SARDAR PATEL UNIVERSITY BALAGHAT (M.P.)

SCHOOL OF ENGINEERING & TECHNOLOGY

CURRICULUM OF EXAMINATION

Session 2024-2025

DIPLOMA IN ENGINEERING FIRST YEAR

COMMON For:

Mining & Mine Surveying (MMS),
Mechanical Engineering (ME)
Civil Engineering (CE)
Computer Science Engineering (CSE)
Electrical Engineering (EE)

DIE011: APPLIED PHYSICS

Course Objectives:

- Students will demonstrate skills in scientific inquiry, problem solving.
- Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and Electromagnetic.
- The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.

Course Outcomes:

- The student would be able to learn the fundamental concepts on Quantum behaviour of matter in its micro state.
- The knowledge of fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
- Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.

COURSE CONTENTS

UNIT I: Units & Measurement

Fundamental and derived units Scalar and vector, Basic requirements to represent vector Symbols, abbreviation, and proculation, Linear measurement by vernier calipers, screw gauge and spherometer, Angular measurement by angular vernier

MOTION

Motion and its type, Linear motion (laws and equation), Circular motion, Angular velocity and relation with linear velocity, Centripetal acceleration, Centripetal and Centrifugal forces, Rotatory motion, Axis of rotation, Moment of Inertia, Radius of gyration, Kinetic energy of rotation, Numerical problems and solution on the topic

UNIT II: Properties of Matter

Elasticity**:** Meaning, definition, stress, stain, Hook's law and elastic limit, Surface Tension**:** Meaning, definition, molecular forces, cohesive and adhesive forces, surface energy, capillary rise and capillary rise method. Viscosity**:** Meaning, definition, streamline and turbulent flow, critical velocity, Stock's law. Numerical problems and solution on the topic.

UNIT III: Sound

Introducing (Longitudinal and transverse waves) Production of sound waves (Longitudinal and transverse waves), Progressive and stationary wave's, Basic knowledge of refraction, reflection, interference and diffraction.   Audible range, Production of ultrasonic, Properties and uses, Principal

of Communication, Elementary information's of analog and digital communications., Types of communication system, Modulation and its types, Modulation factor.

UNIT IV: Electrostatics And Dielectromagnetic Induction

Coulomb's law, Electric field Intensity, potential. Capacity, principle of capacitor, types of capacitor, combination of capacitors. Electromagnetic Induction**:** Faraday's law, Lenz's law**,** Self and mutual inductance, Transformer and electric motor.

UNIT V: Modern Physics, Basic Electronics

Photoelectric effect, threshold frequency, Einstein-equation, Photo electric cells, Radio activity: decay constant, half life, mean life, Properties of nucleus, nuclear mass, mass defect, Production of x-rays, properties and its uses. Thermal emission, semiconductors, Types of semiconductors, Explanation of conductor, semiconductor and insulators on the basis of band theory. P-N junction, diode as rectifier. Ideas and application of LED and LASER

LIST OF EXPERIMENTS

1. Refractive index of prism (I - d) curve

2. Refractive index of prism (spectrometer)

3. Focal length of a convex lens by u-v method

4. Verification of Ohm' slaw

5. Zener Diode Characteristics

6. To find out unknown resistance by meter bridge

7. To find out internal radius of hollow tube by vernier calipers.

8. Surface tension by Capillary rise method.

Reference Books

1. Applied Physics Vol. 1 & 2 - Saxena and Prabhakar

2. Physics- Ttti Publication

3. Engineering Physics- Gaur and Gupta.

4. Principle Of Physics- Brijlal & Subramanyan

5. Physics For Technical Education- Ls Zednov

DIE012: COMMUNICATION SKILL

Course Objective:

- Understand Communication Fundamentals.
- Apply Grammar in Writing.
- Develop Business Communication Skills.
- Enhance Reading and Writing Skills.
- Improve Composition and Translation Abilities.

Course Outcomes:

- Proficient Communication Skills.
- Strong Grammar and Language Application.
- Effective Business Communication.
- Advanced Reading and Writing Skills.
- Competent Composition and Translation.

COURSE CONTENTS

UNIT I: Basics of Communication

Definition and process of communication, Types of communication- formal and informal, oral and written, verbal and non-verbal, Communications barriers and how to overcome them, Barriers to communication, Tools of communication.

UNIT II: Application of Grammar

Parts of speech (Noun, Verb, Adjective, Adverb) and modals, Sentences and its types, Tenses, Active and Passive Voice, Punctuation, Direct and Indirect Speech.

UNIT III: Business Communication

Principles of effective business correspondence. Its parts, mechanics, styles and form, Application for Job, Bio-Data and C.V. Letter of Enquiry, Placing order, Complaint.

UNIT IV: Reading Skill

Unseen passage for comprehension, one word Substitution, Prefixes, Suffixes, Antonyms, Synonyms etc. based upon the passages to be covered under this topic.

Writing Skill: Writing skills on social media platform like Facebook, Instagram, X, Thread

UNIT V: Composition & Translation

Writing paragraphs of 150 words on topics of general interest. i.e. pollution, ragging in college, Importance of computers, Importance of communication skill, Importance of science and Technology etc.

Translation (Hindi to English and vice-versa)

Reference books

1.   Communication Skills for Technical Students Book- I, Book –II- M/S Somaiya Publication, Bombay

2.   Practical English Grammer- Thomson & Martinet

3.   English Conversation Practice- Grant Taylor

4.   Effective Business Communication-M.V. Rodriques, Concept Pub. Co. New Delhi.

5.   English Grammar, Usage, and Composition - Tickoo & Subramanian, S. Chand & Co.

     Standard Allen Longman.

DIE013: ENERGY & ENVIRONMENT

Course Objectives

- Understand Fundamental Energy Concepts.
- Analyze Conventional and Renewable Energy Sources.
- Evaluate Energy Conversion and Consumption Patterns.
- Assess Environmental Impact and Pollution.
- Investigate the Future of Energy.

Course Outcomes

Upon successful completion of the course, students will be able to:
- Define and categorize different forms of energy
- Differentiate between renewable and non-renewable energy sources
- Explain the processes of energy conversion
- Implement strategies for improving energy efficiency

COURSE CONTENTS

UNIT I: Introduction To Energy

Energy Basics: Definition, forms of energy (mechanical, thermal, chemical, etc.), and energy units.
Energy Sources: Renewable (solar, wind, hydro, biomass) vs. Non-renewable (coal, oil, natural gas, nuclear).
Energy Conversion: Overview of energy conversion processes (e.g., mechanical to electrical).
Energy Demand and Consumption: Global and national energy consumption patterns.

UNIT II: Conventional Energy Sources & Environmental Impact

Fossil Fuels: Types (coal, oil, natural gas), extraction methods, and uses.
Nuclear Energy: Basics of nuclear fission and fusion, nuclear power plants.
Environmental Impact: Pollution, greenhouse gas emissions, and other environmental concerns.

UNIT III: Renewable Energy Sources

Solar Energy: Photovoltaic systems, solar thermal systems.
Wind Energy: Wind turbines, power generation, and applications.
Hydroelectric Power: Types of hydroelectric plants, benefits, and limitations.
Biomass and Bioenergy: Sources of biomass, biofuels, and their role in energy generation.

UNIT IV: Environmental Pollution & Climate Change

Air Pollution: Types of pollutants (CO_2, NOx, SOx), sources, and effects on health and environment.
Water and Soil Pollution: Impact of energy production on water bodies and soil.
Waste Management: Management of waste from energy production (e.g., coal ash, nuclear waste).
Climate Change: Role of energy consumption in global warming, greenhouse effect, and climate change.

UNIT V: Energy Conservation and Sustainability

Energy Efficiency: Importance, methods to improve energy efficiency in industries and homes.
Sustainable Practices: Concepts of sustainable development, energy audits, and green buildings.
Government Policies and Regulations: Overview of energy policies, environmental regulations, and international agreements (e.g., Kyoto Protocol, Paris Agreement).
Future of Energy: Emerging technologies, smart grids, and the role of innovation in energy sustainability.

Reference Books

1. Non-Conventional Energy Sources, Fourth Edition, Khanna Publishers, G.D. Rai. (2011).

2. Energy Technology-Nonconventional, Renewable & Conventional, S. Rao and Dr. B. B.

Parulekar, Khanna Publishers.

3. Environmental Pollution and Control, H. S.Bhatia, Galgotia publication, New Delhi (2003)

4. Renewable Energy: Power for a Sustainable Future, Sept 2012, Oxford Press, Godfrey Boyle

5. Solar Energy- Fundamentals, Design, Modelling and Applications, Revised edition 2013,

Narosa Publishing house Pvt. Ltd, G.N. Tiwari. (2013)

DIE014: ENGINEERING DRAWING

Course Objectives

- Learn Geometrical Constructions and Engineering Curves.
- Understand Theory of Projection and Projection Techniques.
- Apply Projections and Sections of Solids.
- Develop Skills in Orthographic Projections and Isometric Views.

Course Outcomes

Upon successful completion of the course, students will be able to:

- Proficient Geometrical Constructions and Curve Drawing.
- Advanced Projection Techniques.
- Accurate Projections and Sections of Solids.
- Orthographic Projections and Isometric Views.

COURSE CONTENTS

UNIT I: Introduction To Drawing Instruments:

Introduction of drawing Instruments, materials and their uses, Applications of mini drafter, Applications of compass and divider, Applications of French curves and spline, Pencils grades and their uses, Designation and sizes of drawing sheet and drawing board.
Planning of drawing sheet as per I.S.: 696-1972 (SP 46: 1988)
Conventional representation of the following as per BIS practice, Common Engineering materials
Electrical installations and fittings, Electronics components, Mechanical components -

UNIT II: Lines, Lettering and Dimensioning

Introduction of type of lines and their applications, Single stroke vertical, inclined letters (capital and lowercase) and numerals.
Dimensioning: Elements of dimensioning, Dimensioning system, Dimensioning of Arcs and Circles, Angular Dimensioning, Dimension of counter sunk and counter bore.

UNIT III: Geometrical Constructions And Engineering Curves

Divide a line into any number of equal parts by parallel line method, Bisecting of line and angle, Construction of triangles and polygons, Introduction of conic sections (curves), Construction of Ellipse by Eccentricity and Concentric circles methods, Construction of Parabola by Eccentricity and Rectangle methods, Construction of Hyperbola by Eccentricity method, Construction of Cycloid, Construction of Involutes of circle and polygon, Construction of Archimedean Spiral of any number of convolutions

Introduction of scales and their applications, Concept of reducing, enlarging and full size scale, Classification of scales – plain, diagonal, vernier, Scale of chord and comparative scales, Definition of R.F, Construction of plain and diagonal scales.

UNIT IV: Theory of Projections And Projection of Points, Lines And Planes

Definition of various term associated with theory of projection, - Planes of projection, Quadrants, first & third angle projection method,
Projection of points in all the four quadrants,
Projection of lines-
1. Parallel to HP and VP Both.
2. Perpendicular to one plane and parallel to other.
3. Inclined to one plane and parallel to other.
4. Knowledge of projection of line inclined to both the planes (No practice required)
Projection of planes –
1. Perpendicular to HP and VP both.
2. Perpendicular to one plane and perpendicular to other.
3. Inclined to one plane and perpendicular to other.
4. Knowledge of projection of plane inclined to both the planes (No practice required)

UNIT V: Projections & Section of Solids

Projection of cylinder, Cone, prism and pyramid
Under the following conditions:
1. Axis perpendicular to HP and parallel to VP
2. Axis perpendicular to HP and parallel to VP
3. Axis perpendicular to VP and parallel to HP
4. Axis inclined to HP and parallel to VP
5. Axis inclined to VP and parallel to HP
6. Axis inclined to both HP and VP(No Practice required)
Section of cone, cylinder, prism and pyramid

(Solid resting on its base in the HP i.e. the Axis perpendicular to HP and parallel to VP)

1. Section plane parallel to HP and perpendicular to VP
2. Section plane parallel to VP and perpendicular to HP.
3. Section plane inclined to HP and perpendicular to VP
4. Section plane inclined to VP and perpendicular to HP

Introduction of intersection of solid

UNIT VI: Orthographic Projections & Isometric Views

Principles of orthographic projections, Selection of front view, Preparation of necessary orthographic views of simple objects, from given pictorial view, Dimensioning of orthographic views as per standard practice.

Concept of isometric projection and isometric view (Isometric Drawing), Construction of isometric scale, Construction of isometric view of polygon and circle, Construction of isometric view of cone, cylinder, prism and pyramids, Construction of isometric view of simple objects from given orthographic views

Reference Books

1. Engineering Drawing N.D. Bhatt
2. Engineering Drawing R.K. Dhawan
3. Engineering Drawing P.S. Gill
4. First Year Engineering Drawing A.C. Parkinson
5. Sp: 46-1988 Bureau of Indian Standard
6. Principles Of Electronics Malvino
7. Abhiyantrik Aarekhan Shivdatt Upadhyay

DIE015: BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Objectives:

- Understand Electrical Circuits and Measurements.
- Explore Electrical Machines.
- Study Semiconductor Devices and Applications.
- Master Digital Electronics.
- Grasp Fundamentals of Communication Engineering.

Course Outcomes:

- Proficient in Electrical Circuits and Measurements.
- Competent in Electrical Machines.
- Skilled in Semiconductor Devices and Applications.
- Proficient in Digital Electronics.
- Knowledgeable in Communication Engineering.

COURSE CONTENTS

UNIT I: Electrical Circuits & Measurements

Ohm's Law – Kirchoff's Laws – Steady State Solution of DC Circuits – Introduction to AC Circuits – Waveforms and RMS Value – Power and Power factor – Single Phase and Three Phase Balanced Circuits. Operating Principles of Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters), Dynamometer type Watt meters and Energy meters.

UNIT II: Electrical Machines

Construction, Principle of Operation, Basic Equations and Applications of DC Generators, DC Motors, Single Phase Transformer, single phase induction Motor.

UNIT III: Semiconductor Devices And Applications

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Halfwave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Elementary Treatment of Small Signal Amplifier.

UNIT IV: Digital Electronics

Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip- Flops – Registers and Counters – A/D and D/A Conversion (single concepts)

UNIT V: Fundamentals of Communication Engineering

Types of Signals: Analog and Digital Signals – Modulation and Demodulation: Principles of Amplitude and Frequency Modulations. Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fiber (Block Diagram Approach only).

LIST OF EXPERIMENTS

1.   To verify ohm's Law

2.   To verify KVL & KCL.

3.   Measurement of power in a three-phase circuit by two wattmeter Method.

4.   Measurement of efficiency of a single-phase transformer by load test.

5.   Study of characteristic of DC Motor.

6.   DC generator characteristics.

7.   Study of running and reversing of a three-phase induction motor.

8.   Study of a single-phase energy meter

9.   Use of tong tester and load manager.

Reference Books

1. Muthusubramanian R, Salivahanan S and Muraleedharan K A, "Basic Electrical, Electronics and Computer Engineering",Tata McGraw Hill, Second Edition, (2006).

2. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press (2005).

3. Mehta V K, "Principles of Electronics", S.Chand& Company Ltd, (1994).

4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, (2002).

5. Premkumar N, "Basic Electrical Engineering", Anuradha Publishers, (2003).

DIE016P: WORKSHOP PRACTICE

Course Objectives:

o   Perform fitting operations with precision, including marking, sawing, filing, drilling, and tapping.
o   Perform carpentry tasks with proper technique, body posture, and precision, ensuring quality and accuracy in assembly and finishing.
o   Perform blacksmithing tasks such as creating J-hooks, S-hooks, chains, and circles with proper technique and safety measures.
o   Execute sheet metal operations such as shearing, punching, bending, and riveting, following proper procedures and safety measures.

Course Outcomes:

o   They will perform various carpentry joints and operations with precision, ensuring high-quality work and proper assembly.
o   They will use blacksmithing tools and materials effectively and adhere to safety regulations.
o   They will select and use appropriate tools and materials for various sheet metal jobs, ensuring proper joint quality and finish.
o   Students will be able to design and implement house wiring systems, including controlling multiple lamps with various switch configurations.

COURSE CONTENT

UNIT I: Fitting Shop

Introduction to bench working. Work holding devices, measuring instruments, fitting tools and their specification, types of joints fitting operations. Suggested Jobs: Preparation of job by use of filling, sawing, chipping, drilling and tapping operations.

UNIT II: Carpentry

Different types of wood, carpentry tools, different joints, polishing, wood working Lathe. Suggested Jobs: Making of name plate, stools and a small job on wood working lathe.
Unit III: Forging: Introduction to manufacturing process, and its classification, use of various forging tools, forging operations, forging defects. Suggested Jobs: Forging of chisel, forging of screw driver.

UNIT IV: Moulding

Pattern materials, allowances, moulding terminology. Suggested Jobs: Prepare moulds of patterns, casting small household objects like paperweight etc.

UNIT V: Welding

Study and use of gas, Arc, soldering, brazing methods. Safety precaution. Suggested Jobs: Preparing Lap and Butt joints by gas and arc welding method.

UNIT VI: Metal Cutting

Common machining operations, different machine tools, cutting tools materials, different type of Lathes, Lathe operations, shaper and its specification. Quick return mechanism of shaper. Suggested Job: Making small shaft, cutting screw thread on Lathe.

Reference Books

1.   Workshop technology vol. I (Hazra & Chaudhary)
2.   Production technology vol. I (R.C. Patel & C.G. Gupta)
3.   Production technology vol. I (Dalela)
4.   Work shop technology vol. I (Raghuwanshi)
5.   Work shop technology vol. I (Chapman)
6.   Workshop Vol. I (P.N. Vijayvargiya) (Hindi medium)

DIE017: BASICS OF INDIAN CONSTITUTION

Course Objectives:

- Constitutional rights and duties, perspective andremedies.
- To realize the significance of constitution of India to students from all walks of life and help them to understand the basic concepts of Indian constitution

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand and explain the significance of Indian Constitution as the fundamental law of the land.
- Exercise his fundamental rights in proper sense at the same time identifies his responsibilities in national building.

Fundamental Rights – I

Definition of State‟ for Enforcement of Fundamental Rights: Justifiability of Fundamental Rights, Doctrine of Eclipse, Severability, Waiver.

Right to Equality (Articles14-18): Doctrine of Reasonable Classification and the Principleof Absence of Arbitrariness, Legitimate Expectations, Principle of Compensatory Discrimination.

Fundamental Freedom (Article 19): Freedom of Speech and Expression, Freedom ofPress and Media; Expansion by Judicial Interpretation of Article19; Reasonable Restrictions (Article19 clause (2)to(5).

Fundamental Rights – II

Right to Life and Personal Liberty (Articles 20-22): Scope and Content (Expansive Interpretation-Right to Privacy, Gays‟ Rights, Live-in Relationships, etc.).

Right to Education (Article 21A): RTE Act, 2009.

Right against Exploitation (Articles23-24): Forced Labour, Child Employment and Human Trafficking.

Freedom of Religion and Cultural and Educational Rights of Minorities(Articles 25-30).

Right to Constitutional Remedies

Writs: Habeas Corpus, Mandamus, Certiorari, Prohibition and Quo-warranto

Art. 32 and Art. 226

Judicial Review

Writ Jurisdiction and Private Sector

Directive Principles and Fundamental Duties

Nature and Justiciability of the Directive Principles

Detailed Analysis of Directive Principles (Articles 37-51)

Fundamental Duties d. Inter-Relationship between Fundamental Rights and (51 A) DirectivePrinciples

SARDAR PATEL UNIVERSITY, BALAGHAT (MP)

School of Engineering and Technology

Syllabus

Course: Diploma in Engineering

Branch: MMS, ME, CE, CSE, ELE

Academic Session: 2024-25

w.e.f-02/09/2024

References Books

1. V.N. Shukla, Constitution of India, Eastern Book Agency, 2014
2. M.P. Jain, Indian Constitutional Law, Lexis Nexis, 2013
3. D.D. Basu, Introduction to the Indian Constitution of India, Prentice Hall of India PrivateLtd., New Delhi, 1994
4. H. M. Seervai, Constitutional Law of India, Universal Law Publishing Co., Reprint, 2013
5. Glanville Austin, Indian Constitution-Cornerstone of the Nations, Oxford University Press, 1999
6. P.M. Bakshi, The Constitution of India, Universal Law Publishing Co., 2014