classification, function, level, control techniques, models, various costs associated, EOQ, optimum lot sizing.

UNIT IV

Introduction of queuing theory ,elements of queuing system ,operating characteristics of a queuing system ,Poisson arrivals & exponential service time , waiting time & idle time cost ,single channel queuing theory.

Simulation, continuous & discrete simulation, Monte Carlo simulation, Generation of random number and its problem.

UNIT V

Network analysis, Introduction of PERT & CPM, computation of PERT, Time estimation , measure of deviation & variation , probability of completing project , Arrow diagram & critical path method , Scheduling , cost analysis & crushing of network.

Text Books:
1. Sharma & S D Kedarnath - Operation Reasearch, Ramnath & Co Meerut
2. Operation Research, Sasien Yaspan
3. Operation Research – N. D. Vohra – TMH Publication
4. Operation Research– Hira & Gupta – S. Chand & Co.
5. Operation Research – H. Gillette – TMH, New Delhi
6. Operations Research – M. Taha – TMH, New Delhi
7. Operations Research – Phillip Ravindran- Wiley Publications

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-VIII Sem	ME-483	Automobile Engineering	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

ME 483 Automobile Engineering

UNIT - I

Introduction of an automobile, component and basis structure of automobile, classification, difference between automobile and automotive, the chassis construction & classification, defect in frames, frameless construction & specifications. Wheel and tyres: Types of wheel, wheel dimension, desirable tyres properties, types of tyres, tyre material, tyre dimension, factor affecting tyre life.

UNIT-II

Transmission system: Function of transmission types, sliding mesh gear box, constant mesh gear box synchro mesh gear box, cylindrical gear box, torque converter, propeller shaft, universal joint, hooks joint, final drive, differential, performance of gear box.

UNIT - III

Clutches: Requirement, function & type of clutch, dry friction clutch, wet friction clutch, clutch plate, single plate & multiple plate clutch, centrifugal clutch, and fluid fly wheel.

Suspension system function and requirement, leaf spring, torsion bar, telescopic shock absorber.

UNIT - IV

Brakes: Function and requirement, brake efficiency, wheel skidding, types of brake, electrical, mechanical and hydraulic & pneumatic brakes, master cylinder, wheel cylinder, self actualizing brakes, brake drum, brake liners, brake shoe, trouble shooting.

UNIT- V

Front axle and suspension wheel alignment purpose, factor of front wheel alignment, steering geometry, correct steering angle, steering mechanism, under steer and over steer, steering gear, power steering, reversibility of steering gears, steering gear ratio, calculation of turning radius.

Engine emission: Emission standard of vehicle in India, Euro norms, emission, testing.Principle of multipoint fuel injection(MPFI),component of MPFI, Different sensors of MPFI system; vehicle air conditioning, Catalytic connectors, engine troubles & repairs.

Text Books:

1. Automobile Engineering Kripal Singh Vol. I, II

2. Automobile Mechanics   Joseph Heitner.

3. Automobile Engineering   Giri N.K

4. Automobile Engineering by Shrinivasan T.M.G.H.

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-VIII Sem	ME-484 A	Total Quality Management(Elective)	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

(Elective) ME - 484 (A)   Total Quality Management

UNIT - I

Basic concepts of Quality, Inspection definition of quality, quality control cost of quality, Value of quality, Statistical Quality Control, Need and advantages of SQC.

Frequency distribution, Variables & attributes, quality characteristics, Theory of control charts, control chart for variable X & R chart, Control chart for attribution p, np, C, Chart & process capability

UNIT - II

Quality Assurance, Quality assurance Manual, Quality Circle, characteristics of quality circle and the process of operation of quality circle, quality Policy & procedure & objectives, Acceptances Sampling, Concept of sampling, O-C curve & its construction ,Sampling plans, single, doubles & multiple sampling plans.

UNIT - III

Contribution of Various Quality Management Gurus, Juran Triology, Deming's 14 Points, P-D-C-A Wheel, Taguchi's philosophy, Design of experiment, old and new Seven QC Tool of Quality, Philip Crosby's zero defect, Quality function deployment

UNIT - IV

Introduction to ISO 9000, Various models of ISO 9000, Clauses of 9000, Total   Quality Control,

Total Quality Management, Tools for TQC & 5's TQM, Kaizen. Seven types of waste, 6 sigma

quality, procedure of six sigma, TQM and Six Sigma.

UNIT - V

Reliability: Definitions, Bathtub curve, design for reliability, Failures & causes of failures, FMECA, Maintainability & Availability, MTBF, and Reliability Models.

System with components in series & in parallel, mixed arrangement, fault –tree-technique.

Text Books

1. SQC by Grant & Livingsworth - Tata Mc. Hill
2. Quality Planning & Analysis by Juran & Gryna - Tata Mc. Hill
3. Total Quality Control By a Feigenbaum - Mcgraw Hill
4. SQC by M.Mahajan – Dhanpat rai publication
5. Total quality management – Besterfield Tata Mc. Hill
6. Total quality management – Purnima charantimath (Low Pearson Education)

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-VIII Sem	ME-484 B	Enterprise Resource Planning (Elective)	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

(Elective) ME – 484 (B)   Enterprise Resource Planning

UNIT –I

Introduction to   Enterprise resource planning, Evolution of ERP, MRP, MRP-II, e-ERP, Generic business model with reference to ERP, Structure of ERP Two tier architecture client, server, Three tier architecture, repository, RDBMS, Operating systems, Generic model of ERP system - Design tree node structure, Design of, Role/Activity Diagrams, Benchmarking, Types of Benchmarking, Process of Benchmarking.

UNIT –II

Introduction to Business Process Re-engineering, Procedure of BPR, Principle of BPR, Process improvement Process redesign

UNIT-III

Introduction : Supply chain Management and ERP, understanding the supply chain with case examples, Supply chain performance with measures, Achieving strategic fit and scope, Supply chain drivers,
Supply chain obstacles, ERP Vs SCM, Benefits of supply chain improvement, Introduction of Logistics
Types of Logistics, Types of Logistics, Benefits of Logistics.

UNIT-IV

Integrated SAP model, Integrated Data, Master Data, Transactional Data, Integrated processes, Evolution Electronic Data Interchange (EDI), Use of EDI, and Benefits of EDI, Selection of ERP: Introduction

Opportunities and problems in ERP selection, Approach to ERP selection of ERP.

UNIT-V

Origins of SAP, SAP's Markets, SAP architecture and integration, SAP Business structure, Customization of SAP, SAP R/3 material Management, Sales and Distribution, Production, Plant Maintenance, Quality Management, Methodology for ERP implementation, Implementation phases, Implementation of Life cycle

Implementation failure

Text Books:
1. Enterprise Resource Planning: Theory and practice by Rahul V. , PHI Publication.
2. Enterprise Resource Planning: Concepts and practice by V.K. Garg, TMH Publication.
3. Enterprise Resource Planning by Alexis Leon, McGraw-Hill Publication.

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-VIII Sem	ME-484 C	MACHINE TOOL DESIGN (Elective)	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

4. (Elective) ME- 484 (C) MACHINE TOOL DESIGN

UNIT - I

Introduction: Introduction to machine tool design and mechanism, definitions, classification and general; requirement of machine tool, working and auxiliary motions in machine tools, parameters defining working motion of machine tools

Regulation of speed and feed rates: objective of speed and feed rate regulation, design of speed box, general recommendation for developing the gearing diagram, determining the number of teeth of gear boxes, mechanical step less regulation of speed and feed rates.

Introduction to NC, CNC & DNC machines.

UNIT- II Design of machine tool structures: function of machine tool structures and their requirement, design criteria and material for machine tool structures, static and dynamic stiffness, profile of machine tool structures, basic design procedure of machine tool structures, design of machine tool bed, columns, housing & bases, tables, cross rails arms and saddles.

UNIT - III

Design of guide ways and power screws: function and types of guide ways, design of slide ways, design criteria and calculation for slide ways, guide ways operating under liquid friction conditions. Design of aerostatic slide ways, design of anti friction guide ways.

UNIT - IV

Design of spindles and spindle supports: function of spindle unit and requirements, material of spindles, effects of machine tool compliance on machining accuracy, design calculation of spindles, design of jigs and fixtures: principle of jigs and fixtures design, locating and clamping, jig bushes, drilling jigs.

UNIT V- Machine Tool Installation & Testing

Installation- principles related to machine tools installation, design of foundation.

Testing- Introduction, idle run test, accuracy test, performance test, Acceptance test for lathe, drilling & milling machine.

Text Books:
1. Machine Tool Design by NK Mehta Tata Mcgraw Publication.
2. Basu, S.K., Design of Machine tool, Allied Publishers, New Delhi.
3. Koenigsberger, F., Design Principles of Metal cutting machine Tools, pergamon Press, Oxford, 1964.
4. Push, V.E., Design of Machine Tools, Mashinostroenie Publishers, Moscow, 1977.
5. Machine Tool Design, vols. I-IV, Mir Publishers, Moscow, 1968.
6.

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-VIII Sem	ME-484 D	ROBOTICS (Elective)	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

(ELECTIVE) ME-484(D) ROBOTICS

UNIT – I

Introduction to Robotics

Evolution of robots and robotics, progressiveadvancement in robots, definitions and classifications, laws of robotics, robot anatomy and related attributes, human arm characteristics, robot control system,manipulation and control, sensors in robotics, robots programming, the future prospects.

UNIT – II

Coordinate Frames, Mapping and Transforms

Robot specification and notations, Coordinate frames, description of objects in space, transformation of vectors, inverting ahomogeneous transform, fundamental rotation matrices, yaw pitch and roll, yaw pitch and roll transformation, equivalent angle.

UNIT – III

Symbolic Modelling of Robots – Direct Kinematic Model

Mechanical structure and notations, description of links and joints, kinematic modelling of the manipulator, Denavit – Hartenberg notation, kinematic relationship between adjacent links,manipulator, transformation matrix, introduction to inverse kinematic model, Artificial Intelligence in robotics.

UNIT – IV

Robotic Sensors and Vision

The meaning of sensing, sensors in robotics, kinds of sensors used in robotics, robotic vision,industrial applications of vision-controlled robotic systems, process of imaging, architecture ofrobotic vision systems, image acquisition, description of other components of vision system, imagerepresentation, image processing.

UNIT – V

Robot Applications

Industrial applications, material handling, processing applications, assembly applications, inspection, application, principles for robot application and application planning, justification of robots, robotsafety, non-industrial applications, robotic application for sustainable development & social issues.

Text Books:

1. Robotics & Control – R.K. Mittal & I.J. Nagrath – TMH Publications

2. Robotics for engineers - Yoram Korean- McGrew Hill Co.

3. Industrial Robotics Technology programming and Applications - M.P.Groover, M.Weiss,

4. Robotics Control Sensing, Vision and Intelligence - K.S.Fu, R.C.Gonzalex, C.S.G.Lee- McGrew Hill Book co.

5. Kinematics and Synthesis of linkages - Hartenberg and Denavit - McGrew Hill Book Co

6. Kinematics and Linkage Design - A.S. Hall - Prentice Hall

7. Kinematics and Dynamics of Machinary - J.Hirchhorn - McGrew HillBook Company