PEOPLE'S UNIVERSITY, BHOPAL

(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			
BT-1101	Engineering Mathematics-I	3	1	0	External (70)	Internal (30)	Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Session– Max Marks: Nil	Assignment / Quiz/Attendance - Max. Marks: Nil

Pre-Requisite	Basic knowledge of function and continuity, Types of matrix, Elementary Differentiation and Integration.
Course Outcome	1. Identify, explain, and evaluate the use of elementary classroom manipulative to model sets, operations, and algorithms.
	2. Explain the importance of mathematics and its techniques to solve real life problems and provide the limitations of such techniques and the validity of the results.
	3. Maintain a core of mathematical and technical knowledge that is adaptable to changing technologies and provides a solid foundation for future learning.

Unit	Contents (Theory)	Marks Weightage
I	**Differential Calculus:** Successive Differentiation and Leibnitz's Theorem. Expansion of functions by Maclaurin's and Taylor's theorem. Partial differentiation. Euler's theorem. Maxima and Minima for one and two variable. Curvature: Radius of Curvature, centre of curvature.	**14**
II	**Integral Calculus :** Definite Integrals : Definite Integrals as a limit of a sum , its application in Summation of series, Beta and Gamma Functions , Double and Triple Integrals, Change of Order of Integration.	**14**
III	**Differential Equations:** Solution of Ordinary Differential Equation of first order and first degree (Equation in which variable are separable, Homogeneous Equation. Non homogeneous equation, Linear equation) Equation of first order and higher degree (Solvable for p, x and y, Clairaut's Equation), Linear Differential Equations of higher order with Constant Coefficients, Cauchy's, Homogeneous differential Equation, Simultaneous differential Equations.	**14**
IV	**Matrices:** Rank by Normal and Echelon form, Solution of Simultaneous linear equation of elementary transformation, Consistency of System of Simultaneous Linear Equation, Eigen Values and Eigen Vectors, Cayley-Hamilton theorem and its Application to find the inverse	**14**
V	**Vector Space:** Vector Space, Vector Sub Space, Linear Combination of Vectors, Linearly Dependent, Linearly Independent, Basis of a Vector Space, Linear Transformations.	**14**

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Programme: Bachelor of Technology **Semester –I/II**

Text Book/References Books/ Websites

1. Ramana; Advance Engineering Mathematics; Tata McGraw hill.
2. B.S. Grewal; Higher Engineering Mathematics; Hanna Publication.
3. D.G.Guffy; Advance Engineering Mathematics.
4. S S Sastri.; Engineering Mathematics; P.H.I.
5. S.Arumungam; Mathematics for Engineers; SCITECH Publication.
6. Erwin Kreyszig; Advanced Engineering Mathematics; Wiley India.

Suggested List of Laboratory Practical (Expandable): Nil

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Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
BT-1102	Engineering Chemistry	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Session Max Marks: 10	Assignment / Quiz/Attendance Max. Marks: 05

Pre-Requisite	Students will be able to explore new areas of research in both chemistry and allied fields of science and Technology.
Course Outcome	1. Have firm foundations in the fundamentals and application of current chemical and scientific theories.
	2. Are able to design, carry out, record and analyze the results of chemical experiments.
	3. Are able to use modern instrumentation and classical techniques, to design experiments, and to properly record the results of their experiment.

Unit	Contents (Theory)	Marks Weightage
I	**Lubricants:** Introduction, Mechanism of lubrication, Classification of lubricants, Properties and Testing of lubricating oils, Numerical problems based on testing methods. Cement & Refractory: Manufacture, IS-code, Setting and hardening of cement, Refractory : Introduction, classification and properties of refractory.	**14**
II	**Water And Its Industrial Applications**: Sources, Impurities, Hardness & its units, Industrial water characteristics, softening of water by various methods (External & Internal treatment), Boiler trouble causes, effect & remedies, Characteristics of municipal water & its treatment, Numerical problems based on softening methods.	**14**
III	**Water Analysis Techniques**:- Alkalinity, Hardness (complex metric), Chloride, Free Chlorine, DO, BOD and COD, Numerical problems based on above techniques. Instrumental techniques in Chemical Analysis: Introduction, Principle, Instrumentation and applications of IR, UV, Gas, Chromatography, Lambert's and Beer's Law.	**14**

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Programme: Bachelor of Technology **Semester –I/II**

IV	**Fuels & Combustion:** Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter Proximate and Ultimate analysis of coal and their significance, calorific value Computation based on ultimate analysis data, Carbonization, Manufacturing of coke & recovery of by products. Cracking of higher Hydrocarbons & mechanism of cracking, Knocking, relationship between' knocking & structure of hydrocarbon, improvement • of anti knocking characteristics of IC engine fuels, Diesel engine fuels, Cetane number, combustion and it related numerical problems.	**14**
V	**High-Polymer** : Introduction, types and classification of polymerization, Reaction Mechanism, Natural & Synthetic Rubber; Vulcanization of Rubber, Preparation, Properties & uses of the following- Polythene, PVC, PMA, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon, Nylon 6:6, Terylene, Phenol formaldehyde, Urea - Formaldehyde Resin, Glyptal, Polyurethanes; Butyl Rubber, Neoprene, Buna N, Buna S. Flow sheet manufacturing diagram of Nylon 6:6 & Decoran.	**14**

Text Book/References Books/ Websites

1. Jain and Jain;Dhanpat Rai Publications Engineering Chemistry
2. B K Sharma; Goel Publication Industrial Chemistry
3. S S Dara; S.Chand Publication Environmental Chemistry & Pollution Control;
4. Shashi Chawla; Dhanpat Rai Publications Engineering chemistry

Suggested List of Laboratory Experiments (Expandable):

1. Determine the type and extent of Alkalinity of given sample of Water by N/50 Sulphuric acid When [P>1/2 M]
2. Determine the type and extent of Alkalinity of given sample of Water by N/50 Sulphuric acid When [P<1/2 M]
3. Determine the total Hardness of the given Water sample B Water Sample A contains 0.8234 gm $CaCO_3$ Equivalent per litre standrized the EDTA Solution and. Report your answer in ppm (Complexometric Titration)
4. Determine the Chloride ion in a given Water sample by Argentometric method.
5. Determine the strength (gm/litre) of supplied $CuSO_4.5H_2O$ solution B Normality of provided solution A ($CuSO_4.5H_2O$) is N/20 and using intermediate Hypo solution .
6. . Determine the strength of $FeSO_4(NH_4)_2 SO_4.6H_2O$ solution B, solution A is standard N/20 Mohr's salt $FeSO_4(NH_4)_2 SO_4.6H_2O$ using intermediate potassium dichromate solution. Diphenylamine as an indicator.
7. Determine the flash point and fire point of given Lubricating oil by Abel's Apparatus.
8. Determine the flash point and fire point of given Lubricating oil by Cleveland's Apparatus.
9. Determine the flash point and fire point of given Lubricating oil by Pensky Marten's Apparatus..
10. Determine the effect of temperature on the viscosity of the given Lubricating oil using Redwood Viscometer No. 1.
11. Determine the effect of temperature on the viscosity of the given Lubricating oil using Redwood Viscometer No. 2.
12. Determine the Cloud and Pour point of given lubricating oil.
13. Determine the moisture content, volatile matter, ash content and fixed carbon in a given coal sample.

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Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
BT-1103	Communication Skills	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance – Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional– Max Marks: 10	Assignment/ Quiz/Attendance – Max. Marks: 05

Pre-Requisite	Nil
Course Outcome	The course will equip the students with the necessary communication skills (reading, writing, listening, and spoken language) that would help student in their profession.

Unit	Contents (Theory)	Marks Weightage
I	**Communication:** Nature, Process and Importance of Communication, Channels of Communication Network, Media of Communication, Verbal and Non-Verbal Communication, Barriers to Communication.	**14**
II	**Listening**: Process of Listening, Barriers to Listening, Types of Listening, Benefits and techniques of effective Listening, Phonetics and phonetics transcription.	**14**
III	**Business letter**: Enquiry, quotation, Order, complaint and adjustment letters, Tender, Noting and drafting, Comment, speech, Job application, resume writing.	**14**
IV	**Report Writing**: Techniques of report writing, and Types of reports--Project report, Observation report, Survey report, Laboratory report, Event and Incident report.	**14**
V	**Advertisement**: Advertisement, slogan writing, Paragraph writing Precise writing, Role play, telephonic conversation, Definitions of common technical and scientific terms.	**14**

Text Book/References Books/ Websites:

1. Dr. Gajanan Malviya & Prof R. N.Shukla; Communication Skills; S. Chand & Company Delhi.
2. R Rizvi ;Professional Communication;TMH.
3. Sharma & Mohan ;Business Correspondence Letter Writing; TMH.
4. Sharma; Business Correspondence and Report Writing; TMH.
5. W.S. Allen; Living English Structure; Longmans.
6. R.K. Bansal and IB Harrison Orient Longman ;Spoken English for India.
7. Joans and Alexander;New International Business English ;OUP.
8. Rizvi; Effective Technical Communication;TMH.

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Programme: Bachelor of Technology **Semester –I/II**

Suggested List of Laboratory Experiments :(Expandable)

1. Basic Grammar and Vocabulary practice
2. Translation
3. Reading, writing, listening and speaking skills practice
4. Body Language
5. Oral presentation and interview skills
6. Public speaking

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Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (35)	Internal (15)	Total (50)
BT-1104	Basic Electrical & Electronics Engineering	3	1	1			Min: 40 (D Grade)			Min:20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance – Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/ Quiz/Attendance – Max. Marks: 05

Pre-Requisite	Knowledge of Physics and Mathematics.
Course Outcome	1. Predict the behaviour of any electrical and magnetic circuits.
	2. Formulate and solve complex AC, DC circuits. Identify the type of electrical machine used for that particular application.
	3. Realize the requirement of transformers in transmission and distribution of electric power and other applications.

Unit	Contents (Theory)	Marks Weightage
I	**Electrical Circuit Analysis:** Voltage and current sources, dependent and independent sources, sources conversion, Kirchhoff's law (KVL & KCL) ,Ohms law DC circuit analysis using Mesh & Nodal Method, Thevenin's & superposition theorem, Maximum Power transfer theorem for dc source, star-delta Transformation. Introduction of single & Three Phase AC circuit, properties Resistor inductor and capacitor and its characteristics, active, reactive & apparent Power and power factor and its importance, 3- phase balanced and unbalanced supply in star delta connection, measurement of power by two and three wattmeter method.	**14**
II	**Transformer:** Review of laws of electromagnetism, mmf , flux , and their relation , analysis of magnetic circuits, Single phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuit, phasor diagram, voltage regulation, losses and efficiency, OC and SC Test ,Autotransformer.	**14**
III	**Rotating Electric Machines:** Constructional details of DC machine, type of dc machine EMF equation of DC machine, Constructional details of Induction Machine and Synchronous machine working principle of 3-phase induction motor Torque equation of 3-phase induction motor, concept of slip in 3-phase induction motor, Explanation of Torque-slip characteristics of 3-phase induction motor. Working principle Synchronous machine.	**14**
IV	**Semiconductor Materials:** Classification of solid materials. Insulators, metal and semiconductor on the basis of band gap. Comparison of conductors, insulators and semiconductors. **Classification of semiconductors**: Intrinsic and Extrinsic. N-type and P-type semiconductors. Effect of temperature on extrinsic semiconductors .PN junction diode. Biasing of PN junction diode. V-I characteristics of diode. Effect of temperature on the V-I characteristics. diode as a rectifier.	**14**
V	**Special diodes and Transistor:** Zener diode, Tunnel diode, PIN diode, LED & photodiode. **Transistor**: Transistor symbols, types of transistor and their working. Modes of operation o transistor. Transistor configurations, relation between current gains of different configuration Comparison of three transistor configuration. Transistor as an Amplifier. **Digital Electronics**	**14**

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Programme: Bachelor of Technology **Semester –I/II**

	Number systems, Gates, Universal gates**,** Demorgan's Theorem , SOP and POS.	

Text Book/References Books/ Websites:

1. Vincent Del Toro; Electrical Engineering Fundamentals;PHI Learning, II Edition.
2. S.Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.
3. V.K.Mehta; Principles of Electronics ;S.Chand & Company.
4. Nagrath & Kothari; Basic Electrical Engineering; III Edition TMH.
5. Hughes; Electrical and Electronic Technology; Pearson Education IX Edition.
6. Navneet Gupta; Basic Electronics ; Dhanpat rai & company.
7. R.P.Jain ;Digital Electronics;TMH Publication.
8. Natrajan & Ramesh Babu ;Electrical & Electronics Engineering ;SCITECH Publication.

Suggested List of Laboratory Experiments :- (Expandable):

1. Verifications of Thevenin's and Superposition theorems.
2. Study of Transformer, name plate rating, determination of ratio and polarity.
3. Determination of O.C and s.c test of single phase transformer.
4. Determination of ratio and polarity test of single phase transformer.
5. Separation of resistance and inductance of choke coil.
6. Measurement of various line & phase quantities for a 3-phase circuit.
7. Study of various electronic components.
8. Study of V-I characteristics of diodes.
9. Study of Transistors.
10. Study of Zener diodes.
11. Verification of truth table for Gate (AND, OR, NOT, EX-OR, NOR, NAND).

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Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
BT-1105	Engineering Drawing	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz Max. Marks: 05

Pre-Requisite	**Nil**
Course Outcome	4. Ability to understand Ability to perform basic sketching techniques will improve.
	5. Ability to draw orthographic projections and sections.
	6. Ability to understand Auto CAD two dimensional drawings.

Unit	Contents (Theory)	Marks Weightage
I	**Basic Geometrical Construction : Scales:** Representative factor, plain scales, diagonal scales, scale of chords. ***Conic* Sections:** Construction of ellipse – General method, Arc of circle method. **Parabola:** General method, Tangential method, Rectangle Method. **Hyperbola:** General method, Intersecting arcs method, Normal and Tangent of conic section. **Special Curves :** Cycloid, Epicycloids, Hypocycloid, Involutes, Archimedean spiral.	**14**
II	**Projection:** Types of Projections, Orthographic Projection, First and Third angle Projection. Projections of Points & straight Lines, Line inclined to one plane, Inclined with both the planes, True length and True inclination and Traces of straight lines.	**14**
III	**Projections of Planes and solids:** Projections of planes like circle and polygons in different positions, Projection of Polyhedrons like Prisms, Pyramids and Solid of revolutions like Cylinder, Cone in different positions.	**14**
IV	**Section of Solids:** Section of right solid by normal and inclined planes. **Development of** surfaces**:** Parallel line and Radial line method for Right solid-prisms, Pyramids and Cone. Isometric projection: Isometric scale, Isometric axes, Isometric projection from Orthographic drawing.	**14**
V	**Introduction of Engineering Drawing Softwares -Computer Aided Drafting (CAD):** Introduction to Computer Aided Drafting software for 2D and 3D Modeling, Benefits, software's basic commands of drafting entities like Line, Circle, Polygon, Polyhedron, Cylinders. Transformations and Editing commands like Move, Rotate, Mirror, Array. Introduction of Pro-E and CATIA.	**14**

Text Book/References Books/ Websites

1. Gill P.S. Engineering Drawing, Kataria.
2. Bhatt N.D. Engineering Drawing, Charotar.
3. Agrawal and Agrawal, Enginnering Drawing, TMH.
4. Visvesvaraya Tech. University, A Premier on Computer Aided Engg Drawing.
5. Venugopal K. Engineering Graphics, New Age.
6. John KC, Engg Graphics for Degree, PHI.

7. Jeyopoovan T, Engineering drawing & Graphics Using AutoCAD, Vikas

Suggested List of Laboratory Experiments (Expandable):

Perform drawing skills on A-2 size sheet of concern topics. (Min 10 sheets).

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Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total	External (70)	Internal (30)	Total (100)
BT-1106	Mechanical Workshop	0	0	2	Nil	Nil	Nil			Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 30	Lab work & Sessional – Max Marks: 20	Assignment / Quiz Max. Marks: 10

Pre-Requisite	**Nil**
Course Outcome	1. Study the basic knowledge of Measurements.
	2. Study the Engineering processes of machine tools and their operations.
	3. Ability to understand construction, function, use and application of different working tools, equipment and machines.

Unit	Contents (Theory)	Marks Weightage
I	**Study of Mechanical tools and components and their Application** 1.Measurement: 1.1 Vernier caliper 1.2 Micrometer 1.3 Dial gauge 1.4 Slip gauge 1.5 Sine-bar 1.6 Combination set.	**14**
II	**Carpentry Shop** 2.0 General Shop Talk 2.1 Name and use of raw materials used in carpentry shop: wood & alternative materials 2.2 Names, uses, care and maintenance of hand tools such as different types of Saws, 'G'-Clamp Chisels, Mallets, Carpenter's vices, Marking gauges, Try-squares, Rulers and other commonly used tools and materials used in carpentry shop by segregating as cutting tools, supporting tools, holding tools , measuring tools etc.	**14**
III	**Smithy/ Forging Shop** 3. General Shop Talk 3.1 Purpose of Smithy / Forging Shop 3.2 Different types of Hearths used in Smithy / Forging shop 3.3 Purpose specifications uses, care and maintenance of various tools and equipments used in hand forging by segregating as cutting tools, supporting tools, holding tools etc. 3.4 Types of fuel used and maximum temperature obtained 3.5 Types of raw materials used in Smithy / Forging shop 3.6 Uses of Fire Bricks & Clays in Forging Work Shop	**14**
IV	**Welding Shop** 4. General Shop Talk 4.1 Purpose of Welding, Brazing and Soldering.	**14**

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	4.2 Purpose, specifications, uses, care and maintenance of various Welding machines, Cables, tools and equipments used for welding, brazing and soldering (soft and hard) 4.3 Purpose of fluxes, electrodes, filler rods 4.4 Safety equipments used in Welding Shop **Bench Work & Fitting Shop** 5. General Shop Talk Purpose of Bench Work and Fitting Shop: (a) Study of different types of hand tools & their uses, care and maintenance of tools e.g. Files, Chisels, Hammers, Hack-saw with frames, Fitting Bench Vice, Different other Vices, Divider, Trysquare, Drill-taps, Dies, V-blocks, Bevel protector, Scribers, Surface plates, Types of Callipers Types of Drill bits etc.	
V	**Machine:** Demonstrations and application of drilling machine, Grinding Machine, Shapping Machine, Milling Machine, and lathe Machine etc.	**14**

Text Book/References Books/ Websites

1. Hazara Choudhary; Workshop Practices; Vol. I & II.
2. R.K. Jain; Production Technology.
3. H.S. Bawa; Workshop Practice;TMH .
4. P.N. Rao; Manufacturing Technology- Vol.1& 2;TMH.
5. K.C. John; Mechanical workshop practice; PHI.
6. Priti Agrawal; Electrician Practical; NK.
7. GK Mittal; Electrical Engineering material; Khanna Publication, 2011.

Suggested List of Laboratory Experiments : (Expandable): Nil

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Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (50)			Total
BT-1107	Disaster Management and Safety	2	0	0	External (35)	Internal (15)	Min: 40 (D Grade)	External Nil	Internal Nil	Nil

Duration of Theory (Externals): 2 Hours

Theory Internal- Max Marks: 15	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks: Nil	Assignment / Quiz/Attendance Max. Marks: Nil

Pre-Requisite	**Nil**
Course Outcome	1. Understanding foundations of hazards; disasters and associated natural/social phenomena.
	2. Familiarity with disaster management theory.
	3. Technological innovations in Disaster Risk Reduction: Advantages and problems.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction Disasters:** Understanding the Concepts and definitions of Disaster; Hazard; Vulnerability; Risk and Capacity – Disaster and Development; and disaster management.	**07**
II	**Types, Trends, Causes, Consequences and Control of Disasters:** Geological Disasters (earthquakes; landslides; tsunami; mining); Hydro-Meteorological Disasters (floods; cyclones; lightning; thunder-storms; hail storms; avalanches; droughts; cold and heat waves) Biological Disasters (epidemics; pest attacks; forest fire); Technological Disasters (chemical; industrial; radiological; nuclear) and Manmade Disasters (building collapse; rural and urban fire; road and rail accidents; nuclear; radiological; chemicals and biological disasters) Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.	**07**
III	**Disaster Management Cycle and Framework 8 Disaster Management Cycle –** Paradigm Shift in Disaster Management Pre-Disaster – Risk Assessment and Analysis; Risk Mapping; zonation and Microzonation; Prevention and Mitigation of Disasters; Early Warning System; Preparedness; Capacity Development; Awareness During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation – Post-disaster – Damage and Needs Assessment; Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment.	**07**
IV	**Disaster Management in India:** Disaster Profile of India – Mega Disasters of India and Lessons Learnt Disaster Management Act 2005 – Institutional and Financial Mechanism National Policy on Disaster Management; National Guidelines and Plans on Disaster Management; Role of Government (local; state and national);Non-Government and Intergovernmental Agencies.	**07**
V	**Applications of Science and Technology for Disaster Management :** Geo-informatics in Disaster Management (RS; GIS; GPS and RS) Disaster Communication System (Early Warning and Its Dissemination) Land Use Planning and Development Regulations Disaster Safe Designs and Constructions Structural and Non Structural Mitigation of Disasters S&T Institutions for Disaster Management in India; Role of Engineers in Disaster Management.	**07**

 # Mandatory (Non Credit) subject according to AICTE. Non University Examination; End Sem marks not to be included in total marks and credit. Students must pass in this subject.

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Programme: Bachelor of Technology **Semester –I/II**

Text Book/References Books/ Websites

1. M C Gupta;Manual on natural disaster management in India; NIDM; New Delhi
2. R K Bhandani;An overview on natural & man-made disasters and their reduction; CSIR New Delhi .
3. World Disasters Report; 2009.
4. Encyclopedia of disaster management; Vol I; II and III
5. S L Goyal; Disaster management policy and administration; Deep & Deep New Delhi; 2006.
6. Anu Kapur & others; Disasters in India Studies of grim reality; 2005, 283 pages; Rawat Publishers; Jaipur.
7. H.N. Srivastava & G.D. Gupta ;Management of Natural Disasters in developing countries;Daya Publishers; Delhi; 2006; 201 pages.
8. Disaster Management Act 2005; Publisher by Govt. of India.
9. National Disaster Management Policy; 2009; GoI

Suggested List of Laboratory Experiments (Expandable): Nil

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Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
BT-1201	Environmental science	3	1	0	(70)	(30)	Min: 40 (D Grade)	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal-Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance- Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks: Nil	Assignment / Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	Nil
Course Outcome	1. Ability to understand the challenges and technologies in Environmental science use.
	2. To understand the environmental recourses and its consequences.
	3. To understand the energy use and the exploitation of energy resource,

Unit	Contents (Theory)	Marks Weightage
I	**Energy resources**: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles .The multidisciplinary nature of environmental studies Definition, scope and importance, Need for public awareness.	**14**
II	**Ecosystems** · Concept of an ecosystem · Structure and function of an ecosystem · Producers, consumers and decomposers · Energy flow in the ecosystem · Ecological succession · Food chains, food webs and ecological pyramids · Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)	**14**
III	**Biodiversity and its conservation** - Introduction – Definition: genetic, species and ecosystem diversity · Bio-geographical classification of India · Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values · Biodiversity at global, national and local levels · India as a mega-diversity nation · Hot-spots of biodiversity · Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts · In-situ and Ex-situ conservation of biodiversity.	**14**
IV	**Environmental Pollution Definition** · Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear pollution · Solid waste management: Causes, effects and control measures of urban and industrial wastes. · Role of an individual in prevention of pollution · **Disaster management**: floods, earthquake, cyclone and landslides.	**14**
V	**Environmental Policy, Legislation, Rules And Regulations :**National Environmental Policy Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act-1981, Water (Prevention and Control of pollution) Act-1974, Water pollution Act-1977, Forest Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules .	**14**

Text Book/References Books/ Websites:

1. Dr. S. S. Dara and Dr. D. D. Mishra; A textbook of Environmental Chemistry and Pollution Control, S. Chand & Company Ltd.
2. Dr. Suresh K. Dhameja; Environmental studies; S K Kataria and Sons.
3. A. Ristinen and Jack J. Kraushaar; Energy and the Environment,2nd Edition: Robert.

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4. Anindita Basak ; Environmental Studies; Pearson Publications.
5. Gilbert M. Masters; Introduction to Environmental Engineering and Science; Prentice-Hall Publications.

Suggested List of Laboratory Practical (Expandable): Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
BT-1202	Engineering Physics	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Session– Max Marks: 10	Assignment / Quiz/Attendance - Max. Marks: 05

Pre-Requisite	Fundamental knowledge of physics and physical principles for development, design and analysis.
Course Outcome	1. Understand concept and knowledge of Laser and Fiber Optics and its industrial applications.
	2. Apply principles and concept of nuclear and particle physics for solving various engineering problems.
	3. Analyze the intensity variation of light due to Polarization, Interference and Diffraction.

Unit	Contents (Theory)	Marks Weightage
I	**Laser and Fiber Optics:** Introduction, Interaction of radiation with matter, Conditions for light amplification, population inversion, active medium, pumping, Optical resonators, pumping schemes, characteristics of laser beam, applications of laser, Types of lasers: Ruby & He- Ne. Introduction of optical fiber, applications & types of optical fiber, Propagation of light through a cladded fiber, acceptance angle, cone, numerical aperture, V Number, attenuation and fiber losses.	**14**
II	**Wave Optics:** Interference: Condition for interference, coherence, Young's double slit experiment, Interference in parallel thin films, Newton's rings and their applications. Fraunhofer Diffraction: single slit and grating, Resolving Power, Resolving Power of telescope and grating, polarization of light, Production of plane polarized light by reflection, Brewster law, Production of elliptically and circularly polarized light.	**14**

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III	**Nuclear Physics:** Atomic Nucleus, Nuclear density, Atomic mass unit, mass defect, Binding energy, Nuclear Models: liquid drop model, shell model, Accelerators: Drift tube LINAC, Cyclotron, Synchrotron, Synchrocyclotron & Betatron, Nuclear Fission, Chain Reaction, Q- Value, Nuclear Fusion, Nuclear Reactor, Geiger - Muller Counter, Bainbridge Mass Spectrograph.	**14**
IV	**Quantum and Nano Physics:**De Broglie Hypothesis, Group and particle velocities & their relationship. Uncertainty principle and its application, Compton Effect, Wave function, Quantum operators, time dependent and time independent Schrödinger wave equation, Application of time independent Schrödinger wave equation for a particle trapped in a one dimensional square potential well. Introduction of nanophysics, concept of nanostructures and materials, characterization, applications and future of nanotechnology	**14**
V	**Solid State Physics and Superconductivity**: Kronig Penny Model (Without Derivation), Band theory for solids, Fermi Dirac distribution function, Fermi level of intrinsic and extrinsic 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.	**14**

Text Book/References Books/ Websites

1. M.N. Avadhanulu; Engineering Physics; S Chand Pub.
2. Beiser; Concepts of Modern Physics; McGraw-Hill
3. Navneet Gupta, S.K.Tiwary; Engineering Physics; Dhanpat Rai & Co.
4. Edward L. Wolf; Nanophysics and Nanotechnology; Wiley India

Suggested List of Laboratory Experiments (Expandable):

1. He- Ne Laser: Width of slit
2. NA of Fiber
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. Energy Band Gap: Semiconductor
9. PN Diode : Characteristic Curve
10. Zener Diode: Characteristic Curve
11. Hall Effect Experiment
12. Photo Cell: Determination of Planck's constant
13. Sextant: Height of Building
14. Electrical Vibrator: Frequency of AC Mains

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Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
BT-1203	Elements of Mechanical Engineering	3	1	0	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance- Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/ Attendance- Max. Marks: 05

Pre-Requisite	Nil
Course Outcome	1. Grasp the concept of stresses and strains.
	2. Understand the basics of thermodynamics and I.C. Engines.
	3. Ability to understand the concept of Forces and Equilibrium.

Unit	Contents (Theory)	Marks Weightage
I	**Materials:** Classification of engineering material, Composition of Cast iron and Carbon steels, Iron Carbon Diagram. Alloy steels their applications. Mechanical properties, Stress-strain diagram of ductile and brittle materials, Hooks law and modulus of elasticity, Tensile, hardness and fatigue testing of Materials.	**14**
II	**Thermodynamic**: Zeroth, First and second law of thermodynamics, thermodynamic processes at constant pressure, volume, enthalpy & entropy. **Refrigeration:** Vapour Absorption and Compression cycle, Coefficient of performance, Refrigerants properties and Eco-friendly Refrigerants.	**14**
III	**Reciprocating Machines:** Working principle of steam Engine, Carnot, Otto, Diesel cycle with P-V, T-S diagrams and their efficiency, Working of Two stroke & Four stroke Petrol & Diesel engines. **Steam Engineering:** Classification and working of boilers, mountings and accessories of boilers, steam properties, use of steam tables.	**14**
IV	**Forces and Equilibrium**: Graphical and Analytical Treatment of Concurrent and non concurrent, Co- planner forces, free Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems.	**14**
V	**Centre of Gravity and moment of Inertia**: Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes. Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple.	**14**

Text Book/References Books/ Websites

1. C M Agrawal; Basic Mechanical Engineering ;Wiley Publication.
2. W. Ganesan; Internal Combustion Engines; TMH.
3. R.C. Hibbler; Engineering Mechanics; Statics & Dynamics.
4. R.K. Rajput ;Engineering Mechanics ;S.Chand & Co..
5. Langley, Billy C., 'Solid state electronic controls for HVACR' Prentice-Hall 1989.

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Programme: Bachelor of Technology **Semester –I/II**

Suggested List of Laboratory Experiments :- (Expandable): Nil

1. To study the working and construction details of Cochran and Babcock & Wilcox Boiler
2. To study Two-Stroke & Four-Stroke Diesel Engines.
3. To Study Two-Stroke & Four-Stroke Petrol Engines.
4. To study different types of Boilers Mountings and accessories
5. To study simple steam engine single.
6. To verify law of Polygon of forces.
7. To determine the Moment of inertia of fly wheel by falling weight method.
8. To determine the Center of Gravity of a given Lamina.
9. To verify Bending Moment at a given section of a simply supported beam.
10. To determine the Coefficient of Friction Between two given surfaces of Horizontal plane Method.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total 100			Total (50)
BT-1204	Basic Civil Engineering	3	1	1	External (70)	Internal (30)	Min 40 D Grade)	External (35)	Internal (15)	Min 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional - Max Marks: 10	Assignment/Quiz/Attendance - Max. Marks: 05

Pre-Requisite	**Nil**
Course Outcome	1. To know about the knowledge of building material and its construction.
	2. To know about the different survey for any construction.
	3. To give the knowledge of advance instrument looking to the current scenario.

Unit	Contents (Theory)	Marks Weightage
I	**Engineering Materials:** Stones, Bricks, Cement, Lime, Timber, Mortar and Concrete-types, basic properties, tests & uses.	**14**
II	**Building construction:** Sub and super structure of a building, Types of Foundations, Types of Brick and Stone masonry, Planning & Orientation of building, Plastering and Pointing, Concept of Green Building.	**14**
III	**Surveying & Positioning:** Introduction to Surveying- Classification, Fundamental Principles, & Instrument Used, Linear measurement by Chain survey, Angular measurement by Compass survey, Measurement of elevation by levelling,	**14**
IV	**Remote Sensing & GIS:** Introduction of Remote sensing & its applications in civil Engineering, GIS , GPS, its application in Civil Engineering	**14**
V	**Mapping:** Mapping details and contouring, Profile cross sectioning and measurement of area Volume, numerical problems. Application of measurements in quantity computations,	**14**

Text Book/References Books/ Websites:

1. S Ramamrutham; Basic Civil Engg;Dhanpat Rai Publishing.
2. B C Punamia & Ashok Jain; Basic Civil Engg.;Laxmi Publications.
3. S.S. Bhavikatti; Basic Civil Engineeing; New Age Publications.
4. N.N. Basak; Basic Civil Engineering; TMH Publisher.

Suggested List of Laboratory Experiments :(Expandable)

1. To determine the Shape and size of clay burnt brick.
2. To determine the Water absorption of given brick.
3. To determine the Compressive strength of bricks.
4. To find the Fineness of give port land cement.
5. To determine the Specific gravity of cement using LeChatelier Flask.
6. To find the Soundness of a given cement.
7. To find the Initial and final setting time of cement.

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8. To Know the Workability of fresh concrete by slump cone apparatus.
9. To determine the Compressive strength of fresh Cement Concrete block.

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Programme: Bachelor of Technology **Semester –I/II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (35)	Internal (15)	Total (50)
BT-1205	Basic Computer Engineering	3	1	1			Min: 40 (D Grade			Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test-- Max Marks: 15	Assignment/Quiz/Attendance Max. Marks: 15
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/ Quiz/Attendance Max. Marks: 05

Pre-Requisite	**Nil**
Course Outcome	1.Student understand operating system concepts, peripheral devices, internet, computer networking
	2.Understand basic data types and the benefits of object oriented programming.
	3.Have the ability to write a computer program to solve specified problems.

Unit	Contents (Theory)	Marks Weightage
I	**Computer:** Definition, Generation, Classification, Von Neumann Model and its architecture, organization, system and application software, introduction to windows, MS DOS, MS OFFICE(word, excel, power point and access) and internet	**14**
II	**Operating System**: Definition, function and types, management of process, memory and file, case study of UNIX and LINUX, case study of DOS and windows	**14**
III	**Computer Networking**: Introduction to data communication, computer networking, goals, data communication concepts ,introduction to layering and protocols, ISO-OSI Model, function of different layers, internetworking concepts, devices, TCP/IP Model, introduction to internet, world wide web, network security, E- commerce`	**14**
IV	**Programming Languages**: Generations, characteristics and categorization, Introduction to programming, procedure oriented programming Vs object oriented programming ,OOPS features, Concept of Inheritance and its types, Virtual function, OOPS Merits.	**14**
V	**Features of C and C++: C**haracter, tokens, program structure, data types, variables, operators, expression, statements and control structures, arrays, functions, structures, Difference between C and C++.	**14**

Text Book/References Books/ Websites

1. Peter Norton;Introduction of Computers; TMH
2. E.Balagurusamy;Object Oriented Programming with C++;TMH
3. Rajesh K.Shukla;Object Oriented Programming in C++;Wiley India
4. Andrew Tananbaum;Computer Networks; PHI

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Suggested List of Laboratory Experiments :- (Expandable)

1. Study of Microsoft Disk operating system with all Internal and external commands
2. Write a procedure to create biodata in MS Word
3. Create a presentation of 10 slides describing Independence Day Celebration in your college
4. Write a procedure to create a spreadsheet in MS Excel
5. Write a program to print text.
6. Write a program to read two numbers and print sum of given two numbers
7. Write a program to accept student roll no, marks in 3 subjects and calculate total, average and print it
8. Write a program to read a three numbers and print the biggest of given three numbers
9. Write a program to read a number and find whether the given number is even or odd.
10. Write a program to accept a number and check the given number is Armstrong or not.

Subject Code	Subject Title	Credit	Theory	Practical

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BT-1206	**Soft Skills**	**L**	**T**	**P**	**External (Nil)**	**Internal (Nil)**	**Total (Nil)**	**External (70)**	**Internal (30)**	**Total (100)** Min: 40 (D Grade)
		-	-	2						

Duration of Theory (Externals):Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test– Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 30	Lab work & Session– Max Marks: 20	Assignment / Quiz/Attendance- Max. Marks: 10

Pre-Requisite	**Nil**
Course Outcome	7. To inculcate good manners and etiquettes to make students more flexible and capable to change before entering the professional work environment
	2. Enhance holistic development of students and improve their employability skills.

Unit	**Contents (*Theory*)**	**Marks Weightage**
I	Introduction to soft skills, its importance in today's world; art of introduction, perception and personality(with examples of national and world leaders in politics and business),grooming personal appearance, diversity, inclusiveness, gender sensitivity, taking initiatives.	**100**
II	Importance of communication and non-verbal communication, courtesy, flexibility, Public speaking, handling criticism, professionalism, work ethics, punctuality, willingness to learn.	
III	Emotional quotient & emotional intelligence: meaning and importance, 5 elements of EQ, how to improve and its advantages.	
IV	Professional skills: stress management, time, management, problem solving , critical thinking, team spirit positive attitude, Goal setting, Networking,	
V	Oral presentation: planning and preparation, job interview: preparing questions, group discursion, debate, extempore.	

Text Book/References Books/ Websites

1. Butterfield,Jeff;Soft Skills for Everyone. New Delhi; Cengage Learning.2010.
2. Chauhan, G.S. and Sangeeta Sharma;Soft Skills. New Delhi;Wiley.2016.
3. Holtz,Shel;Corporate Conversations. New Delhi; PHI. 2007.
4. Turk, Christopher; Effective Speaking. South Asia Division; Taylor & Francis.1985.
5. Lucas, Stephen E;The Art of Public Speaking;McGeaw-Hill Book Co. International edition, 2014.

Suggested List of Laboratory Experiments :(Expandable) Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (50)
BT-1207	Physical Education & Yoga	-	-	1	External (Nil)	Internal (Nil)	(Nil)	External (Nil)	Internal (50)	Min: 20 (D Grade)

Duration of Theory (Externals):

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 50	Lab work & Session– Max Marks: Nil	Assignment / Quiz/Attendance - Max. Marks: 50

Pre-Requisite	Nil
Course Outcome	To improving concentration and stress bust

Unit	Contents (Theory)	Marks Weightage
I	**Yoga:** Meaning & Importance of Yoga, Elements of Yoga. Introduction – Asanas & Meditation. Yoga for concentration & related Asanas (Sukhasana, Tadasana, & Padmasana), Relaxation Techniques for improving concentration – Yog-nidra. Asanas as preventive measures: 1. Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh-Matsyendrasana. 2. Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavanmuktasana, Ardh- Matsyendrasana. 3. Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana. 4. Back Pain: Tadasana, Ardh-Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.	**50**
II	**Sports:** Any two games: Students are required to play two games out of the listed sports:Badminton,Table Tennis, Volleyball ,Football, Basketball ,Kabaddi,Kho-Kho	

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments :- (Expandable):

1 Any one game of your choice out of the list above. Labeled diagram of field & equipment Rules, Terminologies & Skills.