B.E. (PTDC) Mechanical Engineering

SEMESTER –I

Branch	Subject Title	Subject Code	Periods Per week			
B.E. PART TIME MECHANICAL	Mathematics-I	BEPT-101	L	T	P	C
			3	1	0	4

Unit I
Fourier Series: Introduction of Fourier series , Fourier series for Discontinuous functions, Fourier series for even and odd function, Half range series Fourier Transform: Definition and properties of Fourier transform, Sine and Cosine transform.

Unit II
Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, second shifting property, Laplace transform of the derivative, Inverse Laplace transform & its properties, Convolution theorem, Applications of L.T. to solve the ordinary differential equations

Unit III
Second Order linear differential equation with variable coefficients : Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method

Unit IV
Linear and Non Linear partial differential equation of first order: Formulation of partial differential equations, solution of equation by direct integration, Lagrange's Linear equation, charpit's method. Linear partial differential equation of second and higher order: Linear homogeneous and Non homogeneous partial diff. equation of nth order with constant coefficients. Separation of variable method for the solution of wave and heat equations

Unit V
Vector Calculus: Differentiation of vectors, scalar and vector point function, geometrical meaning of Gradient, unit normal vector and directional derivative, physical interpretation of divergence and Curl. Line integral, surface integral and volume integral, Green's, Stoke's and Gauss divergence theorem

References
(i) Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India
(ii) Higher Engineering Mathematics by BS Grewal, Khanna Publication
(iii) Advance Engineering Mathematics by D.G.Guffy
(iv) Mathematics for Engineers by S.Arumungam, SCITECH Publuication
(v) Engineering Mathematics by S S Sastri. P.H.I.

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Branch	Subject Title	Subject Code	Periods Per week			
B.E. PART TIME MECHANICAL	Energy Ecology Environment & Society	BEPT-102	L	T	P	C
			3	1	0	4

Unit – I
Energy – Sources of Energy : Renewable & Non Renewable, Fossil fuel, coal, oil, Gas,Geothermal, Hydrogen, Solar, Wind hydal, nuclear sources, Green energy solution.

Unit – II
Ecosystem – Introduction & Composition of Atmosphere, hydrosphere, Lithosphere,biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: El - Nino, La -Nino, Threats and conservation, Food Chain.

Unit – III
Air Pollution & Noise Pollution –
Air Pollution: Air pollutants, classification, (Primary & secondary pollutants) Adverse effects of pollutants. Causes of Ail pollution, photochemical smog Green house effect, ozone layer depletion & acid Rain. Sampling & Monitoring of Air pollution.
Noise pollution: Causes, controlling measures, measurement of Noise pollution.

Unit –IV
Water Pollution – Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent & pollution load determination, Total Solid, Dissolve Oxygen, BOD, COD & PV Test.
Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

Unit – V
Society & Ethics – Impact of waste on society. Solid waste management (Nuclear, Thermal,Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study. Preliminary studies regsarding Environmental Protection Acts, Environmental Impact Assessment.

Reference:
1. Harris, CE Prichard MS, Rabin's MJ, "Engineering Ethics'Cengage Pub.
2. Rana SVS; Essentials of Ecology and Environment PHI pub.
3. Taynold GW Ethics in information Technology; Cengage.
4. Svakumar ; Energy Environment & Ethics in society; TMH
5. AK De " Environmental Chemistry; New Age Int. Publ..
6. BK Sharma " Environmental Chemistry; Goel Publ. House.
7. Bala Krishnamoorthy; Environmental management ; PHI
8. Gerard Kiely " Entironmental Engineering; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunninghan WP and MA principles of Environment Sc; TMH

Branch	Subject Title	Subject Code	Periods Per week			
B.E. PART TIME MECHANICAL	Instrumentation & Measurement	BEPT-103	L	T	P	C
			3	1	2	6

UNIT I BASIC MEASUREMENT CONCEPTS

Measurement systems – Static and dynamic characteristics – units and standards of measurements – error :- accuracy and precision, types, statistical analysis – moving coil, moving iron meters – multimeters – Bridge measurements : – Maxwell, Hay, Schering, Anderson and Wien bridge.

UNIT II BASIC ELECTRONIC MEASUREMENTS

Electronic multimeters – Cathode ray oscilloscopes – block schematic – applications – special oscilloscopes :– delayed time base oscilloscopes, analog and digital storage oscilloscope, sampling oscilloscope – Q meters – Vector meters – RF voltage and power measurements – True RMS meters.

UNIT III SIGNAL GENERATORS AND ANALYZERS

Function generators – pulse and square wave generators, RF signal generators – Sweep generators – Frequency synthesizer – wave analyzer – Harmonic distortion analyzer – spectrum analyzer :- digital spectrum analyzer, Vector Network Analyzer – Digital L,C,R measurements, Digital RLC meters.

UNIT IV DIGITAL INSTRUMENTS

Comparison of analog and digital techniques – digital voltmeter – multimeters – frequency counters – measurement of frequency and time interval – extension of frequency range – Automation in digital instruments, Automatic polarity indication, automatic ranging, automatic zeroing, fully automatic digital instruments, Computer controlled test systems, Virtual instruments.

UNIT V DATA ACQUISITION SYSTEMS AND FIBER OPTIC MEASUREMENT

Elements of a digital data acquisition system – interfacing of transducers – multiplexing – data loggers –computer controlled instrumentation – IEEE 488 bus – fiber optic measurements for power and system loss – optical time domains reflectometer.

TEXT BOOKS
1. Albert D.Helfrick and William D.Cooper – Modern Electronic
Instrumentation and Measurement Techniques, Pearson / Prentice Hall of India, 2007.
2. Ernest O. Doebelin, Measurement Systems- Application and Design, TMH, 2007. REFERENCES 1.
Joseph J.Carr, Elements of Electronics Instrumentation and Measurement, Pearson Education, 2003.
2. Alan. S. Morris, Principles of Measurements and Instrumentation, 2nd Edition, Prentice Hall of India, 2003.
3. David A. Bell, Electronic Instrumentation and measurements, Prentice Hall of India Pvt Ltd, 2003.
4. B.C. Nakra and K.K. Choudhry, Instrumentation, Meaurement and Analysis, 2nd Edition, TMH, 2004.
5. James W. Dally, William F. Riley, Kenneth G. McConnell, Instrumentation for Engineering Measurements, 2nd Edition, John Wiley, 2003.

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Branch	Subject Title	Subject Code	Periods Per week			
B.E. PART TIME MECHANICAL	Basic Mechanical Engineering	**PTME-104**	L	T	P	C
			3	1	2	6

UNIT- 1

Materials: Classification of engineering material, composite ion of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

UNIT-2

Measurement: Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainly analysis, measurement by Vernier calliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lath, drilling, milling and shaping machines.

UNIT-3

Fluids: Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernauli's equation for incompressible fluids, viscous and turbulent flow, working principle of fluid coupling, pumps, compressors, turbines, positive displacement machines and pneumatic machines. Hydraulic power & pumped storage plants for peak load management as compared to base load plants.

UNIT-4

Thermodynamics: First and second law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, efficiency & performance analysis, natural and induced draught, calculation of chimney height. Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), refrigerant properties & eco friendly refrigerants.

UNIT-5

Reciprocating Machines: Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol & diesel IC engines

Reference Books:-

1.   Narula; Material Science; TMH
2.   Agrawal B & CM; Basic Mechanical Engg. Wiley India
3.   Nag PK, Tripathi et al; Basic Mechanical Engg; TMH
4.   Rajput; Basic Mechanical Engg;
5.   Sawhney GS; Fundamentals of Mechanical Engg; PHI
6.   Nakra and Chaudhary; Instrumentation & measurement; TMH
7.   Nag PK; Engineering Thermodynamics; TMH
8.   Ganesan; Co mbust ion Engines; TMH

List of Suggestive core Experiments (Please Expand it)

1. Tensile testing of standard mild steel specimen.
2. Experiments on Bernoulli's theorem.
3. Flow measurements by ventury and orifice meters.
4. Linear and angular measurement using, Vernier; micro meter, slip gauge, dial gauge and sine-bar.
5. Study of different types of boilers and mountings.
6. Experiment on mini-boiler (50 Kg/Hour)
7. To find COP of a refrigeration unit.
8. Study of different IC engines & measurement of B.H.P. using rope/belt dynamo meter.
9. Analysis of exhaust gases on petrol, diesel & biodiesel engines.

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Branch	Subject Title	Subject Code	Periods Per week			
			L	T	P	C
B.E. PART TIME MECHANICAL	Computer Programming-I	BEPT-105	0	0	4	4

Unit-I

Programming fundamentals: Introduction to computer, block diagram and organization of computer,number system and binary arithmetic , processing data, hardware, software, firmware, types of programming language-Machine language, ALL,HLL, source file, object file, translators-assembler,

compiler, interpreter, testing and debugging, software maintenance, hardware maintenance.

Unit-II

Programming Techniques: Problem Solving Strategies, Steps of program development, Algorithm, Flowchart and its Characteristics, Pseudo code and its Characteristics, History, evolution and classification of programming languages and their comparison.

Unit-III

Fundamentals of C Programming: History of C; Structure of a C Program; Data types; Constant & Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, dowhile; Case switch statement; Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

Unit-IV

Modular Programming: Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, types of recursiondirect,indirect, tree and tail recursion, when to avoid recursion, structures and unions

Unit-V

Introduction to OS, Definition and Roles of Operating System, Types of Operating System, Function of OS, Introduction to DBMS, File-Based Approach and Database Approach, DBA, Introduction to NETWORKING ,Types of Networks, Internet.

Recommended Books:

1. Fundamentals of Computers : E Balagurusamy, TMH
2. Basic Computer Engineering : Sanjay Silakary, Rajesh Shukla, Wiley India.
3. Fundamentals of Computers : V Rajaraman, PHI
4. Computer Fundamentals: Anita Goel, Pearson
5. Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI.
6. Concepts in Computing: Kenneth Hoganson, Jones & Bartlett.
7. Operating Systems – Silberschatz and Galvin - Wiley India
8. Computer Networks: Andrew Tananbaum, PHI
9. Programming with C: Y. Kanitkar