INSTITUTE OF TECHNOLOGY

GURU GHASIDAS VISHWAVIDHALAYA

(A CENTRAL UNIVERSITY ESTABLISHED BY THE CENTRAL UNIVERSITY ACT 2009, NO: 3 OF 2009)

DEPARTMENT OF INDUSTRIAL & PRODUCTION ENGINEERING

STUDY & EVALUATION SCHEME

W.E.F. SESSION 2012-2013

SEMESTER: VIIIth

Sl. No.	Course No.	SUBJECT	PERIODS			EVALUATION SCHEME			Credits
			L	T	P	SESSIONAL EXAM / INTERNAL ASSESSMENT	ESE	SUB TOTAL	
		(THEORY)							
1.	IPE-481	Machine Tool Design	3	1	-	40	60	100	4
2.	IPE-482	Materials Management	3	1	-	40	60	100	4
3.	IPE-483	Product Development	4	0	-	40	60	100	4
4.	IPE-484	Elective-II*	3	1	-	40	60	100	4
		(PRACTICALS) Total	13	03					
5.	IPE-485	Project	-	-	12	120	80		8
6.	IPE- 486	Comprehensive Viva	-	-	-		50		2

Elective – II* *	
IPE - 484A	Automobile Engineering
IPE - 484 B	Refrigeration & Air conditioning
IPE - 484 C	Tribology & Maintenance Engineering

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	
Industrial & Production Engg. B. TECH VIII Sem	IPE-481	MACHINE TOOL DESIGN	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

IPE 481 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 a machine tools, layout 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.

UNIT- II

Design of machine tool structures: function of machine tool structures and their requirement, design criteria for machine tool structures, material of machine tool structures, static and dynamic stiffness, profile of machine tool structures, basic design procedure of machine tool structures, design of bed.

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, design of power screws.

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

Press work die design: Classification of presses and dies, cutting action in dies, clearances and cutting forces, shear, center of pressure, method of mounting punches, design of blanking dies, drawing die design.

Recommended 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.

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Industrial & Production Engg. B. TECH VIII Sem	IPE-482	MATERIALS MANAGEMENT	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

IPE 482 MATERIALS MANAGEMENT

UNIT-I

Introduction: Definition and scope, concept of integrated materials management, materials research, materials planning and budgeting, codification, standardization.

Purchasing: Objective and function of purchasing department, purchasing procedure, negotiation, and source-selection.

UNIT-II

Types of purchasing, buying seasonal commodities, purchasing under uncertainty, purchasing of capital equipment, international purchasing, public buying, legal concept in buying, insurance buying, price forecasting.

UNIT- III

Stores management, stores system and procedure, incoming material control,stores accounting and stock verification, obsolete, surplus and scrap management.

UNIT-IV

Basic inventory system: concept of inventory, types of inventory, relevant costs of inventory, economic order quantity, inventory control techniques, basic models of inventory.

Spare parts management: definition of spares and its classification, MUSIC-3D, view of spares, multi echelon spares inventory.

UNIT-V

Value analysis: value importance, normal degree value analysis applied to purchase; organizing for value analysis, cost analysis and value analysis aid purchase research. Material and process selection in VE design, material, process & supplier decisions.

Recommended Books:

1. Materials Management an integrated approach, Gopalkrishnan.P & Sundaresan.M (2002) Prentice Hall India Limited, NewDelhi.
2. Materials Management Text and Cases, Chitlae,A.K & Gupta,R.C. (2009) Prentice Hall India Limited. NewDelhi.
3. Maintenance and Spare parts Management, Pathak () Prentice Hall India Limited, NewDelhi.
4. Production and Operations Management, Chary.S.N. ( ) Tata McGraw Hill.
5. Material management: An integrated approach, Dutta ()

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Industrial & Production Engg. B. TECH VIII Sem	IPE-483	PRODUCT DEVELOPMENT	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

IPE 483 PRODUCT DEVELOPMENT

UNIT-I

Product Design : Definition, Design by evolution, Innovation, essential factors of product design, production-consumption cycle, flow and value addition in the production – consumption cycle, the morphology of design, primary design phases and flow charting, role of allowance, concurrent engineering.

UNIT-II

Product Design practice and Industry : Introduction, product strategies, time to market, analysis of the product, three S's, standardization, renard series, simplification.
Designer: Role, Myth and reality. Industrial design organization, basic design considerations.
Industrial Designer: Problems, procedure for adoption, types of models. Role of aesthetics in product design, functional design practice.

UNIT-III

New products: Idea generation, modification. Product variants: adding, dropping. Formal testing: new products, concept, product testing, market tests, evaluation, adoption, expansion and forecasting.
Economic factors influencing design: Product value, economic analysis, profit and competitiveness.
Product design for environment: Introduction, importance of DfE, environmental factors, scope of environmental impact, design guidelines for DfE.

UNIT - IV

Developing product strategy: Benefits of strategy, elements of a product strategy, setting objectives, selection of strategic alternatives, increasing sales/market share, increasing profitability.
Design for manufacturing and Design for assembly, Ergonomics in design, Modular versus integral design.
Human Engineering Considerations in product design: Introduction, Anthropometry, Design of controls, The Design of displays, Man/Machine Information exchange.

UNIT –V

Intellectual property systems: Definition, Concept of Intellectual Property, Kinds of Intellectual Property, Economic importance of Intellectual Property. Importance of IPR, TRIPS and its implications. Trademark : Introduction, historical development of the concept, Need for Protection, Kinds of Trademarks, and Well known Trademarks. Patents: Historical development, Concepts, Novelty, Utility, Inventiveness/Non-obviousness. Copyrights, Industrial design.

Books Recommended:

1. Chitale A. K. and Gupta R. C.; Product Design and Manufacturing, PHI.
2. Gupta V., Lal G.K. and Reddy; Fundamentals of Design and manufacturing; Narosa Publishing.
3. James Garratt, Design and technology (1996) Published by Cambridge University Press
4. Donald R.Lehman, Rusell S.Wines 3rd Edition, Product Management TMH.
5. Product Life Cycle Engineering and Management, CEP Lecture notes, Prof B Ravi, IIT Bombay
6. Karl. T. Ulrich and Steven D. Eppinger "Product Design & Development" – TMH – 3rd addition.

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Industrial & Production Engg. B. TECH VIII Sem	IPE-484 A	AUTOMOBILE ENGINEERING	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

IPE 484 A 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.

Auto 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

Recommended Books:

1. Automobile Engineering Kripal Singh Vol. I, II

2. Automobile Mechanics Joseph Heitner. East West Press

3. Automobile Engineering Giri N.K

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

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Industrial & Production Engg. B. TECH VIII Sem	IPE-484 B	REFRIGERATION & AIR CONDITIONING	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

IPE 484 B REFRIGERATION & AIR CONDITIONING

UNIT – I

Refrigeration and heating systems heat engine & heat pump, air refrigeration systems, bell Coleman air refrigeration cycle. Air craft system & its performance.
Vapour compression refrigeration: simple cycle, t-s and p-h charts analysis of vapor compression cycle, factors effecting performance of vapor compression cycle, actual vapour compression cycle.

UNIT – II

Vapour absorption refrigeration systems: description of system components, aqua ammonia and water lithium bromide systems. Its analysis & advantages over vapour compression system.
Refrigeration equipment: constructional details, capacity, control and performance of compressors, condensers, evaporators, expansion devices, thermostatic expansion valve.

UNIT – III

Production of low temperature - cascade system, joule Thomson effect & liquefaction of gases, liquefaction of hydrogen & helium, application of cryogenics.

Nonconventional refrigeration system-thermo-electric refrigeration, vortex tube, pulse tube refrigeration.
Refrigerants: classification, properties & selection of refrigerants.

UNIT – IV

Psychometrics: Psychrometry and psychometric properties, psychometric relations, psychometric chart and its use, psychometrics processes, human comfort, factors affecting comfort, comfort chart.
Requirements of comfort air conditioning: thermodynamics of human body, comfort chart, factors governing optimum effective temperature.
Cooling load calculations & design of a.c. system- different heat sources, design of air conditioning system, bypass factors, effective sensible heat factor, cooling coils.

UNIT – V

Fluid flow, duct design & air distribution system- various losses in fluid flow, different methods of duct design & arrangement system, air distribution system & ventilation system.
Automotive air conditioning: system location and layout, components, system maintenance. Car, Railway air conditioning & marine air conditioning.

Recommended Books:

1. Refrigeration and Air Conditioning C. P. Arora - TMH.
2. Refrigeration and Air Conditioning – Manohar Prasad – Newage International Pub
3. Refrigeration and Air Conditioning – Arora & Domkundwar – Dhanpat Rai & Sons
4. Refrigeration and Air Conditioning – P.L. Ballaney – Khanna Pub.