### FIRST SEMESTER

<table>
<thead>
<tr>
<th>S.No</th>
<th>Board of Study</th>
<th>Subject Code</th>
<th>Subject</th>
<th>Periods Per Week</th>
<th>Scheme of Examination</th>
<th>Total Marks</th>
<th>Credit</th>
</tr>
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<td>P</td>
<td>ESE</td>
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<tr>
<td>1</td>
<td>Humanities</td>
<td>300111(46)</td>
<td>Language (Professional communication in English)</td>
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<td>2</td>
<td>Basic Sciences</td>
<td>300112(11)</td>
<td>Applied Chemistry</td>
<td>3</td>
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<td>Applied Physics-I</td>
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<td>Applied Maths-I</td>
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<td>300115(24)</td>
<td>Basic Electrical Engg.</td>
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<td>Mech. Engg.</td>
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<td>Engg. Mechanics</td>
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<td>300121(11)</td>
<td>Applied Chemistry LAB</td>
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<td>Basic Engineering LAB</td>
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<td>10</td>
<td>Mech. Engg.</td>
<td>300124(37)</td>
<td>Workshop</td>
<td>-</td>
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<tr>
<td>11</td>
<td>Humanities</td>
<td>300125(46)</td>
<td>Communication Skills</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>12</td>
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<td></td>
<td>Library</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

|      | TOTAL          |              |         | 19   | 6  | 15 | 640 | 120 | 240 | 1000   | 32    |

L-Lecture, T-Tutorial, P-Practical, ESE – End Semester Exam, CT- Class Test, TA- Teacher’s Assessment

Note: (i) The teaching in the 1st and 2nd semester will be divided in two groups consisting of various branches as shown below: P1-GROUP: Electronics & Communication, Information Technology, Electronics & Instrumentation, Electrical, Chemical, Electrical & Electronics; Q1-GROUP: Computer Science, Mechanical, Civil, Mining and Applied Electronics & Instrumentation, Metallurgy.

(ii) Applied Maths - I will be taught to both the groups.
Unit – I
Some Key Concepts
Process and Elements of Communication: context of communication; the speaker/writer and the listener/reader; Medium of communication; Principles of communication (7 C’s of communication); Barriers in communication, effective communication; Communication in organization.

[No. of Periods: 6+2]

Unit – II
Writing
Selecting material for expository, descriptive, and argumentative pieces; Resume; covering letter, Elements of letter writing and style of writing, business letters: Quotation and Tenders; Basics of Informal and Formal Reports-technical report writing, lab report; Précis writing.

[No. of Periods: 6+2]

Unit – III
Reading
Effective Reading; reading different kinds of texts for different purposes; reading between the lines. Comprehension of Unseen Passages.

Grammar in use: Errors of Accidence and syntax with reference to Parts of Speech; Agreement of Subject and Verb; Tense and Concord; Use of connectives, Question tags. Voice and Narration. Indianism in English: Punctuation and Vocabulary, Building (Antonym, Synonym, Verbal Analogy and One Word Substitution).

[No. of Periods: 6+2]

Unit – IV
Speaking
Achieving desired clarity and fluency; effective speaking; task-oriented, inter-personal, informal and semi-formal speaking.
Meetings, Seminar, Conferences, Interviews, Presentation, Audio-visual communication.

[No. of Periods: 6+2]

Unit – V
Listening
Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English and American English; Intelligent listening in situations. Advantages of listening. Hearing and Listening; Essentials of Good Listening. Use of Modern Communication Devices; Telephonic Conversation.

[No. of Periods: 6+2]

Name of the Text Books:
- English Sentence Structure by T.C. JUPP, and JOHN MILNE, ELBS edition published by Heinemann Educational Books Ltd. – Latest Edition. (For Unit III)

Name of the Reference Books:
- Communication skills for technical students, book-I; July 1995; compiled by the Curriculum Development Centre, TTTI, Western Region, Bhopal; Somaiya Publications Pvt. Ltd. New Delhi.
- Grammar and Composition by P.R. Sarkar, Anand Marg Publications, Kolkata
Unit – I

[No. of Periods: 8+2]

Unit – II
Fuels: Classification, combustion and chemical principles involved in it, calorific value: gross and net calorific values and their determination by bomb calorimeter.
Liquid Fuels: Petroleum: its chemical composition and fractional distillation, knocking and chemical structure, octane number and cetane number and their significance, power alcohol, Analysis of flue gases by Orsat's apparatus, Numerical on calorific value, combustion, proximate and ultimate analysis of coal.

[No. of Periods: 8+2]

Unit – III
Corrosion: Types of corrosion (dry, wet, atmospheric, galvanic and concentration corrosion), theories of corrosion, protective measures against corrosion, factors affecting corrosion, pitting corrosion, water line corrosion, underground corrosion, stress corrosion, micro biological corrosion, corrosion fatigue.
Batteries and Battery Technology: Primary cells, secondary batteries reserve batteries, fuel cells, solar cells.

[No. of Periods: 8+2]

Unit – IV
Lubricants: Classification of lubricants and mechanisms of lubrication.
Polymers: Industrial applications of thermoplastic, thermosetting, polymers, properties and applications of the major polymers viz polyethylene, Teflon, PVC, nylon, phenol formaldehyde. Elastomers, Natural Polymers.

[No. of Periods: 8+2]

Unit – V
Introduction to Important Industrial Chemicals:
Industrial Method of preparation (one each), properties and major industrial uses of following chemicals: Ammonium Chloride, Ammonium Nitrate, Ammonium Sulphate, Bromine, Calcium Phosphate (Monocalcium Phosphate, Super phosphate), Chromic Acid (Chromium trioxide, Chromic anhydride), Acrylonitrile, Benzene (Benzol), Butyl Acetate, Caprolactam, Carbon Tetrachloride, Cellulose Acetate, Cresol (Cresylic Acid), Chloroform (Trichloromethane), Ether (Ethyl Ether), Ethyl Alcohol (Ethanol, Industrial Alcohol), Glycerine (glycerol), and Melamine.
Explosives and Propellants:
Characteristics of Explosives, Oxygen Balance, Classification of Explosives: Primary or Initiating Explosives or Detonators; Low Explosives or Propellants; High Explosives, Preparation and Applications of Explosives, Rocket Propellants, Characteristics of a Good Propellant, Classification of Propellants.

[No. of Periods: 8+2]

Name of Text Books:
2. Engineering Chemistry by P.C. Jain (Dhanpat Rai publishing company)

Name of Reference Books:
Unit – I
Theory of Relativity:
Space, time and motion, frame of reference, Galileo's principle of relativity. Michelson-Morely experiment, Special theory of Relativity, transformation of space and time, Time dilation, Doppler effect, length contraction, twin paradox, Relativistic mass, Variation of mass with velocity, kinetic energy, equivalence of mass and energy. Relation between energy and momentum.

[No. of Periods: 8+2]

Unit – II
Geometrical Optics and Acoustics
(i) Geometrical Optics: Combination of thin lenses, Cardinal points of coaxial system of thin lenses, location and properties of Cardinal points, Newton’s formula.
(ii) Acoustics: Magnetostrictic oscillator and Piezo-electric oscillator for production of ultrasonic waves, determination of wavelength of Ultrasonic waves and its engineering applications, Basic requirements for an acoustically good hall. Reverberation and Sabine's formula for reverberation time, Absorption coefficient and its measurement, Factors affecting architectural acoustics and their remedy.

[No. of Periods: 10+2]

Unit – III
Wave Optics
Wedge shaped films, Interference by division of amplitude: Newton's rings, Interference by division of wave front: Fresnel's biprism, fringe width, Diffraction at single slit, diffraction grating. Resolving power of grating, Polarisation by reflection (Brewster's law), refraction, double refraction (only introduction).

[No. of Periods: 6+2]

Unit – IV
Digital Electronics
Number system used in digital electronics: decimal, binary, octal, hexadecimal. Conversion of decimal, binary, octal & hexadecimal to one another and vice versa. Addition, subtraction, multiplication, division, 1’s, 2’s compliment and use in subtraction, AND, OR, NOT, NAND, NOR, EX-OR gates & their representation. Logic symbols, Equivalent simplified switching circuits & truth table. Law of Boolean algebra. De Morgan's theorems & De Morganization, implementations of Boolean expressions using gates, NAND Gate and NOR Gate as universal gates, AND, OR, NOT, EX-NOR logic operation using NAND gates or NOR gates.

[No. of Periods: 6+2]

Unit – V
Quantum Physics

[No. of Periods: 10+2]
Name of the Text Books:

1. Gaur and Gupta "Engineering Physics"
3. Avadhanulu and Kshirsagar "Engineering Physics".

Name of the Reference Books:

2. Singh R. B.: "Physics of Oscillations and Waves"
3. Ghatak A.K.: "Optics"
8. Theraja: B. L., Basic Electronics, S. Chand, 2002.
Chhattisgarh Swami Vivekanand Technical University
Bhilai (C.G.)

Semester: Ist
Subject: Applied Maths - I
Total Theory Periods: 50
Total Tutorial Periods: 12
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

Unit – I
Matrices
Rank & inverse by elementary transformation; system of linear equations; eigen values & eigen vectors; Caley-Hamilton Theorem.

[No. of Periods: 9+2]

Unit – II
Differential Calculus
Successive differentiation, Leibnitz's theorem; expansion of functions in Taylor's & Maclaurin's series; tracing of simple curves.

[No. of Periods: 9+2]

Unit – III
Integral Calculus
Reduction formula, application of integration to rectification, quadrature, volume of revolution, centre of gravity & moment of inertia.

[No. of Periods: 10+2]

Unit – IV
Partial Differentiation
Partial derivatives, Euler’s theorem on homogeneous functions, maxima & minima of functions of two variables, Lagrange’s method of undetermined multipliers, Jacobians; differentiation under the integral sign.

[No. of Periods: 10+3]

Unit – V
Ordinary Differential Equations & Applications
Exact differential equations, reducible to exact form; first order differential equations (non-linear); application to simple electrical circuits & heat flow.

[No. of Periods: 10+3]

Name of the Text Books:

Name of the Reference Books:
Unit – I
D. C. networks: Kirchoff’s laws, Node voltage and Mesh current methods, Delta – Star and Star-Delta conversion; classification of Network Elements, Superposition principle, Thevenin’s and Norton’s theorems. Only independent source.

Magnetic Circuits: B-H curve, solution of magnetic circuits; Hysteresis and Eddy current losses. Difference between elect/magnetic circuits.

[No. of Periods: 10+3]

Unit – II
Single Phase AC circuits: Solution of R, L, C series circuits, the j operator, complex representation of impedance, phasor diagram, power in complex notation, solution of parallel and series parallel circuits, series & parallel resonance.

Three phase AC circuits: Delta and Star connection, Linc and Phase quantities, solution of three phase circuits, balanced supply voltage and balanced load, phasor diagram, measurement of power in three phase circuits.

[No. of Periods: 10+3]

Unit – III
Transformers: construction, EMF equation, rating, phasor diagram on no load and full load, equivalent circuit, regulation, Losses, efficiency. All day efficiency calculation, open and short circuit tests.

[No. of Periods: 10+2]

Unit – IV
DC Machines: Construction, EMF and torque equations, classification and application and characteristics of DC motors.

Single & three phase induction Motors: construction, principle of operation TIS curve starting of 1Φ IM, application of 3Φ & 1Φ IM.

[No. of Periods: 10+2]

Unit – V
Electrical Measuring instruments: Classification, indicating, recording and integrating type instruments, deflecting torque, controlling torque Damping torque, DC PMMC instruments, shunts and multipliers, moving iron ammeters and voltmeters, construction & working principle of single phase watt meter and energy meter.

[No. of Periods: 8+2]

Name of the Text Books:

Name of the Reference Books:
1. Basic Electrical Engineering by I. J. Nagrath, (T.M.H.)
Unit – I
EQUILIBRIUM OF FORCES AND COUPLES:
Free body diagram; Resultant of plane concurrent and non-concurrent forces; Conditions of equilibrium – Analytical and graphical methods; Application in solving simple problems.  
[No. of Periods: 6+2]

Unit – II
A] SHEAR FORCE AND BENDING MOMENT DIAGRAM
Types of supports for beams, Beams subjected to concentrated loads and uniformly distributed loads; Shear force and bending moment at any section of a beam Analytical methods and graphical methods, Force polygon and couple polygon. Reactions at supports.
B] ANALYSIS OF PLANE TRUSSES
Analysis of forces in structural members : Method of joint and method of section Analytical and graphical methods.  
[No. of Periods: 10+2]

Unit – III
FRICTION
Laws of friction and its applications in solving problems on
  i)  wedge,
  ii)  Belt and rope drive
  iii)  Screw threads
  iv)  Tractive effort of vehicles on inclined planes.  
[No. of Periods: 8+2]

Unit – IV
A] MOMENT OF INERTIA OF PLANE LAMINA
Parallel axis theorem and perpendicular axis theorem; product of inertia; Moment of inertia about an inclined axis; Principle axis of moment of inertia and position of principle axis.
B] Moment of inertia of solid of revolutions  
[No. of Periods: 8+2]

Unit – V
Kinematics of rigid bodies in motion
A] D’Alembert’s principle applied to bodies having linear and angular motion; Equation of dynamic equilibrium; Maximum acceleration and retardation of vehicles running on inclined planes.
B] Principle of work and Energy: Simple application
C] Principle of Impulse and momentum: Simple examples.  
[No. of Periods: 8+2]

Name of the Text Books:
2.  A. K. Tayal : Engineering Mechanics (Statics and Dynamics); Umesh Pub., Delhi

Name of the Reference Books:
List of Experiments

1. To determine the percentage composition of a mixture of Sodium Hydroxide and Sodium Chloride.
2. To determine the amount of Sodium Carbonate in the given mixture of Sodium Carbonate and Sodium Bicarbonate.
3. Determine the amount of Oxalic Acid and Sulphuric Acid/Hydrochloric Acid in one litre of solution given standard Sodium Hydroxide and Potassium Permanganate.
4. To determine the Carbonate, Bicarbonate and Chloride contents in irrigation water.
5. Argentometric titration one each of Vohlard's method and of Mohr's method.
6. Complexometric Titrations Ca & Mg.
7. Determination of dissolved Oxygen in given sample of water.
8. Determination of calorific value of fuel by Bomb Calorimeter.

Name of the Text Books:

2. Laboratory manual on Engineering Chemistry by Dr. Sudha Rani (S. Chand and Company).

Name of the Reference Books:

List of Experiments

01. To verify Thevenin's and Norton's Theorems.
02. To verify Superposition Theorem.
03. Voltage-Current Characteristics of Incandescent lamp.
04. To study B-H Curve.
05. To Measure Current, Power, Voltage and Power Factor of series R-L-C Circuit.
06. To Measure R and L of a Chock Coil.
07. To Measure Power in Three Phase Circuitry by Two Wattmeter Method.
08. Calculate Efficiency of Transformer by Direct Loading.
09. Calculate Regulation of Transformer.
10. To Perform OC, SC Test of Single Phase Transformer.
11. To study DC Motor.
12. To study Induction Motor.
List of Experiments

1. To verify the Law of Polygon of Forces.
2. To obtain the Stiffness of Helical Spring.
3. To find the position of Centre of Gravity and Moment of Inertia a Connecting Rod.
4. To verify the Forces in member of a Jib Crane.
5. To obtain Velocity Ratio, Mechanical Advantage and Efficiency of a Winch Crab.
6. To obtain the efficiency of a Screw Jack.
7. To verify Newton’s First Law of Motion using Inclined Plane & Rolling Cylinder.
8. To verify ratio of Tensions using Belt and Pulley Apparatus.
10. To verify the reactions in a simply supported Beam.
11. To draw Bending Moment and Shear force Diagram.
    Includes exercises on Force Polygon and Funicular Polygon
12. Graphical Analysis of Trusses.

Note: Students must use computers for solving problems

1. EXCEL has a very power calculation capacity.
2. AUTOCAD “CAL” is a Geometrical Calculator and very easily be used for solving problems on Vector.
3. MATHCAD makes calculations the way we write on our note books.
**Chhattisgarh Swami Vivekanand Technical University**

**Bhilai (C.G.)**

Semester: **Ist**  
Branch: Common to All Branches  
Subject: **Workshop**  
Code: **300124 (37)**  
Total Practical Periods: 72  
Total Marks in End Semester Exam: 40  
Minimum number of class tests to be conducted: 02

**CARPENTRY:**  
Timber, Definition, Engineering Application, Types of Wood, seasoning and preservation, PlyWood, PlyBoards.

6  
Practical Work: T Lap Joint  
End Lap Joint

**FOUNDRY:**  
Moulding Sands, Constituents and Characteristics, Pattern, Definition Material, Types, Core Prints, Role of Gate runner, riser, core, casting defects like blow holes & cavities.

12  
Practical Work: Mould of any pattern  
Casting of simple pattern

**WELDING:**  
Welding, Brazing and soldering process and their applications. Oxy-acetylene gas welding process, Type of flame & their application. Manual & Metal arc welding technique and equipment, AC & DC welding, Constituents and functions of electrode coating, welding positions, type of weld joints, Common welding defects.

12  
Practical Work:  
1. Lap Joint by Gas Welding  
2. Square butt joint Arc welding  
3. Lap joint by Arc welding  
4. Demonstration of brazing

**METAL CUTTING:**  
Introduction to machining and common machining operations. Cutting tool material, Definition of machine tools, specification and block diagram of lathe, Shaper Drilling machine and grinder. Common lathe operations such as turning, parting, chamfering and facing. Quick return mechanism of shaper, Difference between drilling and boring, Files-Material classification.

**Practical Work –**

**FITTING**
1. Preparation of step cutting Job, out of 5mm thick strip.  
2. Preparation of ‘V’ notch ‘V’ groove, out of 5mm thick strip.  
3. Preparation of Male-Female joint our of 5 mm thick strip.

12

**TURNING**
1. Job on Lathe with one plane turning chamfering operations.  
2. Job on Lathe with one step turning  
3. Job on shaper for finishing two sides of a Job.  
4. Drilling two holes of size 5mm and 12mm diameter on job used / to be used for shaping.

12
FORGING:
Forging principle, Material, Operations like drawing, upsetting, bending and forge welding, use of forged parts.

Exposure to High Tech Area: Exposure to High Tech Area like Plastic Injection Moulding, Die Casting, Diamond Cutting PCB Manufacturing, CNC manufacturing Latest Techniques in Welding etc. Should be imparted through factory visit and audio-visual means.

REFERENCE BOOKS:
Semester: Ist  
Subject: Communication Skills  
Total Practical Periods: 24  
Minimum number of class tests to be conducted: 02

Branch: Common to All Branches  
Code: 300125 (46)  
Total Tutorial Periods: -

**Communication Skills (Practical)**

List of exercises to be performed as practical work in language lab to train the students to be proficient in communication.

- Formal and Informal Speaking
- Elementary Phonetics (Speech Mechanism. The Description of Speech Sounds, The Phoneme the syllable; Intonation and Word Accent)
- Paralinguistic features of speaking (voice quality, pitch, tone, etc.)
- Paper Presentation
- Use of Audio-Visual aids: Preparation of transparencies, slides, power point presentation etc.
- Body Language.
- Exercises on Listening Comprehension.
- Exercises on Reading Comprehension.
- Effective Writing.
- Internet exploration.