<table>
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<tr>
<th>Code</th>
<th>Course Name</th>
<th>Hours/week L/T</th>
<th>Credit Theory</th>
<th>University marks</th>
<th>Internal Evaluation</th>
<th>Hours/Week L/T</th>
<th>Credit Practical</th>
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<tr>
<td>BS</td>
<td>Applied Mathematics-II</td>
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<td>ES</td>
<td>Basics of Civil Engineering / Basics of Mechanical Engineering</td>
<td>3-0</td>
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<td>100</td>
<td>50</td>
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<td>MC &amp; GS</td>
<td>Environmental Studies &amp; Health Care Engineering/ Professional Ethics</td>
<td>3-0</td>
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<td>100</td>
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<tr>
<td>ES</td>
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<td>Computer Lab</td>
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<tr>
<td>ES</td>
<td>Engineering Graphics lab. / Engineering Workshop</td>
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<td>NSS/NCC/NSO/Yoga</td>
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<td><strong>Total</strong></td>
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<td><strong>17</strong></td>
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<td><strong>Total Marks: 1200</strong></td>
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<td><strong>Total Credits: 25</strong></td>
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ES/MC - ELECTRICAL & ELECTRONICS ENGINEERING (3-1-0)

Module I (10 Hours)
University Portion (80%)
Fundamentals of Electric Circuits:
DC Circuits: Voltage and current sources (Ideal and Practical), Charge, current, Kirchhoff's laws, circuit elements and their characteristics, Resistance and Ohm's Law, Measuring Devices (Ohm meter, Ammeter, Volt meter). Node voltage analysis, Mesh current analysis, with controlled and uncontrolled sources, superposition, Thevenin's and maximum power transfer Theorem.
AC Circuits: Energy storage elements, time dependent signal sources, solution of circuits containing energy storage elements, phasor solutions of the circuits with sinusoidal excitations, AC circuit analysis. Transient Analysis, Writing differential equations for circuits, Star-Delta Conversion.

College/Institute Portion (20%)
DC steady state solutions of circuits, Resonance in series and parallel R-L-C circuit, Time response of second-order circuit OR any related topic as decided by the concerned faculty member teaching the subject.

Module II (10 Hours)
University Portion (80%)
Introduction to Machines: DC Machines, AC Machines

College/Institute Portion (20%)
Residential Wiring, Grounding and safety, Measurement Systems and Transducers, or any related topic as decided by the concerned faculty member teaching the subject.

Module III (12 Hours)
University Portion (80%)
Semiconductor Diodes: Intrinsic semiconductors, Doped semiconductors, P-N junction with open circuit, P-N junction with an applied voltage, Ideal Diode, Terminal characteristics of junction diode, modeling the diode forward characteristics, Operation in the reverse breakdown region-Zener Diode, Rectifier circuit, special Diode.
Bipolar Junction Transistors (BJTs): Simplified structure and physical operation of n-p-n and p-n-p transistors in the active region, Current-voltage characteristics of BJT, BJT as an amplifier and as a switch BJT Circuits at DC, Biasing in BJT amplifier circuits, Small Signal Operation of BJT: Simplified hybrid-π model and its application to single stage BJT amplifiers (Common-Emitter, Common-Base and Common-Collector configurations)

College/Institute Portion (20%)
The Operational Amplifier (Op-Amp): The ideal Op-Amp, Inverting and non-inverting configurations, Difference amplifier, CMRR, Application of Op-Amp (Instrumentation amplifier, Summing amplifier, Integrator and Differentiator) OR any related topic as decided by the concerned faculty member teaching the subject.
Module IV  (10 Hours)
University Portion (80%)
Digital Electronic Principles: Introduction, Binary digits, Logic levels and Digital waveforms, Introduction to basic Logic operation, Number system, Decimal numbers, Binary numbers, Decimal-to-Binary conversion, Simple binary arithmetic.
Logic Gates, Boolean algebra and Combinational Logic Circuits: The inverter, The AND, OR, NAND NOR, Exclusive-OR and Exclusive-NOR gate, Boolean operations and expressions, Laws and Rules of Boolean algebra, DeMorgan’s theorem, Boolean analysis of logic circuits, Standard forms of Boolean expressions, Boolean expression and truth table. Basic combinational logic circuits, Implementation of combinational logic, the universal properties of NAND and NOR gates, Basic adders.
College/Institute Portion (20%)
Multiplexers and Demultiplexers. OR any related topic as decided by the concerned faculty member teaching the subject.

Text Book

REFERENCE BOOKS
4. Microelectronic Circuits (sixth Edition), Adel S. Sedra and Kenneth C. Smith, Oxford University Press,
ELECTRICAL & ELECTRONICS ENGG. LABORATORY

Group-I
1. Familiarization of electronic components and devices (Testing of semiconductor diodes and transistors using digital multimeter)
2. Study and use of Oscilloscope, signal generator to view waveforms and measure amplitude and frequency of a given waveform.
3. V-I characteristics of semiconductor diode and determining its DC and AC resistance.
4. Studies on half-wave and full-wave rectifier circuits without and with capacitor filter; recording of the waveforms and measurement of average and rms values of the rectifier output.
5. V-I characteristic of an n-p-n or p-n-p transistor, DC biasing the transistor in common-emitter configuration and determination of its operating point (i.e., various voltages and currents).

Group-II
1. Study of different electrical equipments.
2. Power factor improvement using capacitor for fluorescent lamp.
3. Verification of Superposition and Thevenin’s theorem.
4. Polarity test of transformer.
5. Power measurement using 2-wattmeter method.
6. Calculation of current, voltage and power in series R-L-C circuit excited by single-phase AC supply and calculation of power factor.
2nd semester B.Tech Syllabus for Admission Batch 2016-17

APPLIED MATHEMATICS-II

Module - I (10 Hours)

Laplace transformation and its use in getting solution to differential equations, Convolution, Integral Equations.

Module - II (12 Hours)

Fourier series, Fourier expansion of functions of any period, Even and odd functions, Half range Expansion, Fourier transform and Fourier Integral, Gamma, Beta functions, error function

Module - III (10 Hours)

Vector differential calculus: vector and scalar functions and fields, Derivatives, Curves, tangents and arc
Length, gradient, divergence, curl

Module - IV (13 Hours)

Vector integral calculus: Line Integrals, Green Theorem, Surface integrals, Gauss theorem and Stokes Theorem

Text Book

1. Advanced Engineering Mathematics by E. Kreyszig, John Willey & Sons Inc. 10th Edition Chapters 6, 9, 10,11

Reference Books:

2. Engineering Mathematics by Pal and S. Bhunia, Oxford Publication
3. Advance Engineering Mathematics by P.V. O'Neil, CENGAGE
APPLIED PHYSICS

Module-I (07 Classes)

Classical Dynamics


Oscillation & Waves

Simple Harmonic Oscillation, damped harmonic oscillation, Forced oscillator, resonance, coupled oscillation, concept of wave and wave equation.

OPTICS

Concept of interference, two source interface pattern, Bi-prism, Michelson Interferometer & measurement of wavelength.

Diffraction: Hugen’s principle, Fresenel & Frauhoper’s diffraction, Zone plate.

Module-II (07 Classes)

Solid State Physics

Crystalline and amorphous solid, unit cell, Miller Indices, Reciprocal lattice, Bragg’s law, Brillouin’s zone, concept of fermions, Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein distribution function (only statement and formula), Concept of Fermions and Bosons. Classification of materials: metals, semiconductor and insulator in terms of band theory.

LASER and Fibre Optics:

principle and application -stimulated emission, population inversion, Lasing material (solid and gas), He-Ne laser, Rubi- LASER, Application of LASER (Engineering Application), Principle of optical fibre and its application to communication.

Module-III (08 Classes)

Electromagnetism- Student will be familiarized with some basic used in vector calculus prior to development of Maxwell’s electromagnetic wave equations. No proof of theorems and laws included in this unit expected- statement and interpretation should sufficient.

a) Vector calculus: gradient of scalar field, divergence, curl of vector field (Only Physical significance) Gauss divergence theorem, Stoke’s theorem, Green’s theorem (Only Statements)

b) Gauss's law of electrostatics in free space and in a medium(Only statements)electric displacement( D)magnetic Induction (B),Amperes circuital law (Only statements), displacement current, Faraday's law of electromagnetic induction(Only statements).
Module-IV(08 Classes)

Quantum Physics: Elementary concepts of quantum physics formulation to deal with physical systems.

a) Need for Quantum physics-Historical overviews, Particle aspects of radiation-Black body radiation, photoelectric effect, Compton scattering, pair production. (No derivations), Wave aspect of particles- matter wave, de Broglie Hypothesis, Heisenberg Uncertainty principles- Statement, Interpretation and example

b) Basic features of Quantum mechanics- Transition from deterministic to probabilistic, States of system- Wave function, probability density, superposition principle, observables and operators, expectation values. Schrodinger equation-Time dependent and time independent, wave packets.

Text Books:

2. Engineering Physics by D.R. Joshi, Mc Graw Hill
3. Engineering Physics by D.K Bhattacharya and Poonam Tandon, Oxford University Press

Reference Book:

1. Quantum Mechanics by Powel & Craseman.
2. Optics- A. K. Ghatak
3. Electricity & Magnetism: E.M. Purecell
4. Introduction to Electrodynamics- David J. Griffiths, PHI Publication
9. An Introduction to Machanics by D.Klippner & R. Kolenkow, TMH
APPLIED PHYSICS LABORATORY

A student is expected to perform ten experiments from the list given below.

1. Determination of Young’s modulus by Searle’s method.
2. Determination of Rigidity modulus by static method.
3. Determination of surface tension by capillary rise method.
4. Determination of acceleration due to gravity by Bar / Kater’s pendulum.
5. Determination of unknown resistance using meter bridge.
6. Determination of wave length of light by Newton’s ring apparatus.
7. Determination of grating element of a diffraction grating.
8. Plotting of characteristic curve of a PN junction diode.
9. Plotting of characteristic curves of BJT.
10. Verification of laws of vibration of string using sonometer.
14. Determination of Young’s modulus by bending of beams.
15. Michelson Interferometer.
16. Determine of reduction factor of the given tangent galvanometer and horizontal component of earth’s magnetic field by using tangent galvanometer.
2nd semester B.Tech Syllabus for Admission Batch 2016-17

APPLIED CHEMISTRY

Course Objectives:

(1) To understand the basics of molecular interactions.
(2) Introductory idea about organometallics and their catalytic applications.
(3) Basics of fuels an corrosion chemistry.

Module I:
Quantum Chemistry and Spectroscopy: Basic concepts and postulates of quantum mechanics. Introduction to Schrodinger Wage Equation. Particle in a box: Energy levels, quantum members and selection rule.

Spectroscopy: Lambert Beer’s Law, Principles and applications of UV-Visible Molecular Absorption Spectroscopy; Chromophores, applications to colorimetry. Effect of conjugation on chromophores, Absorption by aromatic systems, Introductory idea on Rotational and Vibrational Spectroscopy-Principles and application to diatomic molecules. [7 Classes]

The phase rule: Statement of Gibb’s phase rule and explanation of the terms involved, Phase diagram of one component system – water and sulfur system, Condensed phase rule, Phase diagram of two component system – Eutectic Bi-Cd system. [3 Classes]

Module II:
Organometallics: Introduction to organometallics, EAN rule; classification, nomenclature and characteristics of organometallic compounds. Applications of organometallic compounds and catalyst in alkene isomerization hydrogenation and hydroformylation (detail mechanisms are to be excluded). [10 Classes]

Module III:

Module IV
Corrosion: Electrochemical theory of corrosion, galvanic series, Types of corrosion; Differential metal corrosion, Differential aeration corrosion (Pitting and water line corrosion), Stress corrosion (caustic embrittlement in boilers), Factors affecting, Metal coatings – Galvanizing and Timing, Corrosion inhibitors, cathodic protection.
Text Books:

4. Physical Chemistry by Gordon M. Barrow, McGraw-Hill

Reference Books:

3. Molecular Spectroscopy, Ira N. Levine, John Wiley and Sons
APPLIED CHEMISTRY LAB. (0-0-2)

B.Tech. (for all branches):

1. Determination of amount of sodium hydroxide and sodium carbonate in a mixture.
2. Determination of total hardness of water by EDTA method.
3. Estimation of calcium in calcium in limestone.
4. Determination of percentage of available chlorine in a sample of bleaching powder.
5. Preparation of Phenolphthalein.
6. Acid-Base Titration by Potentiometry.
7. Preparation of buffer solution and determination of pH of a buffer solution.
8. Standardization of KMnO₄ using sodium oxalate. Determination of ferrous iron in Mohr’s salt by potassium permanganate.
10. Determination of rate constant of acid catalyzed hydrolysis reaction.
11. Determination of concentration of a coloured substance by spectrophotometer.
12. Determination of dissolved oxygen in a sample of water.
14. Determination of Flash point of a given oil by Pensky-Marten’s flash point approach.
15. Determination of Critical Micelle concentration (CMC) of an ionic surfactant (Both cationic and anionic).
MODULE-1
Thermodynamics: (9 classes)

MODULE-2: (11 classes)
Application of Thermodynamics:
Air compressors, Steam Power Plant, Refrigerators and Heat pump, I.C. Engines (Brief Description of different components of above mentioned systems and working principles with Schematic diagram only)
Introduction to Fluid Mechanics and Heat transfer:
Fluid properties, Pascal's law, Buoyancy, Bernoulli's theorem, pipe flow, hydraulic turbines and pumps. Different modes of heat transfer, heat exchangers (basics).

MODULE-3(8 classes)
Production processes
Turning, Casting, Welding and forming (Drawing, Forging, Extrusion) (working principles with Schematic diagram only)
Engineering materials:
Classification of Engineering materials. Mechanical properties of Steel, Aluminum and Plastics.

MODULE-4 (8 classes)
Fasteners and Power transmission devices:
Nut, Bolt, Screw, Rivets, Belt, Rope, Gear drives. Coupling, clutch, brakes. (Basics, applications, advantages and limitations only).
Mechanical Measurements:
Temperature, pressure, velocity, flow, strain, force, torque measurements. (Working principle only).

Text books
1. Basic Mechanical Engineering by Pravin Kumar, Pearson
2. Basic Mechanical Engineering by A R Israni, P K Shah, BS Publications

Reference books
1. Basic Mechanical Engineering by D. Mishra, P.K Parida, S.S.Sahoo, India Tech Publishing company
2. Basic and applied Thermodynamics by P. K. Nag, Tata Mc Graw Hill
3. Elements of Mechanical Engineering by J K Kittur and G D Gokak, Willey
4. Basic Mechanical Engineering by Basant Agrawal, C M Agrawal, Willey
5. Engineering Thermodynamics by P. Chattopadhaya, Oxford University Press
BASIC MECHANICAL ENGINEERING PRACTICAL

(HOURS PER WEEK): 2, CREDIT: 1

(Minimum 8 experiments/studies)

1. Determination of equilibrium of coplanar forces.
2. Determination of Moment of Inertia of Flywheel
3. Model study of Fire Tube Boilers
4. Model study of Water Tube Boilers
5. Model study of Two stroke I.C. Engine
6. Model study of Four stroke I.C. Engine
7. Model study of Refrigerator
8. Model study of Automobile Parts
9. Model study of Water Turbines
10. Model study of Water pumps
12. Determination of velocity ratio of belt drive
13. Study of Gears and Gear trains
14. Study of Mechanical fasteners
15. Verification of Bernoulli’s Theorem and its application to Venturimeter.
16. Calibration of Bourdon Tube Pressure gauge and measurement of pressure using manometers
BASICS OF CIVIL ENGINEERING (3-0-1)

MODULE-I (10 classes)

Mechanics: Concurrent forces on a plane – Composition and resolution of forces and equilibrium of concurrent coplanar forces, Method of projections, Methods of moment, Friction. Parallel forces in a plane- Two parallel forces, General case of parallel forces, Center of parallel forces in a plane and center of gravity- centroids of composite plane figure and curves, Distributed parallel forces in a plane. General case of forces in a plane- composition of forces in a plane and equilibrium of forces in a plane.

Module-II (10 classes)

Plane trusses- method of joints and method of sections. Moments of Inertia- Plane figure with respect to an axis in its plane and perpendicular to the plane- parallel axis theorem, Moment of Inertia of material bodies.


Module-III (8 classes)

Building Material and Building Construction: Bricks: Brick as a construction material and its importance, qualities of a good brick, Stone: classification, composition and characteristics, Cement: Classification, tests for cement, uses of cement, types of cement, Concrete: Quality of mixing water, Workability, vibration of concrete, concrete mix design, Grade and strength of Concrete. Building Components and their basic requirements, Foundation: Types of foundation, spread foundations, pile foundations, Mortar, Stone masonry, brick masonry, roof, floors, building services: air conditioning, fire protection, ventilation.

Module-IV (8 classes)

Surveying: Linear measurement and chain survey: Use of chains and tapes for measurement of correct length of lines, direct and indirect ranging, Compass surveying: Use of prismatic compass, bearing of a line. Local attraction, Introduction to modern surveying instruments EDM and Total Station.

Transport, Traffic and Urban Engineering: Introduction to planning and design aspects of transportation engineering, different modes of transport, highway engineering, rail engineering, airport engineering, traffic engineering, urban engineering

TEXT BOOKS

2. Basic Civil Engineering, S. Gopi, Pearson
4. Surveying and Levelling by R. Subramanian, Oxford University Press

REFERENCE BOOKS

4. Surveying Vol-1 by R Agor, Khanna Publishers
5. Basic Civil Engineering, M.S. Palanichamy, McGraw Hill
BASICS OF CIVIL ENGINEERING LAB

1. Polygon Law of Coplanar Forces
2. Support Reactions of a beam
3. Experiment on trusses to calculate the force in the member of a simple truss
4. Friction experiment on inclined plane for determining coefficient of friction
5. Moment of inertia of fly wheel
6. Shape and size test of brick
7. Compressive strength of brick
8. Testing of chain and measurement of correct length of the line
9. Bearing of a line
10. Study of Total Station
ENVIRONMENTAL STUDIES AND HEALTH CARE ENGINEERING (3-0-0)

Objective: This course introduces the environmental consequences of Industries on the human health and methods for minimizing their impact through technology and legal system to the undergraduate engineering students.

Module-I  [8 Periods]


Module-II  [8 Periods]

Causes, effects and control of air, noise and water pollution, treatment of surface water and waste water (pre-, primary and secondary). DO, BOD and COD of waste water treatment process. Sources, properties and management of solid wastes and hazardous wastes. [6 Periods]

Module-III  [6 Periods]

Occupational health and safety act and procedure. Hazard control measures in industries like steel, petroleum and pharmaceutical. First aid treatments.

Module-IV  [8 Periods]

Environment and Human health:-

Occupational health – nutrition, control of communicable diseases, environmental sanitation, mental health. Prevention of occupational diseases through medical measures, engineering measures and legislation. Role of information technology in human health, causes, prevention and control of diseases like hepatitis, typhoid and malaria.

Text Book:

1. Environmental Studies by Dash & Kumar, India Tech Publication, New Delhi
2. Environmental Engineering and Safety by Mohapatra, Seven Seas Publication, Cuttack
4. Environmental Studies by R.Rajagopalan Oxford University Press

Reference:

1. Essentials of Community Health Nursing, By K. Park, M/s. Banarsidas Bhanot, Jabalpur
2. Environmental Studies by Dr. S. K. Dhameja, Kataria and Sons, New Delhi
4. Environmental Studies by Bharucha, University Press, Hyderabad.
5. 
PROFESSIONAL ETHICS

MODULE-I

Introduction to Ethics: 1.1 Basic terms- Moral, Ethics, Ethical dilemma, Emotional intelligence 1.2 Moral development theories of Kohlberg and Piaget 1.3 View on ethics by Aristotle 1.4 Governing factors of an individual's value system 1.5 Personal and professional ethics

MODULE-II

Profession and Professionalism: 2.1 Clarification of the concepts: Profession, Professional, Professionalism, Professional accountability, Professional risks, Profession and Craftsmanship, Conflict of interest 2.2 Distinguishing features of a professional 2.3 Role and responsibilities of professionals 2.4 Professionals’ duties towards the organization and vice-a-versa 3 Ethical Theories: 3.1 Various ethical theories and their application- Consequentialism, Deontology, Virtue theory, Rights Theory, Casuist theory 3.2 Ethical terms: Moral absolutism, Moral Relativism, Moral Pluralism etc. 3.3 Resolving Ethical Dilemma

MODULE-III

Ethics in Engineering: 4.1 Purpose and concept of Engineering Ethics 4.2 Engineering as social experimentation 4.3 Types of inquiry 4.4 Issues in engineering ethics 5 Engineers’ Responsibility and Safety: 5.1 Safety, Risk, Underestimating the risk, Over estimating the risk, Risk-benefit analysis 5.2 Causes of an accident and identification of the preventive measures to be taken 5.3 Case Studies

MODULE-IV

Global Ethical Issues: 6.1 Different ethical issues in business, environment, IT, Bioethics, Intellectual Property Rights (IPR), Research, Media, CSR etc. 7 Ethical Codes: 7.1 Meaning and the significance of ethical codes 7.2 The limitations of ethical codes.

RECOMMENDED BOOKS FOR REFERENCE:

ENGINEERING GRAPHICS

Introduction Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning line
Conventions

AUTO CAD, layout of the software, standard tool bar/menus and description of most commonly
used toolbars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP,
RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and
creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles,
ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves,
constraints.

2 – Sheets

Orthographic Projections
Introduction, Definitions - Planes of projection, reference line and conventions employed,
Projections of points in all the four quadrants, Projections of straight lines (located in First
quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference
planes

2 – Sheets

Orthographic Projections of Plane Surfaces (First Angle Projection Only)
Introduction, Definitions – projections of plane surfaces – triangle, square, rectangle, rhombus,
pentagon, hexagon and circle, planes in different positions by change of position method only

1-Sheet

Projections of Solids (First Angle Projection Only)
Introduction, Definitions – Projections of right regular tetrahedron, hexahedron (cube), prisms,
pyramids, cylinders and cones in different positions.

2-Sheets

Sections and Development of Lateral Surfaces of Solids
Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True
shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP.

2 – Sheet

Isometric Projection (Using Isometric Scale Only)
Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of
tetrahedron, hexahedron (cube), right regular prisms, pyramids, cylinders, cones, spheres,
cutspheres.

2-Sheets

Text Books
   Publishing House Pvt. Ltd., New Delhi
3. Engineering Drawing by N.S. Parthasarathy and Vela Murali Oxford University Press

Reference Books
2. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer
3. Computer Aided Engineering Drawing, Prof. M. H. Annaiah, New Age International Publisher,
   New Delhi
ENGINEERING WORKSHOP

Fitting Practice:
Use of hand tools in fitting, preparing a male and female joint of M.S. or making a paper weight of M.S.

Welding Practice:
Gas welding & Electric Arc welding Practice.
A joint such as a Lap joint, a T-joint or a Butt joint is to be prepared or to make furniture.

Machining:
(i) Stepped cylindrical Turning of a job and Thread-cutting in lathe.
(ii) Shaping   (iii) Milling

Reference
2. Workshop Technology by WAJ Chapman, Viva Books
3. Workshop Manual by Kannaiah/ Narayana, Scitech
COMPUTER LAB
will be uploaded soon