

**PEOPLE'S UNIVERSITY, BHOPAL**

PROGRAMME: B TECH (Common to all Branches)

SEM: I, II

Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Engineering Physics	BT-201	3	1	-	Min: (D Grade)	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Content
I	<b>Laser and Fiber Optics :</b> Lasers: Introduction, Interaction of radiation with matter, Conditions for light amplification, population inversion, active medium, pumping, Optical resonators, pumping schemes, characteristics of laser beam, Application of lasers & types of lasers: Solid state, Gas & semiconductor laser. Introduction of Optical Fibre, Applications & types of Optical Fibre, Propagation of light through a cladded fibre, Modes of Propagation, acceptance angle, cone, numerical aperture, V Number, dispersion, attenuation, and fibre losses.
II	<b>Wave Optics :</b> Interference: Condition for interference, coherence, Young's double slit experiment, Interference in parallel thin films, wedge shaped thin film, Newton's rings and their applications. Fraunhofer Diffraction: single slit, circular aperture, multiple slit, diffraction grating, Resolving Power, Resolving Power of telescope and grating, polarization of light, Production of plane polarized light by reflection, Brewster law, Double refraction, quarter & half wave plate Production of elliptically and circularly polarized light.
III	<b>Nuclear Physics:</b> Atomic Nucleus, Nuclear density, Atomic mass unit, mass defect, Binding energy, Nuclear Models: liquid drop model, shell model, Geiger - Muller Counter, Q- Value, Nuclear reaction cross-section, Accelerators: drift tube LINAC, Cyclotron, Synchrotron, Synchrocyclotron & Betatron, Nuclear Fission, chain Reaction, nuclear Fusion, Nuclear Reactor, Isotopes, Bainbridge Mass Spectrograph.
IV	<b>Quantum Physics :</b> De Broglie Hypothesis, Davission and Germer Experiment, Group and particle velocities & their relationship. Uncertainty principle and applications of uncertainty principle. Compton Effect. Wave function and its properties, Quantum operators, time dependent and time independent Schrödinger wave equation. Application of time independent Schrödinger wave equation for a free particle and a particle trapped in a one dimensional square potential well.
V	<b>Solid state physics and Superconductivity:</b> Kronig Penny Model (without derivation), Band theory for solids, Fermi dirac distribution function, effective mass, types of semiconductor, Fermi level of intrinsic semiconductor, PN Diode, Zener diode, photodiode, solar cell, Hall effect. Superconductivity: Introduction, Meissner effect, Type I and Type II superconductors, BCS theory, Josephson Effect, applications of superconductors.

**REFERENCE BOOKS:**

1. Engineering physics by M.N. Avadhanulu and. S. Chand & Co
2. Optics by Ghatak, TMH
3. Atomic and Nuclear physics by Brijlal and Subraminiyan.
4. Concepts of Modern Physics- Beiser, TMH
5. Solid State Physics by Kittel, Wiley India
6. Fundamentals of Physics - Halliday, Wiley India

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		L	T	P	Externals (35)	Internals (15)	Total (50)
Engineering Physics	BT-201	-	-	2	Min: 1 (D Grade)	Min: Nil	Min: 20 (D Grade)

**PRACTICALS:**

At least 10 of the following core experiments must be performed during the session

1. He-Ne laser: Width of slit
2. NA of Fibre
3. Newton's Ring Apparatus: Wavelength of Sodium Lamp
4. Grating: Measurement of wavelength
5. Resolving power: Telescope & Grating
6. Polarimeter: Determination of Specific rotation
7. Spectrometer: Refractive index of Prism
8. Band Gap: Semiconductor
9. PN Diode: Characteristic Curve
10. Zener Diode : Characteristic Curve
11. PNP: Characteristic Curve
12. NPN Transistor: Characteristic Curve
13. Sextant: Height of Building
14. Electrical Vibrator: Frequency of AC Mains

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Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Energy Environment Ecology & Society	BT-202	3	1	-	Min: (D Grade)	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Contents (Theory)
I	<b>Energy</b> – Sources of energy : renewable sources :- solar ,wind , hydal ,hydrogen ,geothermal ,tidal and nuclear sources , bio mass energy . Non-renewable sources: - fossil fuel, coal, oil, natural gas.
II	<b>Ecosystem</b> –segments of environment: atmosphere, hydrosphere, lithosphere, biosphere, energy balance on earth. Cycle in ecosystem: oxygen cycle, water cycle, carbon cycle, nitrogen cycle. Biodiversity: threats and conservation.
III	<b>Pollution – air pollution</b> : air pollutants ,classification (primary and secondary pollutants) adverse effect of pollutant .causes of air pollution chemical , photochemical , green house effects, ozone layer depletion , acid rain. <b>Sound pollution</b> : causes, controlling measures, measurement of sound pollution (deciblage) ,industrial and non industrial. <b>Water pollution</b> : water pollution, pollutants in water, adverse effects, treatment of industrial water effluent. <b>Soil Pollution</b> : soil profile, pollutants in soil, their adverse effects, controlling measures.
IV	<b>Society and Social Issues</b> : impact of waste on society , solid waste management (nuclear , thermal ,plastic , medical , agriculture , domestic ,and e - waste) , exponential growth in population , interaction between environment , life support system and socio-culture system .Globalization and environmental issues <b>Case Study</b> : KYOTO protocol, Bhopal gas tragedy, Chernobyl tragedy, E-L NINO.
V	<b>Sustainable Development and Ethics</b> : environmentally optimum sustainable population, free access resources and the tragedy of commons <b>Ethics</b> : codes of ethics & their limitations, institute of engineers code for corporate member, IEEE & ACM professional code. Managing Environmental challenges for future

**REFERENCE BOOKS:**

1. The environmental ethics and policy book Philosophy, ecology, economics. II edition.
2. Environmental Psychology
3. Ecology and equity Madhu Gadgil and Ramchander Guha
4. Environment, ecology, and social development: Anuradha Sharma

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Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Basic Mechanical Engineering	BT-203	3	1	-	Min: 5 (D Grade)	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Contents (Theory)
I	<b>Materials:</b> Classification of engineering material, composition 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.
II	<b>Measurement:</b> Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainty analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lath, drilling, milling and shaping machines
III	<b>Fluids:</b> Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernoulli's equation for incompressible fluids, viscous and turbulent flow. Basic introduction of turbines, classification, hydraulic turbine, pelton, francis Kaplan.
IV	<b>Thermodynamics:</b> First and second law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy. <b>Refrigeration</b> vapor absorption & compression cycles, coefficient of perform (COP), refrigerant properties & eco friendly refrigerants.
V	<b>Reciprocating Machines:</b> <b>Steam engines:</b> steam properties, classification and working of boiler, steam hypothetical and actual indicator diagram; <b>I.C Engines:</b> Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol & diesel 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; Combustion Engines; TMH




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Subject Title	Subject Code	Credits			Practical		
		L	T	P	Externals (35)	Internals (15)	Total (50)
Basic Mechanical Engineering	BT-203	-	-	2	Min: 1 (D Grade)	Min: Nil	Min: 20 (D Grade)

**PRACTICALS:**

At least 10 of the following core experiments must be performed during the session

1. Study of different types of Mountings & Accessories.
2. Study of Lancashire boiler.
3. Study of Locomotive boiler.
4. Study of Babcock & Wilcox boiler.
5. Study of Cochran boiler.
6. Study of steam engines.
7. Experiments on Bernoulli's theorem
8. Flow measurements by venture meters and orifice meters.
9. Study of four stroke petrol engine
10. Study of four stroke diesel engine.
11. Study of two stroke petrol engine.
12. Study of two stroke diesel engine.
13. Linear and angular measurement using, Vernier, micrometer, slip gauge, dial gauge and sine-bar.

  
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SEM: I, II

Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Basic Civil Engineering & Engineering Mechanics	BT-204	3	1	-	Min: (D Grade)	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Contents (Theory)
I	<b>Building Materials &amp; Construction</b> Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete. Elements of Building Construction, Foundations conventional spread footings, brick masonry walls, plastering and pointing, floors, Introduction of roofs, Doors, windows, lintels, staircases – types and their suitability
II	<b>Surveying, Mapping &amp; Sensing</b> <b>Introduction to surveying Instruments:</b> levels, theodolites, plane tables and related devices. Electronic surveying instruments etc. Measurement of distances – by chain survey, measurement of elevations by leveling. <b>Mapping:</b> Mapping details and contouring, Profile Cross sectioning and measurement of areas, Volumes, application of measurements in quantity computations, Survey stations, <b>Introduction of remote sensing and its applications</b>
III	<b>Forces and Equilibrium:</b> Graphical and Analytical Treatment of Concurrent and non-concurrent, co-planner forces, free body diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: <b>Analysis of plane Trusses:</b> Method of joints, Method of Sections. Frictional force in equilibrium problems
IV	<b>Centre of Gravity and moment of Inertia:</b> Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes.
V	<b>Introduction of dynamics:</b> Linear motion, Motion of Projectile-Introduction, Equation of the Trajectory, Expressions for Time of Flight, Height, Range and Angle of Projection, Motion of a Projectile Thrown Horizontally, Motion of a Projectile up an Inclined Plane, Virtual Work

**REFERENCE BOOKS:**

1. S. Ramamrutham & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
2. Surveying by Duggal – Tata McGraw Hill New Delhi.
3. Punmia, B.C., Surveying, Standard book depot.
4. Building Construction by S.C. Rangwala- Charotar publications House, Anand
5. Building Construction by Grucharan Singh- Standard Book House, New Delhi
6. Global Positioning System Principles and application- Gopi, TMH
7. R.K. Rajput, Engineering Mechanics S.Chand & Co.
8. Prasad I.B., Applied Mechanics, Khanna Publication



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Subject Title	Subject Code	Credits			Practical		
		L	T	P	Externals (35)	Internals (15)	Total (50)
Basic Civil Engineering & Engineering Mechanics	BT-204	-	-	2	Min: (D Grade)	Min: Nil	Min: 20 (D Grade)


**PRACTICALS:**

At least 10 of the following core experiments must be performed during the session

1. To verify law of polygon of forces
2. To verify the principle of moment using Bell Crank Lever.
3. To Verify Mechanical Advantage, velocity Ratio and Efficiency using Screw jack.
4. To determine the Center of Gravity of a given Lamina.
5. To determine the Compressive Strength of brick.
6. To determine the workability of fresh concrete of given proportions by slump test or compaction factor test.
7. To measure horizontal and vertical angles in the field by using Theodolite
8. To verify the reaction at the Support of a Simply Supported Beam.
9. To determine the Coefficient of Friction between given surfaces by horizontal and inclined plane methods.
10. To determine the moment of inertia of fly wheel by falling weight method.
11. To verify bending moment at a given section of a simply supported beam
12. To perform traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
13. To perform leveling exercise by height of instrument of Rise and fall method.
14. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.



  
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SEM: I, II

Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Basic Computer Engineering	BT-205	3	1	-	Min: (D Grade)	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Contents (Theory)
I	Computer: Definition, Generation, Classification, Von Neumann Model and its Architecture, Organization, , System & Application Software. Introduction to Windows, MS DOS, MS OFFICE (Word, Excel, PowerPoint and Access) and Internet
II	Operating System: Definition, Function, Types, Management of Processes, Memory and Files, Case Study of UNIX, LINUX, DOS and Windows
III	Computer Networking : Introduction to Data Communication and Computer Networking, Goals, Data Communication Concepts, Introduction to Layering and Protocols, ISO-OSI Model, Functions of Different Layers, Internetworking Concepts, Devices, TCP/IP Model, Introduction to Internet, World Wide Web, Network Security & E-commerce
IV	Programming Languages: Generations, Characteristics & Categorization. Introduction to Programming: Procedure Oriented Programming VS object oriented Programming,, OOPS Features and Merits
V	C: Features Character, Tokens, Program Structure, Data Types, Variables, Operators, Expressions, Statements and control structures, Array, Functions, Structures

## REFERENCE BOOKS:

1. Computer Fundamentals and C Programming. Amiya Kumar Rath. Scitech Publication
2. Computer Fundamentals and Windows with Internet Technology, Krishnan Scitech Publication.
3. Fundamental of Computer & Architecture, B Rajaraman
4. Basic Computer Engineering, E Balagurusamy, McGraw Hill

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Subject Title	Subject Code	Credits			Practical		
		L	T	P	Externals (35)	Internals (15)	Total (50)
Basic Computer Engineering	BT-205	-	-	2	Min: 1 (D Grade)	Min: Nil	Min: 20 (D Grade)

**PRACTICALS:**

1. Creating a File in MS WORD and work on it
2. Creating a Presentation in MS POWERPOINT and work on it
3. Creating a Spread Sheet in MS EXCEL and work on it
4. Creating a Database in MS ACCESS and work on it
5. Write a Program in C to print any String
6. Write a Program to perform Arithmetic Operations
7. Write a Program using Conditional Statements
8. Write a Program to perform Looping
9. Write a Program for Functions
10. Write a Program for Arrays



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		L	T	P	Externals (35)	Internals (15)	Total (50)
Language Lab & Seminars	BT-206	-	-	2	Min: (D Grade)	Min: Nil	Min: 20 (D Grade)

<b>Contents (Practicals)</b>
1. Introducing oneself, family, social roles, personal image design, building relationships, body language, concept of time and space.
2. Reading Comprehension: Intensive reading skills, rapid reading, and reading aloud (Reading material to be selected by the teacher).
3. Public Speaking and oral skills with emphasis on conversational practice, Role plays, extempore speech, JAM (Just a minute sessions), describing objects and situations, giving directions, debate, telephonic etiquette
4. Translation from English to Hindi and vice versa.
5. Oral Presentation: preparation and delivery (Topic to be selected by the teacher.)
6. Project works related to enhancement of English Vocabulary & comprehension

**REFERENCE:**

Prescribe language lab Software- Globerina /K-van

**Suggested Reading-** Language Lab Manuals




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