

TRIPURA UNIVERSITY
(A Central University)

SYLLABUS OF DIPLOMA COURSES

**FIRST SEMESTER
(For all Branches)**

SYLLABUS FOR DIPLOMA COURSES IN

- CIVIL ENGINEERING
- MECHANICAL ENGINEERING
- ELECTRICAL ENGINEERING
- ELECTRONICS AND TELECOMMUNICATION ENGINEERING
- COMPUTER SCIENCES AND ENGINEERING
- AUTOMOBILE ENGINEERING
- FOOD PROCESSING ENGINEERING
- INTERIOR DECORATION HANDICRAFTS AND FURNITURE DESIGNING
- INFORMATION TECHNOLOGY
- FASHION TECHNOLOGY
- MEDICAL LAB. TECHNOLOGY

First Semester

Sl No	Theoretical Papers					Sessional			
	1 st Half	2 nd Half	Marks	CPW	C	Sessional / Lab	Marks	CPW	C
1	Ec EIT-101	ECIT EIT-101	100	4	4	Comp Application Lab CAL-105	100	4	2
2	EP – I EPC -102	EC – I EPC -102	100	4	4	Physics Lab-I PCL-106	50	2	1
3	EE EDM-103	DM EDM-103	100	4	4	Chemistry Lab – I PCL-106	50	2	1
4	Engg Math – I ENM-104		100	4	4	Engineering Drawing - I EDL-107	100	4	2
5						Workshop Practice WPL - 108	100	4	3
Total			400	16	16		400	20	9

The meaning of the abbreviations –

CPW – Contact Period per Week

C - Credits

Ec – English Communications

ECIT – Elements of Information
Technology

EP – I – Engineering Physics – I

EC – I – Engineering Chemistry – I

EE – Environmental Engineering

DM – Disaster Management.

Second Semester

Sl. No	Theoretical Paper					Sessional / practical paper			
	1 st half (50mark)	2 nd half (50 mark)	Mark	C P W	Credit	Name of Sessional / Lab	Mark	C P W	Credit
i	Engineering Economics EEA 201	Financial Accounting – EEA 201	100	4	4	Basic Electrical & Electronics Lab – EEL – 205	100	4	2
ii	Engg. Physics-II – EPC 202	Engg. Chemistry-II – EPC 202	100	4	4	Physics Lab-II – PCL – 206	50	2	1
iii	Engg. Mechanics & Graphics – EME – 203	Elements of Electrical & Electronics Engg. – EME – 203	100	4	4	Chemistry Lab-II – PCL - 206	50	2	1
iv	Engg. Mathematics-II – ENM - 204		100	4	4	Engg. Drawing-II CDL - 207	50	3	1
v						Communication Skill- I – CDL - 207	50	2	1
vi						Workshop Practice-II – WPL - 208	100	6	3
			400	16	16		600	20	09

Theoretical & Practical / Sessional subjects : 70% marks for end semester exam & 30% marks for internal assessment.

EIT - 101
First Half
ENGLISH COMMUNICATION
Full Marks – 35+15

MODULAR DIVISION OF THE SYLLABUS & EXAMINATION SCHEME

DETAIL COURSE CONTENT

MODULE – 1 READING & REMEDIAL GRAMMAR

1.1 DEVELOPING READING SKILLS

Skimming – Scanning – Reading for information Structure

1.2 REMEDIAL GRAMMAR

TIME & TENSE — TRANSFORMATION OF SENTENCES: Active<-->Passive, Direct<-->Indirect, Relative Clauses — LANGUAGE FUNCTION: Reporting, Suggesting, Agreeing, Defining, Purpose, Instruction, Prohibition

MODULE – 2 NOTE – TAKING

- 2.1 Importance of note-taking
- 2.2 Recognising important information in spoken and written texts
- 2.3 Concept of Linkers
- 2.4 Use of abbreviations, charts, diagrams and symbols in note-taking
- 2.5 Different ways of note-taking

Module – 3 WRITING PARAGRAPHS

- 3.1 Identifying Paragraphs
- 3.2 Using Linkers in Paragraphs
- 3.3 Developing Notes into Paragraphs
- 3.4 Identifying & writing Topic Sentences and Supporting Sentences
- 3.5 Recognising different types of paragraph organization and process writing

MODULE – 4 WRITING REPORTS

- 4.1 Format for writing different types of report using sentence structure and grammatical forms
- 4.2 Laboratory Reports
- 4.3 Workshop Reports
- 4.4 Investigative Reports

TEXT BOOK AND OTHER RECOMMENDED BOOKS

ENGLISH SKILLS for Technical Students – TEACHERS’ HANDBOOK / West Bengal State Council of Technical Education in collaboration with THE BRITISH COUNCIL / Orient Longman – Business Correspondence and Report Writing, by Krishna Mohan & C. Sharma – Business Correspondence, by V.G. Natu and C Kaur – Professional Communication Skills, by Pravin Bhatia and A.M. Shaikh – A Guide to Business Correspondence and Communication Skills, by A.N. Kapoor – English Grammar, by Wren & Martin.

EIT - 101**Second Half, Full Marks – 35+15
Elements of Information Technology****GROUP – A****Module 1 INTRODUCTION TO COMPUTER**

Evolution of computer through different generations — Classification of computer — Block diagram of a computer system — Brief description of each functional unit of computer with examples: Input Devices – Output Devices – Central Processing Unit (Control Unit & Arithmetic Logic Unit) – Primary Memory (Read Only Memory & Random Access Memory) — Secondary Memory

Module 2 REPRESENTATION OF INFORMATION

NUMBER SYSTEM: Binary, Octal & Hexadecimal and conversion of each system to any another system — Positive & Negative number representation (1's & 2's complements) — Character Codes (ASCII, EBCDIC)

GROUP – B**Module 3 DATA PROCESSING**

Information & Data: Data types – Record Structure – Concept of File Structure – Directories & Folders

Module 4 SOFTWARE CONCEPTS

Importance of Software — Application Software — Systems Software — Necessity of Operating System with examples — Elementary DOS commands: Internal & External commands , Utility of Batch file — Basic functions of Translator — Difference between Compiler, Assembler & Interpreter — Classification of programming languages: High & Low Level Languages (definitions with examples)

GROUP – C**Module 5 INTRODUCTORY CONCEPTS**

Problem solving through flowcharting

Module 6 ELEMENTARY PROGRAMMING WITH BASIC

Line Number — Constants & Variables — Operators & Formulae (Expressions) — Hierarchy of Operations — ASSIGNING VALUES: The LET statement — READING INPUT: The INPUT & READ/DATA statements — PRINTING OUTPUT: The PRINT statement — PROGRAM TERMINATION: The STOP & END statements — PROGRAM COMMENTS: REM statement — TRANSFERRING CONTROL: The GOTO statement — BRANCHING: The IF-THEN & IF-THEN-ELSE statements — LOOPING: FOR-TO/NEXT & WHILE/WEND statements — ARRAY (one dimensional): The DIM statement — STRING MANIPULATION: LEN(X\$), STR\$(X), ASC(X\$), VAL(X\$), LEFT\$, RIGHT\$, MID\$

Module 7 FILE MANAGEMENT IN BASIC

Handling of sequential file — Giving a name to a file — Writing to or reading from a file — Closing a file

REFERENCE BOOKS

1. Computer Applications for Beginners / H Rahaman & P Mondal
2. Computer Applications for Polytechnic Students / Gautam Roy
3. A Guide book on computer Applications for Diploma Students / Chittaranjan Rout
4. Computer Awareness / S Rai & R Ghosh
5. P C Software / Taxali
6. THEORY AND PROBLEMS OF PROGRAMMING WITH BASIC / Byron S. Gottfried / Schaum's Outline Series, McGraw-Hill Book Company

EPC - 102**First Half, Full Marks – 35+15****Engineering Physics - I****GROUP – A****Module 1 UNITS & DIMENSION**

- 1.1 Fundamental and derived units (SI)
- 1.2 Proportional and percentage of errors – examples & simple numerical problems.
- 1.3 Dimension of physical quantities – Principle of dimensional homogeneity – limitations of dimensional analysis – simple numerical problems.

Module 2 KINEMATICS I

- 2.1 Rest and Motion – Displacement, Velocity, Acceleration, Momentum (definitions & SI units). Position vs. Time graph & Acceleration vs. Time graph. Introduction to Equations of motion.
- 2.2 Vectors – Idea about Unit vector, collinear vector, Negative vector & Zero vector (definitions only). Resolution of vectors in a plane. Laws of vector addition & subtraction, Scalar & vector product.
- 2.3 Force & Friction – Force & Inertia(definitions only), Newton's Laws of Motion, Impulse, Conservation of momentum (simple numerical problem), Idea of Friction, Laws of limiting friction, Angle of friction & angle of repose (definitions only), Methods to reduce friction.
- 2.4 Circular motion - Angular displacement-Angular velocity- Angular acceleration (definitions and relation among them), Concept of centripetal & centrifugal force.

Module 3 GENERAL PROPERTIES OF MATTER

- 3.1 Gravitation: Newton's Law of Gravitation – Relation between g and G – Variation of 'g'-Escape velocity (concept, no deduction of formula)- simple numerical problem.

- 3.2 Elasticity and plasticity: Elasticity and plasticity (concept only) – Stress and strain (definition) – Hook’s Law – Modulus of elasticity, Poisson’s Ratio (σ) – Simple numerical problems.
- 3.3 Pressure: Pressure & Thrust (definitions & SI units) – Pressure inside a fluid– Archimedes' Principle (statement) – Buoyancy and condition of floatation in equilibrium.

GROUP – B

Module 4 WORK, POWER & ENERGY

- 4.1 Concept and explanation of - Work, Power & Energy with their SI units— Mechanical energies: Kinetic Energy & Potential Energy – Law of Conservation of Energy – (numerical problems), Work done against friction.

Module 5 HEAT

- 5.1 HEAT & TEMPERATURE: Difference between heat & temperature-Relation between Celsius & Kelvin scales of temperature (numerical problems).
- 5.2 EFFECT OF HEAT ON MATTER: SOLID MATTER: Expansion co-efficient, their relation and change of density with temperature (numerical problems) — LIQUID MATTER: Two expansion co-efficient, their relations – Anomalous expansion of water (no problems) — GASEOUS MATTER: Ideal gas, Boyles' Law, Charles' Law, Law of Pressure – Ideal Gas Equation, $PV = nRT$ (dimension & SI unit of R) – Numerical problems
- 5.3 Heat Transfer – Conduction, convection & radiation – Thermal conductivity (definition & S.I unit).
- 5.4 Heat Exchange – Specific heat-water equivalent-latent heat (definitions and S.I unit), Principle of calorimetry.

Module 6 OSCILLATIONS

- 6.1 VIBRATIONS - Distinguish between periodic motion & Simple Harmonic Motion – Characteristic of S.H.M. –Equation of S.H.M. – Displacement, velocity and energy of harmonic oscillator – Application: Measurement of Time Period (simple pendulum, floating body, oscillations of spring and liquid column in U-tube).
- 6.2 ELASTIC WAVES - Longitudinal & transverse waves (definitions), Velocity of sound (Newton’s & Laplace’s formula) – Effect of density, pressure, temperature and humidity on velocity of sound.

EPC - 102**Second Half, Full Marks – 35+15****Engineering Chemistry –I****GROUP - A****MODULE 1 : ACIDS, BASES, ELECTROLYSIS**

Different units for measurement of concentration of solutions viz. normality, molarity, molality and percentage strength, pH value, neutralization reaction Indicators and their choice, Buffer solution Principles of acidimetry and alkalimetry, Electrolysis (Arrhenius Theory, Faraday's Laws, Simple numerical problems on electrolysis, Electroplating, Electrotyping, Nernst equation.

MODULE 2 : OXIDATION, REDUCTION

Oxidation and Reduction, Balancing of equations by Ion-electron method, Redox titrations

MODULE 3 : CHEMICAL BONDING

Types of Bond – ionic, covalent, hydrogen bond and metallic bond, Concept of hybridization, VSEPR theory, Structure of simple molecule, crystalline and amorphous solids, Structure of diamond, graphite and sodium chloride.

GROUP – B**MODULE 4 : ATOMIC STRUCTURE**

Rutherford – Bohr model of atom, quantum number, electronic configuration of atom, (orbital concept) Aufbau Principle, Law of Mass Action, La Chateliers Principle, Industrial preparation of Ammonia, Nitric acid & Sulphuric acid (Physiochemical properties).

MODULE 5: METALLURGY

Minerals, ores, flux, slag, General method of extraction of metals with reference to Iron, Copper and Aluminium [detailed method of extraction is excluded]. Composition and uses of alloys (Brass, Bronze, German Silver, Duralumin, Nichrome, Bell metal, Stainless steel), Amalgams, Properties and uses of Cast Iron Wrought Iron and Steel, Composition and uses of different alloy steels.

GROUP – C**MODULE 6: ORGANIC CHEMISTRY**

General features of Organic compounds, their differences from inorganic compounds, classification, Homologous series, Functional groups, Isomerism, IUPAC Nomenclature of simple organic compounds, Preparation and uses of Ethylene, Acetylene and Ethyl Alcohol.

EDM – 103**First Half, Marks 35 +15****ENVIRONMENTAL ENGINEERING****AIR & ENVIRONMENT****INTRODUCTION**

Man & Environment: Overview (socio-economic structure & occupational exposures) – Scope of Environmental Engineering – pollution problem due to urbanisation & industrialisation

AIR POLLUTION:

Causes of air pollution – types & sources of air pollutants – Climatic & Meteorological

effect on air pollution concentration – formation of smog & fumigation,

AIR POLLUTION CONTROL MEASURES & EQUIPMENT

Control of Particulate Emission – Control of Gaseous Emission – Flue Gas Treatment Methods: Stacks Gravitational and Inertial Separation, Settling Chambers, Dynamic Separators, Cyclones, Filtration, Liquid Scrubbing, Spray Chambers, Packed Towers, Orifice and Venturi Scrubbers, Electrostatic Precipitators, Gas/solid Adsorption, Thermal Decomposition

WATER & ENVIRONMENT**WATER SOURCES**

Origin of wastewater — Type of water pollutants and their effects

DIFFERENT SOURCES OF WATER POLLUTION

Biological Pollution (point & non-point sources) – Chemical Pollutants: Toxic Organic & Inorganic Chemicals – Oxygen demanding substances – Physical Pollutants: Thermal Waste – Radioactive waste – Physiological Pollutants: Taste affecting substances – other forming substances.

WATER POLLUTION & ITS CONTROL

Adverse effects on: Human Health & Environment, Aquatic life, Animal life, Plant life — Water Pollution Measurement Techniques – Water Pollution Control Equipments & Instruments – Indian Standards for Water Pollution Control.

SOIL & ENVIRONMENT**SOIL POLLUTING AGENCIES & EFFECT OF SOLUTION**

Liquid & Solid Wastes – Domestic & Industrial Wastes – Pesticides – Toxic: Inorganic & Organic Pollutants – Soil Deterioration – Poor Fertility, Septicity, Ground Water Pollution, Concentration of Infecting Agents in Soil.

NOISE & ENVIRONMENTAL MANAGEMENT SYSTEM

NOISE POLLUTION & CONTROL

Noise Pollution: Intensity, Duration – Types of Industrial Noise – Ill effects of Noise – Noise Measuring & Control – Permissible Noise Limits.

REFERENCE BOOKS

1. Concept of Ecology / Kormondy / Prentice Hall of India, New Delhi
2. Fundamental of Ecology / Odum
3. Environmental Science / J. Turk & A. Turk
4. Human Rights – A Source Book Eds. / R. Dev & S. Das / NCERT
5. Environmental Pollution / Dix
6. Pollution Control Acts, Rules and Notification / Central Pollution Control Board, New Delhi

EDM – 103

Second Half, 35+15 Marks

Disaster Management

- Introduction :- Disaster & it's various forms.
- Elements of Engineering Seismology :- Earthquake occurrence in the world, causes of earthquake, seismic zoning map of India and its use.
- Earthquake Phenomenon:-Focus, epicenter, seismic waves, magnitude, intensity, intensity scale and its correlation with ground. Guide lines on construction of Earthquake resistant House.Do's and Don'ts for protection of life and property during disaster.
- Land Slides: Causes of Landslides and control of Landslide Hazard.
- Flood: Flood control as a measure of Disaster Management and Mitigation
- Cyclone and Fire: Cyclone Disaster Mitigation and ensuring wind and fire hazard safety during disaster.
- Reference BIS codes for earthquake, wind and fire resistant constructions.

References:

1. Earthquakes Tips/ Murty, C. V.R., NICEE, IIT Kanpur (www.nicee.org)
2. Earthquakes/Bolt, B.A., W.H. Freeman and Company, New York, USA.
3. Vulnerability Atlas of India, BMTPC (Building materials and Technology Promotion Council) Ministry of Urban Development, Government of India,New Delhi.
4. A text book of Engineering Geology/ Kesabalu
5. Irrigation Engineering- by N.N. Basak
6. Building Construction-By B.C. Punmia.
7. Flood control and Drainage Engineering/ Ghosh, S.N., Oxford and IBH Publishing Co Pvt Ltd.

8. Disaster Management Approaches and strategies / Tej Singh/ Akansha Publishing House, New Delhi
9. Irrigation and water Resources Engineering/ Aswa, G.L./ New age International Publishers.

ENM - 104

Engineering Mathematics-I

70+30 Marks

1st Half

GROUP - A

Module 1 ALGEBRA (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)

- 1.1 Quadratic Equations – Quadratic expressions – Analysing the discriminant & nature of roots – Relation between roots & coefficients – Conjugate roots – Applications & problems
- 1.2 Binomial Theorem – Definition & meaning of ${}^n P^r$ & ${}^n C^r$ – statement of Binomial Theorem (no proof) – General Term – Middle Term – Application & problems
- 1.3 Concept of vector - Addition and subtraction of vectors – Multiplication of a vector by a scalar – Position vector of a point – Ratio formula – Rectangular resolution of a vector – Dot and cross product – Geometrical interpretation – Distributive law – Applications.
- 1.4 Complex Numbers – Definition – Geometric Representation – Modulus – Amplitude – Polar form – Rationalization – Addition & multiplication – Conjugate complex number – Cube roots of unity- simple problems.
- 1.5 Variation, A.P, G.P – formula & simple problems.

Module 2 TRIGONOMETRY (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)

- 2.1 Trigonometric Ratios of associated angles, compound angles, multiple & submultiple angles (no deduction) – Related problems
- 2.2 Inverse circular function – Definition – Formulae & problems
- 2.3 Solution of Trigonometric equations between 0 & 2π only (no deduction)
- 2.4 Properties of Triangle – Formulae & Problems

GROUP - B

Module 3 CO-ORDINATE GEOMETRY OF TWO DIMENSION (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)

- 3.1 Co-ordinate system – Cartesian & polar – Distance between two points – Area of a triangle.
- 3.2 Straight line - Different forms of equations of a straight line – Angle between two straight lines – Parallelism & perpendicularity – Equation of bisectors of the angles between two straight lines – Problems
- 3.3 Circle - Different forms of equation – Common chord – Problems
- 3.4 Conic section - Different forms of equation of parabola & their components – Standard equation of an Ellipse – Different components of an ellipse – Focal distance of a point

2nd Half**G R O U P - C****Module 4 DIFFERENTIAL CALCULUS (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)**

- 4.1 Function – Even – Odd – Periodic – Limit – Theorems on limit – Important limits – Evaluation of limits – Definition of Continuity – Theorems of continuity – Testing of Continuity Problems
- 4.2 Differentiation - Definition – Derivative of standard functions – Rules for differentiation of function – Logarithmic differentiation – Differentiation of I.C.F. – Differentiation of parametric & implicit function – Problems
- 4.3 Successive differentiation up to second order – Problems

Module 5 INTEGRAL CALCULUS (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)

- 5.1 Integration as the inverse process of differentiation – List of formulae for integration – Method of substitution – Integration by parts – Integration by partial fraction – Evaluation of integrals by each of the above methods
 - 5.2 Definite integral – Rules & properties of definite integral (statement only) – Evaluation of definite integrals
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CAL – 105
Full Marks – 70+30

COMPUTER APPLICATIONS LAB
(FOR ALL DISCIPLINES)

DETAIL COURSE CONTENT

MODULE 1 FAMILIARIZATION WITH COMPUTER SYSTEM & PERIPHERALS

1. To be familiarized with booting of a computer.
2. To handle files with DOS commands.
3. To create Batch File.
4. To handle diskettes.
5. To study features of WINDOWS.
6. To handle printers.

Module 2 WORD PROCESSOR

1. To create and save a word document.
2. To select text to copy and move.
3. To format and align text.
4. To print a text document by setting margin.
5. To align text vertically.
6. To change page orientation and paper size.
7. To mail merge.
8. To work with tables.

Module 3 SPREADSHEET

1. To create a worksheet.
2. To make changes in the worksheet and saving a worksheet.
3. To insert and delete rows & columns.
4. To adjust column width & row height.
5. To edit & delete cell contents.
6. To sort a worksheet.
7. To use simple formulae like SUM, AVERAGE etc.
8. To use operators (arithmetic, comparison).
9. To print a worksheet.

Module 4 PRESENTATION PACKAGE

1. To create a new presentation.
2. To be familiarized with templates (Creating a new blank presentation – Saving a presentation – Closing a presentation – Opening an existing presentation).
3. To work with slides (Creating a title slide – Adding new slides – Changing a slide's layout – Editing slide text).
4. To view & move slides (practice).
5. To print slides.

Module 5 APPLICATIONS IN BASIC

The following applications are suggested for practice. These elementary problems are mere suggestions. The teachers may give the students other application problems of similar order of difficulty. But at least ten programs are to be written with at least three dealing with string constants & variables.

1. To write a program to find the roots of a quadratic equation.

2. To write a program to find the area and circumference of a circle.
3. To write a program to read a list of numbers and print the sum of first n natural numbers.
4. To write a program to read a list of numbers and print the sum of first n even (or odd) numbers.
5. To write a program to find the maximum or minimum of n numbers.
6. To write a program to find the greatest common divisor of two numbers.
7. To write a program to determine whether a triangle can be formed or not using three given line segments.
8. To write a program to input few numbers and to find the average of them.
9. To generate the Fibonacci Numbers.
10. To write a program to check whether a given number is prime or not.
11. To write a program to count the number of times a particular character has appeared in a sentence.
12. To write a program to reverse a given string and to check whether it is a Palindrome or not.
13. To write a program which will read a word and rewrite it in alphabetically.
14. To write a program to arrange n number of given names alphabetically.
15. To write a program to arrange the letters of a given word in all possible permutations & combinations.

REFERENCE BOOKS

1. Computer Applications for Beginners / H. Rahaman & P. Mondal
 2. Computer Applications for Polytechnic Students / Gautam Roy
 3. A Guide book on computer Applications for Diploma Students / Chittaranjan Rout
 4. Computer Awareness / S Rai & R Ghosh
 5. P C Software / Taxali
 6. THEORY AND PROBLEMS OF PROGRAMMING WITH BASIC / Byron S. Gottfried / Schaum's Outline Series, McGraw-Hill Book Company
 7. Comdex Computer Course Kit: Revolutionary 3-Stage Self-learning System (Book + CD) / Vikas Gupta / dreamtech press, 19-A Ansari Road, Daryaganj, New Delhi – 110 002
 8. Introduction to Computers with MS-Office 2000 / Alexis Leon & Mathews Leon / Tata McGraw-Hill Publishing Company Limited, New Delhi
 9. Training Guide: Microsoft Word 2000 / Maria Reid / BPB Publications, B-14, Connaught Place, New Delhi – 110 001
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PCL – 106
First Half, Full Marks – 35+15

PHYSICS LAB-1

(FOR ALL DISCIPLINES)

DETAIL COURSE CONTENT

1. To determine the density of thin solid rod using common balance and slide callipers; diameter of the rod is to be measured by screw gauge.
2. To determine the specific gravity of solid insoluble in water by hydrostatic balance.
3. To determine the specific gravity of sand by specific gravity bottle.
4. To verify Boyle's Law by Boyle's Law apparatus.
5. To determine the velocity of sound (at Normal Temperature & Pressure) by resonance air column method.
6. To determine the Young's modulus of elasticity of steel wire by Searle's method.
7. To determine the gravitational acceleration by using simple pendulum.

PCL – 106
Second Half, Full Marks – 35+15

CHEMISTRY LAB - I

(FOR ALL DISCIPLINES)

DETAIL COURSE CONTENT

1. To identify the following basic radical by dry and wet test :
Pb, Cu, Al, Fe, Zn, Ca, Mg, Na, NH₄, K.
2. To identify the following acid radical by dry and wet test :
Cl, SO₄, NO₃, CO₃
3. To identify 1(one) acid radical and 1(one) basic radical of an unknown water soluble salt.
4. To perform titration of N/10 alkali solution with an un known strength of acid solution.

EDL – 107

Full Marks – 70+30

ENGINEERING DRAWING-I

(FOR CSE, ETCE, IT, EE)

DETAIL COURSE CONTENT**Module 1 INTRODUCTION TO DRAWING INSTRUMENTS & THEIR USES**

Module 2 Drawing Instruments — Drawing Board — Drawing Sheets & their sizes — Compasses — Scales — Drawing Pencils — How to begin a drawing.

Module 3 BIS CONVENTIONS

ISO and BIS — Types of Lines — Layout of Drawing Sheets — Border Lines — Title Block — Folding of Drawing Sheets — Dimensioning.

Module 4 INTRODUCTION TO LETTERING

Uniformity — Legibility — Size

Module 5 LETTERING

Single stroke vertical and inclined Roman alphabets (in both upper & lower cases) and numerical as per the Bureau of Indian Standards.

Module 6 GEOMETRICAL CONSTRUCTION

Drawing of a line passing through 'n' number of given points — Dividing a straight line into 'n' number of equal parts — Construction of regular polygons — Inscribing a regular polygon in a circle.

Module 7 INTRODUCTION TO SCALES

Concepts of: Full size scale – Reducing scale – Enlarging scale – Representative Fraction – Plain scale – Diagonal scale – Vernier scale.

Module 8 SCALES

Construction of: Plain scale – Diagonal scale – Vernier scale.

Module 9 CURVES

Construction of curves based on engineering practice: Ellipse – Parabola – Hyperbola – Cycloid – Epicycloids – Spiral.

Module 10 INTRODUCTION TO THE PRINCIPLES OF ORTHOGRAPHIC PROJECTION

Projectors & Plane of Projection — Vertical Plane & Horizontal Plane — Front & Top Views — Four Quadrants — First Angle Projection — Auxiliary Vertical Plane — Side View (Demonstration with models).

Module 11 ORTHOGRAPHIC PROJECTIONS OF POINTS

Notation system — Points in First, Second, Third and Fourth quadrants

Module 12 ORTHOGRAPHIC PROJECTIONS OF STRAIGHT LINES

Projection of straight lines under the following conditions: (a) Parallel to both the planes, (b) Perpendicular to one plane & parallel to the other, and, (c) Inclined to one or both the planes — True length & true inclinations — Traces: Vertical Traces & Horizontal Traces.

Module 13 ORTHOGRAPHIC PROJECTIONS OF LAMINA

Projection of triangular, rectangular, square, pentagonal, hexagonal & circular lamina as follows:
Perpendicular planes – Oblique planes.

Module 14 ORTHOGRAPHIC PROJECTIONS OF RIGHT REGULAR SOLIDS

- (a) Right & Oblique solids (concept only) — Regular Polyhedra — Prisms — Pyramids — Solids of Revolution (Cylinder & Cone) — Projection of the above solids in their Simple Positions
- (b) Projection of the solids mentioned above under the following conditions: Axis parallel to both the planes — Axis perpendicular to one plane & parallel to the other — Axis inclined to one plane & parallel to the other — Axis inclined to both Horizontal Plane & Vertical Plane.

EDL – 107

Full Marks – 70+30

ENGINEERING DRAWING-I

(FOR CE, ME, AE, IDHFD, FPT, FT, MLT)

Module 1 INTRODUCTION TO DRAWING INSTRUMENTS & THEIR USES

Drawing Instruments — Drawing Board — Drawing Sheets & their sizes — Compasses — Scales — Drawing Pencils — How to begin a drawing.

Module 2 BIS CONVENTIONS

ISO and BIS — Types of Lines — Layout of Drawing Sheets — Border Lines — Title Block — Folding of Drawing Sheets — Dimensioning.

Module 3 INTRODUCTION TO LETTERING

Uniformity — Legibility — Size

Module 4 LETTERING

Single stroke vertical and inclined Roman alphabets (in both upper & lower cases) and numerical as per the Bureau of Indian Standards.

Module 5 GEOMETRICAL CONSTRUCTION

Drawing of a line passing through 'n' number of given points — Dividing a straight line into 'n' number of equal parts — Construction of regular polygons — Inscribing a regular polygon in a circle.

Module 6 INTRODUCTION TO SCALES

Concepts of: Full size scale – Reducing scale – Enlarging scale – Representative Fraction – Plain scale – Diagonal scale – Vernier scale.

Module 7 SCALES

Construction of: Plain scale – Diagonal scale – Vernier scale.

Module 8 CURVES

Construction of curves based on engineering practice: Ellipse – Parabola – Hyperbola – Cycloid – Epicycloids – Spiral.

Module 9 INTRODUCTION TO THE PRINCIPLES OF ORTHOGRAPHIC PROJECTION

Projectors & Plane of Projection — Vertical Plane & Horizontal Plane — Front & Top Views — Four Quadrants — First Angle Projection — Auxiliary Vertical Plane — Side View (Demonstration with models).

Module 10 ORTHOGRAPHIC PROJECTIONS OF POINTS

Notation system — Points in First, Second, Third and Fourth quadrants

Module 11 ORTHOGRAPHIC PROJECTIONS OF STRAIGHT LINES

Projection of straight lines under the following conditions: (a) Parallel to both the planes, (b) Perpendicular to one plane & parallel to the other, and, (c) Inclined to one or both the planes — True length & true inclinations — Traces: Vertical Traces & Horizontal Traces.

Module 12 ORTHOGRAPHIC PROJECTIONS OF LAMINA

Projection of triangular, rectangular, square, pentagonal, hexagonal & circular lamina as follows: Perpendicular planes – Oblique planes.

Module 13 ORTHOGRAPHIC PROJECTIONS OF RIGHT REGULAR SOLIDS

- (c) Right & Oblique solids (concept only) — Regular Polyhedra — Prisms — Pyramids — Solids of Revolution (Cylinder & Cone) — Projection of the above solids in their Simple Positions
- (d) Projection of the solids mentioned above under the following conditions: Axis parallel to both the planes — Axis perpendicular to one plane & parallel to the other — Axis inclined to one plane & parallel to the other — Axis inclined to both Horizontal Plane & Vertical Plane.

Module 15 SECTION OF SOLIDS

Section views — Section planes — True shape of section — Section lines — Section of Right Regular Solids under the following conditions: Section plane perpendicular to one principal plane & parallel to the other — Section plane perpendicular to one principal plane & inclined to the other — Section plane perpendicular to both the principal planes.

Module 16 INTERSECTION OF SURFACES

Classification — Line of Intersection — Line/Generator method — Section plane method — Intersection of two prisms — Intersection of two cylinders — Intersection of cone and cylinder.

Module 17 DEVELOPMENT OF SURFACES

Parallel Line development method — Radial Line development method — Development of Surfaces of whole & truncated Right Regular Solids.

Module 18 INTRODUCTION TO DIFFERENT PICTORIAL VIEWS

Necessity of Pictorial view — Isometric — Axonometric — Perspective (concepts only).

Module 19 ISOMETRIC VIEWS & PROJECTIONS

Difference between isometric view & isometric projection — Isometric axes — Isometric & non-isometric lines — Isometric scale — Isometric views & projections of regular geometrical lamina — Four Centre method — Isometric views & projections of whole & truncated right regular solids

WPL – 108
Full Marks – 70+30
Workshop Practice
(For CSE, IT , ETCE & EE)

Group A ELECTRICAL SHOP
DETAIL COURSE CONTENT

1.0 GENERAL SHOP TALK

- 1.1 General safety & precautions taken in Electrical Workshop
- 1.2 Electric shock, methods of shock treatment
- 1.3 Fuse and safety measure(MCB)
- 1.4 Earthing as safety measure — I.E. Rule – 61 — Different types of Earthing
- 1.5 Different types of wire-gauge & strands, applications
- 1.6 Different tools used Electrical wiring installations — Applications
- 1.7 Selection of electrical wiring materials

2.0 PRACTICES*

- 2.1 PVC Wiring in Casing and Conduit Wiring (PVC Conduit) for one light, one fan & one plug point
- 2.2 Wiring of Calling-Bell Indicator
- 2.3 Making of a Series-Parallel Board and testing of different equipments & house-hold appliances with it
- 2.4 Connection of Twin-Fluorescent Tube (AC/DC) and measurement of current & voltage across each component
- 2.5 Wiring of one lamp controlled by Two-Way Switches / Intermediate Switches for staircase lighting
- 2.6 Connection of ceiling fan and familiarization with common troubles — Remedies
- 2.7 Cable and O/H wire joining: Britannia Joint – Western Union Joint – Married Joint – Tee Joint – Sleeve Joint
- 2.8 Measurement of Earth Resistance by Megg-earth Tester
- 2.9 Connection of single-phase Energy Meter
- 2.10 Demonstration of installed Pump-Motor set

* N.B. ITEM 2.10 IS COMPULSORY AND THE STUDENTS ARE TO UNDERGO ANY 6 OUT OF THE REST 9 PRACTICES.

LIGHTING SCHEMES

Types of lighting scheme and factors considered for designing lighting schemes i.e. illumination level, uniformity of illumination, colour of light, glare, mounting height, spacing between luminaries, colour of surrounding walls etc.

Group B ELECTRONICS SHOP

DETAIL COURSE CONTENT

UNIT - I SHOP THEORY

- 1.1 Common Assembly tools.
- 1.2 Identification of Basic Components; both active & passive
- 1.3 Use of Multimeter (both Analog and digital).
- 1.4 Rules for soldering & de-soldering.
- 1.5 Rules of component mounting and harnessing.

- 1.6 Artwork Materials in PCB design, General artwork rules, taping guidelines.

UNIT - II PRACTICES

- 2.1 Identification of basic components: Passive- resistors, Capacitors, Inductors/Coils, Transformers, relays, switches, connectors; Active- Batteries/cells, diode, transistors (BJT, FET) SCR, diac, Triac, LED, LCD, Photo-diode, Photo-transistors.
- 2.2 Use of Multimeters to test components and measurement of circuits, Voltage, resistance etc.
- 2.3 Soldering and de-soldering practice
- 2.4 Component mounting practice
- 2.5 Wire harnessing practice

General artwork practice on graph sheets and taping practice on mylar sheet.

WPL – 108
Full Marks – 70+30

WORKSHOP PRACTICE

(FOR CE, ME, AE, FPT, IDHFD)

Group- A

MODULE – 1 CARPENTRY SHOP

DETAIL COURSE CONTENT

1.0 GENERAL SHOP TALK

- 1.1 Name and use of raw materials used in carpentry shop: wood & alternative materials
- 1.2 Names, uses, care and maintenance of hand tools such as different types of Hack-saws, Chisels, Mallets, Carpenter's vices, Marking gauges, Try-squares, Rulers and other commonly used tools used in carpentry shop
- 1.3 Specification of tools used in carpentry shop

2.0 PRACTICES

2.1 PRACTICES FOR BASIC CARPENTRY WORK

- (a) Sawing practice using different types of saws
- (b) Assembling jack plane — Planning practice including sharpening of jack plane cutter
- (c) Chiselling practice using different types of chisels including sharpening of chisel
- (d) Marking, measuring and inspection of jobs

2.2 PREPARATION OF JOINTS

- (a) Half-lap joint ("I" Cross or "L")
- (b) Mortise & Tenon Joint (including drilling and fixing using wooden pins) — T-joint
- (c) Dovetail joint

MODULE – 2 SMITHY/FORGING SHOP

DETAIL COURSE CONTENT

GENERAL SHOP TALK

- Purpose of Smithy / Forging Shop
- Different types of Hearths used in Smithy / Forging shop
- Purpose specifications uses, care and maintenance of various tools and equipments used in hand forging
- Firing of Hearths / Furnaces
- Types of fuel used and maximum temperature obtained
- Types of raw materials used in Smithy / Forging shop (1 – 6)

PRACTICES

Practice on different basic Smithy / Forging operations such as Cutting, Upsetting, Drawing down, Setting down, Necking, Bending, Fullering, Swaging, Punching and Drifting

Demonstration — Making cube, hexagonal cube, hexagonal bar from round bar

2.2.1.1.1.1 Job Preparation

- Job 1 Making a cold / hot, hexagonal / octagonal flat chisel including tempering of edges
- Job 2 Making a chain-link by bending and forge-welding

Group-B

MODULE – 3 WELDING SHOP

DETAIL COURSE CONTENT

3 GENERAL SHOP TALK

- Purpose, specifications, uses, care and maintenance of various tools and equipments used for welding, brazing and soldering (soft and hard)
- Purpose of fluxes, electrodes, filler rods
- Safety equipments used in Welding Shop
- Spot-Welding and its use

PRACTICES

Study of Welding Transformers and Generators used in Arc-Welding

Demonstration of Gas-Cutting and Gas-Welding processes

Simple run on arc-welding practice

PRACTICE OF WELDING: (a) Lap welding, (b) Butt Welding (single plate)

(A) Job Preparation

- JOB - 1 JOINING of M.S. plates — Two jobs on Lap-Joint and Butt-Joint (single/double plates), thickness of plates varying from 3 mm to 12 mm with proper edge preparation
- Job-2 SPOT WLding on M.S /G.I sheet

MODULE – 4 BENCHWORK & FITTING SHOP
DETAIL COURSE CONTENT

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, Vice, Divider, Try-square, Drill-taps, V-blocks, Bevel protector, Scribes, Surface plates etc.
- (b) Study of measuring instruments: Micrometer – Vernier callipers – Bevel protectors

BASIC FITTING SHOP PRACTICES

Chipping and chiselling practice

WPL – 108
Full Marks – 70+30

WORKSHOP PRACTICE
(For Fashion Technology)

COURSE CONTENTS:

GROUP-A

DESIGNING AND DRAWING

1. Designing and drawing of jewellery, bags, shoes, saris, sunglasses, hats, gloves, bats by using A4 and A3 papers.
2. Use of pencils, hi-tech pen, gel pen, acrylic colour, poster colour and colour pencils.
3. Models to be made using paper pulps and thermocols.
4. Use of block printing, stencil, fabric colour and hand embroidery.

GROUP-B

5. Theme board
6. Mood board
7. Design development sheet
8. Preparation of presentation drawing, flat sketch and design details etc.
9. Final product:
 - a. Jewellery by the use of terracotta, beads jute etc.
 - b. Bags by the use of leather, cotton, jute etc.
 - c. Hat by the use of cloth, bamboos, leather etc.
 - d. Gloves by the use of cloth and leather.
 - e. Belt by the use of cloth, bamboos, leather, jute, beads etc.

WPL – 108
Full Marks – 70+30
WORKSHOP PRACTICE
(FOR MLT)
(BASIC BIOCHEMISTRY – I)

Group – A

1. Carbohydrate Chemistry
 - a. definition and function
 - b. Classification with example
 - c. Chemical structure of monosaccharide, disaccharide and polysaccharide in pyranose & furanose
 - d. Isomerism: Optical isomerism, stereoisomerism, epimers, anomers & mutarotation.
 - e. Homopolysaccharides & Heteropolysaccharide
 - f. General reaction of Carbohydrate

Group – B

2. Vitamins and Minerals
 - a. Fat soluble vitamins : Vit – A, D, E, K
 - b. Water soluble Vitamins: Vit – C, B- complex and Co – enzyme, activity of the members of B – complex vitamins
 - c. Dietary Source, digestion, absorption, excretion
 - d. Role of micronutrients like Zinc, copper , selenium etc
 - e. Serum electrolytes – Na , K, Li

Reference Books:

1. Biochemistry – West & Tohz
2. Biochemistry – Harper
3. Biochemistry –Thorpe
4. Biochemistry –Fearom
5. Biochemistry – Leninger
6. Pathological Biochemistry – Duncan

EEA-201
1st half, full Marks –35 +15

Engineering Economics

Module 1 : Subject matter of Economics

Problems of scarcity of resources and alternative uses of resources Basic problems of Economics : what, How & for whom to produce, Idea of how the market through price mechanism solves these basic problems in a capitalist economy, concept of productive efficiency and allocative efficiency using the PPF

Module-2 : Demand-supply interaction

Demand : difference between movement along the demand curve and shift of demand curve, Price elasticity of demand : Arc & point elasticity, determinants of price elasticity, diagrammatic & mathematical derivation showing relationship between sales & price elasticity. Demand forecasting : estimating demand trend using least square method, supply schedule , supply curve, interaction of demand supply and equilibrium price determination, simple comparative static exercises like shift of demand & supply curves

Module3 : Theory of production & cost

The concept of production functions as a technical relationship between output and factors of production, law of variable proportion.

EEA-201
2nd half, full Marks –35+15

Financial Accounting

Module –1: INTRODUCTION TO ACCOUNTANCY

Accountancy : definition & objectives-book keeping & Accountancy , Accountancy Accounting evaluation , single & double entry system.

Double entry system :

Module 2: TRANSACTION

concepts;.. accounts- transaction two aspects events, golden rules, Journal as a book of Prime entry : sub divisions of Journal, Recording of Transaction , Narration, Ledger : rules for writing ledger balancing of ledger accounts, , concept of B/d and C/D and concept of day books

Module 3:CASH BOOK

Single column , double column and triple column including contra entry

Module 4 :ELEMENTS OF COST AND COST SHEET

TRIAL BALANCE : Preparation of trial balance, Rectification of a wrong trial balance, error detected and not detected in trial balance

ASSETS, LIABILITIES, RESERVE, BAD DEBTS etc.

General concept, Asset, Liabilities, capital Drawings, provision, reserve, reserve fund, bad debts, provision for bad debts, investments , shares & Debentures, profit seeking & non-profit seeking concerns

FINAL ACCOUNT : Trading account, profit & loss account, Balance sheet (simple adjustment)

AN OVERVIEW OF COMPUTERIZED FINANCIAL ACCOUNTING

EPC-202
1st half, full Marks –35+15
Engineering Physics – II
 (FOR ALL DISCIPLINES)

DETAIL COURSE CONTENT
GROUP – A

Module 1 Kinematics II

Concept of relative velocity- Numerical problems, Centre of mass- Angular momentum, Law of conservation of angular momentum & its applications.

Idea of Elastic, Inelastic & perfectly inelastic collisions (definitions & examples) - Coefficient of restitution.

Module 1 LIGHT

- 1.1 **PHOTOMETRY:** Luminous flux, luminous intensity, illumination and their S.I. units — Principle of Photometry & its applications — Simple numerical problems.
- 1.2 **REFRACTION OF LIGHT:** Refraction of light through plane surface — Laws of refraction — Refractive index: Relative & Absolute, its relation in terms of velocity of light in different media — Total internal reflection and critical angle — Principle applied in Optical Fibre & its various practical applications
- 1.3 **OPTICAL LENS:** Ray diagram: Position and nature of images formed by different types of lenses (convex and concave lenses) for different object positions — Relation between u , v , f (usual symbols) [No deduction] — Power of a lens and its unit and simple numerical problems

MODULE 3 MAGNETO- ELECTRO- STATICS

- 3.1 Coulomb's Inverse Square Law in magnetostatics — Magnetic dipole and its moment (Definition only) — Diamagnetic, Paramagnetic and Ferromagnetic materials (properties & applications).
- 3.2 Coulomb's law between electric charges- electric permittivity — Definition of unit charge (S.I. unit) — Field intensity and electric potential for point charge (Statement & Formula), Electrostatic capacity and its S.I. unit — Capacitance for spherical, cylindrical and parallel plate capacitors (Working formula only) — Equivalent capacitance for series and parallel capacitors (Working formula only) Energy stored in capacitor (Working formula only) — Simple numerical problems.

GROUP - B**4 CURRENT ELECTRICITY**

- 4.1 ELECTRIC CURRENT: Ohm's law — Resistance and its unit, specific resistance — various factors affecting the resistance, concept of super conductivity — Equivalent resistance for Series and Parallel arrangements of resistances (No deduction), Simple numerical problems — E. M. F of a cell- Internal resistance of a cell- Grouping of cells-Concept of conversion of Galvanometer to Ammeter and Voltmeter and related simple problems — Wheatstone Bridge Principle for balanced condition, its applications in Meter Bridge and P.O. Box.
- 4.2 HEATING EFFECTS OF CURRENT: Joule's law — Electrical work, energy and power with units — Simple numerical problems, Efficiency of a source, Maximum power transfer theorem-Applications of heating effect of current.

5 MODERN PHYSICS

- 5.1 ELECTRONS & PROTONS: Photoemission, Work function — Photoelectric current, its variation with intensity and frequency of incident radiation, Threshold frequency — Einstein's photoelectric equation.
- 5.2 NUCLEAR PHYSICS: Stability of nucleus — Laws of radioactivity, Units of radioactivity – Curie & Rutherford — Half life and average life — Radioisotope, its uses in agriculture, medicine & industry.
- 5.3 SEMI – CONDUCTOR: Energy band in solids (Idea) — Distinction between conductor, insulators & semi-conductors in terms of energy band diagram — Junction diode; depletion region — Principle of photo-voltaic cell.
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EPC-202
2nd half, full Marks –35+15

ENGG. CHEMISTRY – II
(FOR ALL DISCIPLINES)

DETAIL COURSE CONTENT

MODULE 1 :

Water – Soft and hard water, types of hardness, cause of hardness, Units of hardness, Disadvantages of hard water, Estimation of total hardness by EDTA method, Removal of hardness – Permutit process, phosphate conditioning and by calgon; Deionised water.

MODULE 2 :

Cement – Portland cement its composition and manufacture, Setting and hardening of cement, Cement mortar and cement concrete, Lime mortar, Plaster of Paris.

MODULE 3 :

Lubricant – Purpose and types of Lubrication, Definition, Names of common lubricants and uses, Flash point, fire point, pour point and cloud point.

GROUP – B

MODULE 4 :

Fuels – Definition, classification, calorific value (higher & lower), calculation of calorific value (Dulong formula).

- a) Solid fuels, composition, properties and uses of wood, peal, lignite, Proximate and ultimate analysis of coal.
- b) Liquid fuels : Fractional distillation of petroleum oil (product and uses). Cracking, knocking, octane number, Cetane number, Antiknock compounds.
- c) Gaseous fuels : Composition and use of coal gas, water gas, producer gas, Elementary idea of L.P.G., Gobar gas, natural gas & CNG.

GROUP – C

MODULE 5 :

- a) Definition, cause of corrosion and methods of prevention.
- b) Properties and uses of Boron Carbide and Carborandum (Refractory)

MODULE 6 :

Protective Coating :

- a) Paints – Composition, types (distemper).
- b) Varnish – Definition, types, difference from paint, uses, characteristics.
- c) Metallic Coating – Galvanisation.

MODULE 7 :

Definition of Polymer, classification of synthetic polymers:

- a) Synthetic Plastic – Thermoplastic plastic – polyethylene & thermosetting plastic - bakelite.
- b) Synthetic Rubber – Bura-S, Bura-N, Neoprene, Butyl Rubber, Vulcanisation.
- c) Synthetic fibres with reference to nylon and terylene.

EME-203

Ist half, full Marks –35 +15

Engineering Mechanics & Graphics**Group – A****Module – 1**

Analytical and graphical methods for resultant of forces, parallel forces, Resolution of forces, Varignon's principle of moments, Equilibrium of forces. Analytical and graphical methods for reaction of a beam having point loads & uniformly distributed load.

Module - 2

Centroid and center of gravity of plane & solid bodies, Moment of inertia of plane rectangular, circular, triangular and composite sections. Theorems of parallel axis and perpendicular axis, Mass moment of inertia of disc, cylinder and sphere, Radius of gyration.

Module - 3

Laws of static and dynamic friction, Angle of friction, Co-efficient of friction, Equilibrium of bodies on rough horizontal and inclined planes.

Group – BModule - 4

Principle of virtual work, sign conventions, Application of principle of virtual work on beams having point loads and uniformly distributed load.

Module - 5

Analysis of perfect frames, Method of joints and sections, Force table, Solution of simple problems of frames by analytical and graphical methods

Module - 6

Laws of motion, Newton's laws, D'Alembert's principle, Elastic collision of bodies, Co-efficient of restitution, Simple harmonic motion – equation & graphical representation, velocity and acceleration of simple harmonic motion with their maximum values.

EME-203
2nd half, full Marks –35+15

ELEMENTS OF ELECTRICAL & ELECTRONICS ENGG.

DETAIL COURSE CONTENT

GROUP – A

Module 1 INTRODUCTION

Introduction to Electrical & Electronics Engg., Voltage Source, Current Source, A.C & D.C Signal, Kirchoff's voltage and current laws, Star-delta transformations – Simple problems on all topics.

Module 2 A. C. FUNDAMENTALS & A. C. SERIES CIRCUIT

Concept & significance of R.M.S. value, peak value, average value, and form factor of sinusoidal voltage/current – Equation of instantaneous value of sinusoidal voltage/current – Simple problems on all. R-L & R-C A.C. series circuit (no deduction, only the expressions of voltage, current & power for sinusoidal sources), power factor – simple problems.

Module 3 STORAGE CELL, TRANSFORMER, MOTORS ETC.

Basic Principle of: Storage cell, D.C. motors, Transformer, A.C. generators & motors (No deduction & problems).

Module 4 POWER GENERATION, TRANSMISSION & DISTRIBUTION

Brief idea about the power generation, transmission and distribution using block diagram of different stages.

Module 5 VOLTAGE STABILISER & UPS SYSTEM

Brief idea about the operational principle of voltage stabilizer and UPS system (no description of internal circuit)

GROUP – B

Module 1 *PASSIVE & ACTIVE CIRCUIT ELEMENTS*

Familiarity with the following components: —

RESISTORS, CAPACITORS, INDUCTOR

Module 2 *TRANSFORMER*

Features and specifications of AF,RF transformer

Module 3 *Relays, Switches, Cables & Connectors*

Module 4 *OPERATIONAL CHARACTERISTICS OF PN-JUNCTION DIODE, ZENER DIODE , BIPOLAR TRANSISTOR, & FIELD EFFECT TRANSISTOR, UJT & THYRISTER*

Construction of PN Junction Diode, Zener diode and operation of PN Junction diode, Zener diode in reverse biased condition — Simple voltage regulator circuit, Operation of NPN and PNP transistors-V-I characteristics, operation and VI characteristics of JFET, Enhancement and depletion type MOSFET- concepts of CMOS. operation and characteristics of UJT & SCR , Field of applications

ENM-204
Full Marks –70 + 30

ENGINEERING MATHEMATICS-II
(for all disciplines)

DETAIL COURSE CONTENT
GROUP – A

Module 1 MATRIX & DETERMINANT (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)

- 1.1 Matrix – Definition – Order of a matrix – Leading element – Principal diagonal. Types of matrices – Null matrix – Square matrix – Identity matrix – Upper and lower triangular matrix – Symmetric matrix.
- 1.2 Determinant of a square matrix – Minors and cofactors – Procedures for evaluation – Properties of determinants (no deduction) – Evaluation of determinant by Chio's method (4th order) – Problems.

GROUP – B

Module 2 NUMERICAL METHODS (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)

- 2.1 Meaning of interpolation – Difference table – Newton's forward interpolation formula (no deduction) – Problems.
- 2.2 Introduction to numerical integration – Formulae for composite trapezoidal and Simpson's 1/3 rule (no deduction) – Related problems.
- 2.3 Numerical solution of non-linear equations – Formula for Newton-Raphson method (no deduction) – Problems.
- 2.4 Numerical solution of system of linear equation – Gauss-Elimination Method (no deduction) – Problems.

2nd Half

GROUP – C

Module 3 DIFFERENTIAL EQUATIONS (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)

- 3.1 Definition – Order and degree of a differential equation – Differential equations of 1st order and 1st degree – Separation of variables – Problems.
- 3.2 Homogeneous differential equations – Equations reducible to the homogeneous form – Problems.
- 3.3 Exact differential equations – equations reducible to the exact form – problems.
- 3.4 Linear equations – Bernoulli's equations.
- 3.5 Differential equations of 2nd order with constant co-efficients – Complementary function and particular integral – Problems.

GROUP – D

Module 4 PARTIAL DIFFERENTIATION (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)

- 4.1 Function of two or more variables – Definition and meaning of partial derivatives (1st order).
- 4.2 Homogeneous functions – Euler's theorem on homogeneous functions (no deduction) – Problems.

- 4.3 Applications of differential & integral calculus – Physical meaning of derivative – Rate measurement- Maxima, Minima (one variable) – Area under plane curve- volume and surface revolution.

Module 5 PROBABILITY (BASIC CONCEPTS AND SIMPLE PROBLEMS ONLY)

- 5.1 Introduction – Random experiment – Sample space – Events.
 5.2 Classical and axiomatic definition of probability.
 Addition and multiplication theorem – Related problems.

EEL 205
Full Marks :70 + 30

BASIC ELECTRICAL & ELECTRONICS LAB
(All discipline except IT, CST,ETCE , & EE)

OBJECTIVE

On satisfactory completion of the course, the students should be in a position to develop the skills corresponding to the knowledge acquired in the theoretical subject Elements of Electrical & Electronics Engg..

DETAIL COURSE CONTENT

- Job 1 To be familiar with the common assembly tools.
- Job2 To be able to identify the following passive and active circuit elements: —
 Resistor, capacitor, inductor, transformer, relay, switches, batteries/cells, diode, transistors, SCR, DIAC, TRIAC, LED, LCD, photodiode, phototransistors, ICs etc.
- Job3 To be familiar with the following basic instruments: —
 Multimeter, oscilloscope, power supply and function generator.
- Job4 To practice soldering and desoldering.
- Job5 To construct & test a battery eliminator
- Job6 To construct & Test simple amplifier circuit on a Bread Board and Vero Board.

EEL 205

Full Marks :70 + 30

BASIC ELECTRICAL & ELECTRONICS LAB (for IT, CST,ETCE , & EE)

credit : 2

DETAIL COURSE CONTENT

- Job1 To be familiar with the following basic instruments: —
oscilloscope, power supply and function generator.
- Job2 To practice . & test a battery eliminator
- Job3 To study VI Characteristics of Semiconductor Diode
- Job4 To study VI Characteristics of Zener Diode
- Job5 To study CB,CE,,CC Characteristics of BJT
- Job6 To study VI Characteristics of JFET
- Job7 To construct & Test simple amplifier circuit on a Bread Board and Vero Board.

PCL-206

1st half , full Marks-35 + 15

PHYSICS LAB-II

(FOR ALL DISCIPLINES)

1. To verify laws of refraction of light and to determine refractive index of glass slab.
 2. To determine the focal length of a convex lens by U-V method.
 3. To find the value of unknown resistance by P.O. Box.
 4. To determine the specific resistance of a wire using Meter Bridge.
 5. To verify Ohm's law by ammeter and Voltmeter method with —
 - (a) series connection of resistances;
 - (b) parallel connection of resistances.
 6. To draw the characteristics curve of P-N junction diode (forward and reverse bias).
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PCL-206
2nd half , full Marks-35 +15

CHEMISTRY LAB-II
(FOR ALL DISCIPLINES)

1. To estimate the Hardness of a given sample of water by :
 - (a) Standard (N/10) Na_2CO_3 solution and
 - (b) Standard (N/10) EDTA solution
2. To perform qualitative detection of Arsenic content of a given sample of water
3. To determine pH value of an unknown solution by pH meter.
4. To perform proximate analysis of coal (demonstration purpose)

CDL-207
1st half, Full Marks-35 + 15

ENGINEERING DRAWING – II
(for CST , IT, ETCE, MLT, EE, & FT)

AUTOCAD

Module 1 GETTING STARTED – I

Starting AutoCAD – AutoCAD screen components – Starting a drawing: Open drawings, Create drawings (Start from scratch, Use a template & Use a wizard) – Invoking commands in AutoCAD – Drawing lines in AutoCAD – Co-ordinate systems: Absolute co-ordinate system, Relative co-ordinate system – Direct distance method – Saving a drawing: Save & Save As – Closing a drawing – Quitting AutoCAD

Module 2 GETTING STARTED – II

Opening an existing file – Concept of Object – Object selection methods: Pick by box, Window selection, Crossing Selection, All, Fence, Last, Previous, Add, Remove – Erasing objects: OOPS command, UNDO / REDO commands – ZOOM command – PAN command, Panning in real time – Setting units – Object snap, running object snap mode – Drawing circles

Module 3 DRAW COMMANDS

ARC command – RECTANG command – ELLIPSE command, elliptical arc – POLYGON command (regular polygon) – PLINE command – DONUT command – POINT command – Construction Line: XLINE command, RAY command – MULTILINE command

Module 4 EDITING COMMANDS

MOVE command – COPY command – OFFSET command – ROTATE command – SCALE command – STRETCH command – LENGTHEN command – TRIM command – EXTEND command – BREAK command – CHAMFER command – FILLET command – ARRAY command – MIRROR command – MEASURE command – DIVIDE command – EXPLODE command – MATCHPROP command – Editing with grips: PEDIT

CDL-207
1st half, Full Marks-35 + 15

ENGINEERING DRAWING – II
(For CE, AE, ME, FPT and IDHFD)
Cpw = 3, Credit : 1,

MODULE 1 INTERSECTION OF SURFACES

Classification — Line of Intersection — Line/Generator method — Section plane method — Intersection of two prisms — Intersection of two cylinders — Intersection of cone and cylinder.

MODULE 2 DEVELOPMENT OF SURFACES

Parallel Line development method — Radial Line development method — Development of Surfaces of whole & truncated Right Regular Solids.

MODULE 3 INTRODUCTION TO DIFFERENT PICTORIAL VIEWS

Necessity of Pictorial view — Isometric — Axonometric — Perspective (concepts only).

MODULE 4 ISOMETRIC VIEWS & PROJECTIONS

Difference between isometric view & isometric projection — Isometric axes — Isometric & non-isometric lines — Isometric scale — Isometric views & projections of regular geometrical lamina — Four Centre method — Isometric views & projections of whole & truncated right regular solids.

MODULE 5 CONVERSION OF ISOMETRIC VIEWS TO ORTHOGRAPHIC PROJECTIONS & VICE-VERSA

Conversion of isometric views to orthographic projections & vice-versa of: Carpentry Joints – Blocks & Stops (V-block, H-block, V-block with circular road, dovetail stop, stop block, bearing block, steel block, cavity block, angular block etc.) – Plates (angle plate, bottom swage block, ribbed angle plate, jig plate etc.) – Brackets (simple bracket, shaft bracket, dovetail bracket, end bracket etc.) – Bearings – Shafts & Flanges – Threads – Nuts & Bolts (hexagonal & square) – Furniture (table, chair etc.) – Building.

Students are to undertake any three topics out of the ten mentioned above.

MODULE 5(A) FREEHAND SKETCHES

Freehand sketching of the following: Rivet heads – Riveted joints – Thread sections – Nuts & Bolts (hexagonal & square) – Foundation bolts – Screws, Studs & Washers

Or

MODULE 6 (B) AXONOMETRIC PROJECTIONS (FOR ARCHITECTURE AND INTERIOR DECORATION HANDICRAFTS & FURNITURE DESIGN) Axonometric projection of interiors like: Drawing/Living room – Bed Room – Kitchen – Toilet – Class Room – Office.

CDL-207
2nd half, Full Marks-35 + 15
COMMUNICATION SKILL- I
(For all Discipline)

DETAIL COURSE CONTENT

PRACTICING READING, WRITING AND LISTENING SKILL

Asking to read from a given paragraph – Comprehending a paragraph – Speaking on a given topic – Comprehending an audio visual presentation – Writing correctly on a given topic relating to real field situation.

AT THE WORKPLACE

Group discussion – Responding appropriately – Discourses and interaction – Skimming newspaper information – Identification of different formats of personal & business letters – Memorandum – Deliberation on extempore speech – Comprehension of audio visual aids.

TEACHING INSTRUCTIONS

There should be no difference between the teaching methodology of the lecture classes of the subject ENGLISH COMMUNICATION and those of the sessional classes of the subject COMMUNICATION SKILL-I (LAB), since all the modules are practical oriented.

TEXT BOOK AND OTHER RECOMMENDED BOOKS

ENGLISH SKILLS for Technical Students – TEACHERS’ HANDBOOK / West Bengal State Council of Technical Education in collaboration with THE BRITISH COUNCIL / Orient Longman – Business Correspondence and Report Writing, by Krishna Mohan & C. Sharma – Business Correspondence, by V.G. Natu and C Kaur – Professional Communication Skills, by Pravin Bhatia and A.M. Shaikh – A Guide to Business Correspondence and Communication Skills, by A.N. Kapoor – English Grammer, by Wren & Martin.

WPL-208
Full Marks-70 + 30

WORKSHOP PRACTICE -II

(for ETCE, EE, CST & IT)

Credit : 2

DETAIL COURSE CONTENT

Group-A

CIRCUIT MAKER

Getting Started

Circuit Maker Basics

- Starting circuit maker, Circuit maker workspace
- Connectivity, About the Circuit maker windows
- Anatomy of a schematic drawing, Circuit maker conventions
- Circuit maker files

Accessing Tools & Features

- Task overview, Using the toolbar, Using a mouse, Hotkeys, Shortcut keys
Saving Schematic Options, Basic . CKT File Management
- Starting, saving & closing a .CKT File, Opening and Re- opening a . CKT
- Reverting to Previously saved file

Tutorials

Tutorial 1 : Drawing a Schematic

- Using the Browse tab in the panel
- Placing a transistor, Placing the resistors
- Placing +V and ground devices, Changing resistor label-values
- Wiring the circuit together

Tutorial 2 : Digital Logic Simulation

Tutorial 3 : Analog Simulation

- Simple circuit simulation, Creating a simple RC circuit
- Simulating a simple AC circuit

Tutorial 4 : More Circuit Simulation

- Setting up the Analysis, Running the simulation

Mixed- Signal Simulation Example

Group-B

PC Maintenance

- Job 1** To locate and identify the most common components (parts) in a PC .
- Job 2** To install and configure FDD, CDROM and HDD.
- Job 3** To be familiar with SMPS.
- Job 4** To install video card, sound card, Network card, & Modem etc.

- Job 5** To install DMP, inkjet and laser printing; to undertake preventive maintenance and to troubleshoot DMP.
- Job 6** To disassemble and reassemble a total PC system.
- Job 7** To practice anti-virus software installation and virus removal.
- Job 8** To install Windows XP/2000, or Linux.

WPL208
Full Marks-70 + 30

WORKSHOP PRACTICE –II (for CE,ME,AE,FPT)

MODULE –1 SMITHY / FORGING SHOP

DETAIL COURSE CONTENT

GENERAL SHOP TALK

Purpose of Smithy / Forging Shop

Different types of Hearths used in Smithy / Forging shop

Purpose specifications uses, care and maintenance of various tools and equipments used in hand forging

Firing of Hearths / Furnaces

Types of fuel used and maximum temperature obtained

Types of raw materials used in Smithy / Forging shop (1 – 6)

PRACTICES

Practice on different basic Smithy / Forging operations such as Cutting, Upsetting, Drawing down, Setting down, Necking, Bending, Fullering, Swaging, Punching and Drifting

Demonstration — Making cube, hexagonal cube, hexagonal bar from round bar

3.1.1.1.1.1 Job Preparation

Job 3 Making a cold / hot, hexagonal / octagonal flat chisel including tempering of edges

Job 4 Making a chain-link by bending and forge-welding

MODULE – 2 BENCHWORK & FITTING SHOP

DETAIL COURSE CONTENT

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, Vice, Divider, Try-square, Drill-taps, V-blocks, Bevel protector, Scribers, Surface plates etc.**
- b) Study of measuring instruments: Micrometer – Vernier callipers – Bevel protectors**

WPL208
Full Marks-70 + 30

WORKSHOP PRACTICE-II (IDHFD)

MODULE – 1 M O D E L L I N G S H O P

D E T A I L C O U R S E C O N T E N T

GENERAL SHOP TALK

Purpose Of Modelling
Types Of Modelling
Understanding The Behaviour Of Materials
Uses, Care And Maintenance Of Various Tools And Equipments Used In Modelling
Precautions During The Process

PRACTICES

Practice On Preparation Of Materials
Mixing, Moulding , Fixing, Smoothing, Curing Etc.

JOB 1 : MAKING A CLAY MODEL OF SIZE NOT EXCEEDING 1'X 1' X 1'

JOB 2:MAKING A P.O.P. (PLASTER OF PARIS) MODEL OF SIZE NOT EXCEEDING 8" X 8" X 8"

MODULE – 2 B E N C H W O R K & F I T T I N G S H O P

D E T A I L C O U R S E C O N T E N T

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, Vice, Divider, Try-square, Drill-taps, V-blocks, Bevel protector, Scribers, Surface plates etc.**
- b) Study of measuring instruments: Micrometer – Vernier callipers – Bevel protectors

WPL208
Full Marks-70 +30
WORKSHOP PRACTICE –II (MLT)

(BASIC BIOCHEMISTRY-II)

Group-A

1. Biochemical tests for Proteins (Colour Reactions)

- a. Biuret Test
- b. Ninhydrin Test
- c. Xanthoprotein Test
- d. Millon's Test
- e. Molish'S Test
- f. Nitroprosside Test

2. Biochemical Test for Proteins (Solubility Test)

Solubility of different proteins like albumin, globulin, gelatin, caseinogen has to be performed in different solvents like- cold water, hot water, 2% Nacl, Dilute acid, dilute alkali, alcohol etc.

Group-B

3. Solubility test of lipids in some solvents like protein, translucent spot test, emulsification test etc.

4. Experiments on blood

- a. Preparation of blood smear and staining
- b. Observation of blood smear under microscope
- c. Separation of plasma and serum from blood
- d. Detection of BT and CT of blood
- e. Counting of blood cells (RBC, WBC)

5. Preparation of solutions

- a. Normal solution, molar solution, molal solution
- b. W/V, V/V, % solution etc

Reference books:

1. Biochemistry- West & TOHZ
2. Biochemistry- Harper
3. Biochemistry- Thorpe
4. Pathological biochemistry – Duncan
5. Practical pathology-Nanda Maheswari
6. Medical Lab Technology- Ramnik Sood
7. Medical Lab Technology- Kolhatkar

WPL208
Full Marks-70 +30

WORKSHOP PRACTICE-II (Fashion Technology)

Objective : Study of Designing and Sketching

Draw own Design

Understand the construction and designing of different costumes.

COURSE CONTENTS :

Group - A

1. Introduction to various colour mediums – Poster Colours, Water Colours, Crayons, Water proof inks, Pencil & Pen.
2. Sketching of the main parts of human body – Skull, Trunk, Hip & Lower part.
3. Different position of hands and legs.
4. Sketching of figures in different poses.

Group – B

1. Introduction – Fashion terminology, Fashion theories and Fashion drawing.
2. Sketching of figures in different types of dresses and poses.
3. Normal body and abnormal body – correct figure, Stopping figure, Square shoulder figure.
4. Selection of cloth – Suitability , Durability, Serviceability , Suitable for weather and climate.
