STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for
Ist Semester DIPLOMA in Electrical Engg./ Mechanical Engg. /C.Sc&Engg.

(Group-I)

(Effective from Session 2016-17)

THEORY

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME			EXAMINATION – SCHEME					Credits
			Periods per Week	Hours of Exam.	Teacher's Assessment (TA) Marks (A)	Class Test(CT) Marks (B)	End Semester Exam. (ESE) Marks (C)	Total Marks (A+B+C)	Pass Marks ESE	Pass Marks in the Subject	
1.	Basic Physics	01101	02	03	10	20	70	100	28	40	2
2.	Basic Chemistry	01102	02	03	10	20	70	100	28	40	2
3.	Basic Mathematics	01103	05	03	10	20	70	100	28	40	5
4.	Communication Skill-I	01104	02	03	10	20	70	100	28	40	2
5.	Engg. Graphics	01105	02	03	-	-	30	30	12	12	2
6.	Computer Fundamentals	01106	02	03	-	-	50	50	20	20	2
			15			Total:-	360	480			

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME					Credits
			Periods per Week	Hours of Exam.	Practical (ESE)		Total Marks (A+B)	Pass Marks in the Subject	
					Internal	External			
7.	Basic Physics Lab.	01107	02	03	15	35	50	20	1
8.	Basic Chemistry Lab	01108	02	03	15	35	50	20	1
9.	Computer Fundamental	01109	02	03	15	35	50	20	1
10.	Basic Workshop Practice	01110	02	06	15	35	50	20	1
			08		**Total:-**		**200**		

TERM WORK

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME				Credits
			Periods per week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	
11.	English (Language Lab)	01111	02	25	00	25	10	1
12.	Engg. Graphics	01112	04	06	14	20	08	2
13.	Basic Workshop Practice	01113	04	07	18	25	10	2
			Total:- 10			**70**		
Total Periods per week Each of duration One Hour 33				Total Marks = 750				24

BASIC PHYSICS

Subject Code	Theory			No of Period in one session :			Credits
01101/ 02201	No. of Periods Per Week			Full Marks	:	100	2
	L	T	P/S	ESE	:	70	
	02	—	—	TA	:	10	
				CT	:	20	

Contents (Theory)		Hrs/week	Marks
Unit -1 **UNITS AND MEASUREMENTS**	**1.1** Need of Measurement in engineering and science, unit of a physical quantity, requirements of standard unit, systems of units-CGS,MKS and SI, classification of physical quantities-Fundamental and Derived with their units **1.2** Accuracy, Precision of instruments, Errors in measurement, Estimation of errors-Absolute error, Relative error and percentage error, significant figures. (Simple Problems) **1.3** Basic Measuring instruments-Vernier Caliper, Micrometer screw gauge, inner & outer caliper thermometer, spherometer, ammeter, voltmeter with their least count, range, accuracy and precision. Standard reference surfaces used in engineering measurements-surface plate, angle plate, V- block, Engineer's square.	**03**	**06**
Unit -2 **GENERAL PROPERTIES OF MATTER**	**2.1 Elasticity :** Deforming force, Restoring force, Elastic and plastic body, Stress and strain with their types, Hooke's law, Stress strain diagram, Young's modulus, Bulk modulus, Modulus of rigidity and relation between them(no derivation), (simple problems). (Simple problems) Stress strain diagrams of H.T. Steel, Cast iron, Aluminium and Concrete, Ultimate and breaking stress, Factor of safety.	**03**	**06**
	2.2 Surface Tension: Forces—cohesive and adhesive, , angle of contact, shape of liquid surface in a capillary tube, capillary action with examples, relation between surface tension , capillary rise and radius of capillary (no derivation)(simple problem),effect of impurity and temperature on surface tension.	**02**	**04**
	2.3 Viscosity : Velocity gradient, Newton's law of viscosity, coefficient of viscosity ,streamline and turbulent flow, critical velocity, Reynold's number,(simple problems), Stokes law and terminal velocity(no derivation) ,buoyant (up thrust) force, effect of temperature & adulteration on viscosity of liquid.	**02**	**04**
Unit – 3 **HEAT**	**3.1 Transmission of heat and expansion of solids** Three modes of transmission of heat-conduction, convection and radiation, good and bad conductor of heat with examples, law of thermal conductivity, coefficient of thermal conductivity (simple problems), expansion of solids-linear, aerial and cubical and relation between them.	**02**	**06**
	3.2 Gas laws and specific heats of gases Boyle's law, Charles's law, Gay Lussa's law, absolute temperature, Kelvin scale of temperature, general gas equation(no derivation)(simple problems),molar or universal gas constant, universal gas equation, standard or normal temperature and pressure (N.T.P.), specific heat of gases, relation between two specific heat (simple problems), thermodynamic variables, first law of thermodynamics (statement & equation only), isothermal, isobaric, isochoric & adiabatic processes (difference among these processes and equations of state) (simple problems).	**04**	**08**

Unit – 4 **LIGHT**	**4.1 Properties of light** Reflection and, refraction, Snell's law, physical significance of refractive index (simple problems), Total internal reflection, dispersion, diffraction and polarization of light (only introduction) **4.2 Wave theory of light & Interference** Newton's corpuscles theory of light, Huygens's wave theory, wave front, Types of wave front-spherical, cylindrical and plane Huygens's principle of propagation of wave front, Principle of superposition of waves, Interference of light, constructive and destructive interference, Young's experiment. Analytical treatment of interference, conditions for stationary interference pattern. **4.3 Laser** Light amplification by stimulated emission of radiation, properties of laser, spontaneous and stimulated emission, population inversion, pumping methods, He-Ne laser-construction & working, recording and reconstructing of hologram by using He-Ne laser.	**03** **04** **04**	**06** **08** **08**
Unit – 5 **MODERN**	**5.1 Photo electricity** Plank's hypothesis, properties of photons, photo electric effect,	**03**	**08**
PHYSICS	laws and characteristics of photoelectric effect, Einstein's photoelectric equation,(simple problems), construction and working of photoelectric cell, applications of photoelectric cell **5.2 X-rays** Production of X-rays, types of X-ray spectra-continuous and characteristics, X-ray wavelength (simple problems), properties of X-rays, applications of X-rays-engineering, medicine and scientific research work.	 **03**	 **06**
	Total	**33**	**70**

BASIC CHEMISTRY

Subject Code	Theory			No of Period in one session :			Credits
01102/ 02202	No. of Periods Per Week			Full Marks	:	100	2
	L	T	P/S	ESE	:	70	
	02	—	—	TA	:	10	
				CT	:	20	

Pre-Requisite :-Nil

	Contents	Hrs/week	Marks
Unit -1	**Atomic Structure** Definition of Atom, Fundamental Particles of Atom – their Mass, Charge, Location, Definition of Atomic no, Atomic Mass no., Isotopes & Isobars, & their distinction with suitable examples, Bohr's Theory, Definition, Shape & Distinction between Orbits & Orbitals, Hund's Rule, Filling Up of the Orbitals by Aufbau's Principles (till Atomic no. 30), Pauli's exclusion principle Valency – Definition, types (Electrovalency & Covalency), Distinction, Octet Rule, Duplet Rule, Formation of Electrovalent & Covalent Compounds e.g. Nacl, $CaCl_2$, MgO, $AlCl_3$, CO_2, H_2O, Cl_2, NH_3, C_2H_4, N_2, C_2H_2.	05	12
Unit -2	**Electrochemistry** Definition Ionisation & Electrolytic Dissociation, Arrhenius Theory of Ionisation, Significance of the Terms Involved in Electrolysis. Such as Conductors, Insulators or Dielectrics, Electrolyte, Non Electrolyte, Electrolysis, Electrolytic Cell, Electrodes, Current Density, Temperature, Mechanism of Electrolysis – Primary & Secondary Reactions at Cathode & Anode, Electrochemical Series for Cations & Anions, Electrolysis of $CuSO_4$ Solution by using Cu Electrode & Platinum Electrode, Electrolysis of NaOH solution & fused NaCl, Faraday's first & second law of Electrolysis & Numericals, Electrochemical Cells & Batteries, Definition, Types (Primary & Secondary Cells), e.g. Construction, Working & Applications of Dry Cell /	06	14
	Laclanche Cell & Lead – Acid Storage Cell, Applications of Electrolysis such as Electroplating & Electro refining, Electrometallurgy & electrotyping Conductivity of Electrolyte – Ohms Law, Definition & Units of Specific Conductivity, Equivalent Conductivity, specific resistance		
Unit -3	**Metals & Alloys** **Metals** Occurrence of Metals, Definition Metallurgy, Mineral, Ore, Gangue, Flux & Slag, Mechanical Properties, Processing of Ore, Stages of Extraction of Metals from its Ores in Detail i.e. Concentration, Reduction, refining. Physical Properties & Applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Co, Ag, W. **Alloys** Definition of Alloy, Purposes of Making alloy Preparation Methods, Classification of Alloys such as Ferrous & Non Ferrous, examples. Composition, Properties & Applications of Alnico, Duralumin, Dutch Metal, German Silver / Nickel Silver, Gun Metal, Monel metal, Wood's Metal, Babbitt Metal.	08	16

Unit -4	**Non Metallic Materials** **Plastics** Definition of Plastic, Formation of Plastic by Addition & Condensation Polymerisation by giving e.g. of Polyethylene & Backelite plastic Respectively, Types of Plastic, Thermosoftening & Thermosetting Plastic, with Definition, Distinction & e.g., Compounding of Plastics – Resins, Fillers, Plasticizers, Acceleraters, Pigments, Engineering Applications of Plastic based on their Properties. **Rubber** Natural Rubber: Its Processing, Drawbacks of Natural Rubber, Vulcanisation of Rubber with Chemical Reaction. Synthetic Rubber: Definition, & e.g., Distinction Between Natural & Synthetic Rubber. **Thermal Insulating Materials** Definition, Characteristics & Applications of Glass Wool, Thermocole, Asbestos, Cork.	04	10
Unit – 5	**Environmental Effects (Awareness Level)** Introduction, Definition, Causes of Pollution, Types of Pollution, Such as Air & Water Pollution. **Air Pollution** Definition, Types of Air Pollutions their Sources & Effects, Such as Gases, Particulates, Deforestation, Radio Active Gases, Control of Air Pollution, Air	09	18
	Pollution Due to Internal Combustion Engine & Its Control Methods, Causes & Effects of Ozone Depletion & Green House Effects**.** **Water Pollution** Definition, Causes & Methods of Preventing Water Pollution, Types of Waste such as Domestic Waste, Industrial Waste, their Physical & Biological Characteristics, BOD, COD, Biomedical Waste & E – Waste, their Origin, Effects & Control Measures. Preventive Environmental Management (PEM) Activities.		
	Total	**32**	**70**

BASIC MATHEMATICS

Subject Code	Theory			No of Period in one session :			Credits
01103/ 02203	No. of Periods Per Week			Full Marks	:	100	5
	L	T	P/S	ESE	:	70	
	04	1	5	TA	:	10	
				CT	:	20	

Contents (Name of Topics)		Hrs/week	
Unit -1 Chapter No.	**ALGEBRA**	**01**	
	1.1 REVISION 1.1.1 Laws of Indices 1.1.2 Formula of factorization and expansion ((a^2-b^2), $(a+b)^2$ etc.) 1.1.3 Laws of logarithm with definition of Natural and Common logarithm.		**--**
	1.2 PARTIAL FRACTION Definition of polynomial fraction proper & improper fractions and definition of partial fractions. 1.2.2 To Resolve proper fraction into partial fraction with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors. 1.2.3 To resolve improper fraction into partial fraction.	**04**	**07**
	1.3DETERMINANT AND MATRICES. **Determinant ---------- 4 Marks** Definition and expansion of determinants of order 2 and 3. 1.3.2 Cramer's rule to solve simultaneous equations in 2 and 3 unknowns. **Matrices---------- 11Marks** Definition of a matrix of order m X n and types of matrices. 1.3.4 Algebra of matrices such as equality, addition,	**12**	**15**
	Subtraction, scalar multiplication and multiplication. Transpose of a matrix. 1.3.6 Minor, cofactor of an element of a matrix, adjoint of matrix and inverse of matrix by adjoint method. Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion method.		
	1.4 BINOMIAL THEOREM 1.4.1 Definition of factorial notation, definition of permutation and combinations with formula. 1.4.2 Binomial theorem for positive index. 1.4.3 General term. 1.4.4 Binomial theorem for negative index. 1.4.5 Approximate value (only formula)	**04**	**03**
Unit -2	**TRIGONOMETRY.**		
	2.1 REVISION 2.1.1 Measurement of an angle (degree and radian). Relation between degree and radian. 2.1.2 Trig ratios of 0^0, 30^0, 45^0 etc. 2.1.3 Fundamental identities.	**02**	**03**

	2.2 TRIGONOMETRIC RATIOS OF ALLIED, COMPOUND, MULTIPLE & SUBMULTIPLE ANGLES (Questions based on numerical computations, which can also be done by calculators, need not be asked particularly for allied angles).	**08**	**07**
	2.3 FACTORIZATION AND DEFACTORIZATION FORMULAE	**04**	**03**
	2.4 INVERSE TRIGONOMETRIC RATIOS 2.4.1 Definition of inverse trigonometric, ratios, Principal values of inverse trigonometric ratios. 2.4.2 Relation between inverse trigonometric ratios.	**02**	**03**
	2.5 PROPERTIES OF TRIANGLE 2.5.1 Sine, Cosine, Projection and tangent rules (without proof) 2.5.2 Simple problems.	**02**	**03**
Unit -3	**COORDINATE GEOMETRY**		
	3.1 POINT AND DISTANCES 3.1.1 Distance formula, Section formula, midpoint, centriod of triangle. 3.1.2 Area of triangle and condition of collinearity.	**04**	**03**
	3.2 STRAIGHT LINE 3.2.1 Slope and intercept of straight line. 3.2.2 Equation of straight line in slope point form, slope-intercept form, two-point form, two-intercept form, normal form. General equation of line. 3.2.3 Angle between two straight lines condition of parallel and perpendicular lines. Intersection of two lines. 3.2.5 Length of perpendicular from a point on the line and perpendicular distance between parallel lines.	**06**	**09**
	3.3 CIRCLE 3.3.1 Equation of circle in standard form, centre – radius form, diameter form, two – intercept form. 3.3.2 General equation of circle, its centre and radius.	**06**	**06**
Unit-4	**VECTORS**		
	4.1 Definition of vector, position vector, Algebra of vectors (Equality, addition, subtraction and scalar multiplication) 4.2 Dot (Scalar) product with properties. 4.3 Vector (Cross) product with properties.	**04**	04
	4.4 **Applications** 4.4.1 Work done and moment of force about a point & line	**04**	04
	Total	64	**70**

Suggested List of Assignments/Tutorial :

S.No	Topic on which tutorial is to be conducted
1	Partial fractions
2	Determinants
3	Matrices
4	Solution of simultaneous equation by Matrix inversion method.
5	Binomial theorem
6	Trigonometry- fundamental identities-revision only
7	Trigonometry-allied, compound and multiple angles
8	Trigonometry-factorization and defactorization formulae.

9	Trigonometry-inverse trigonometric ratios.
10	Point and distances
11	Straight line
12	Circle.
13	Vectors
14	Vectors' applications

ENGLISH

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	2
01104/ 02204	L	T	P/S	ESE	:	70	
	02	—	—	TA	:	10	
				CT	:	20	

Contents		Hrs/week	
Unit -1	**PART I: TEXT** • Vocabulary - Understanding meaning of new words from text • Comprehension – Responding to the questions from text • Identifying parts of speech	10	24
Unit -2	**PART II -Application of grammar** • Verbs • Tenses Do as directed (active /passive, Direct/indirect, affirmative/negative/assertive, question tag, remove too, use of article, preposition ,conjunctions, interjections, punctuation)	06	14
Unit — 3	**PART III - Paragraph writing** • Definition – Types of paragraphs • How to write a paragraph	02	06
Unit — 4	**PART IV - Vocabulary building** • Word formation • Technical jargon • Use of synonyms /antonyms/Homonyms/paronyms • One word substitute	04	06
	Total	**22**	**50**

	हिन्दी		
खंड–I	विषय	**03**	**05**
	शब्द–रचना–उत्पति एवं विकास		
	व्युत्पत्ति एवं नए शब्दों का निर्माण, अनेक शब्दों के लिए एक शब्द, विदेशी भाषा के शब्दों का हिन्दी में प्रयोग, देशज एवं विदेशज शब्द, समानार्थक शब्द, विपरीतार्थक शब्द, युग्म शब्द, संक्षेपण		
	वाक्य :– प्रकार, रूपान्तरण, अशुद्ध वाक्यों को शुद्ध करना		
	हिन्दी में प्रयुक्त विराम– चिह्न एवं उनका प्रयोग		
खंड–II	व्याकरण के नियमों का ज्ञान एवं उनका प्रयोग	**02**	**01**
खंड–III	**अनुच्छेद एवं गद्यांश**	**02**	**05**
	1. अनुच्छेद लेखन		
	2. अपठित गद्यांश एवं प्रश्नोत्तर		
खंड–IV	**औपचारिक पत्र लेखन**	**04**	**05**
	1. कार्यालयी पत्र		
	2. प्रेस–सूचना		
	3. प्रेस–विज्ञप्ति		
	4. प्रतिवेदन		
	5. व्यावसायिक पत्र लेखन		

	6. नौकरी के लिए आवेदन–पत्र		
	7. बायोडाटा		
खंड–V	**क्रियात्मक / व्यावहारिक**	**03**	**04**
	1. शब्दों का सही उच्चारण		
	2. मौखिक संप्रेषण / वक्तूता शैली का विकास		
	3. समुचिम शारीरिक भाषा का प्रयोग		
	4. संवाद कौशल		
	• **Assignments कार्य भार**		
	1. शब्द एवं उनका सार्थक प्रयोग		
	2. कार्यालयी शब्द		
	3. वाक्यों की अशुद्धियाँ		
	4. विराम चिह्नों का प्रयोग		
	5. संवाद लेखन – स्थिति के अनुसार		
	6. अनुच्छेद लेखन		
	7. समाचार पत्र, रिर्पोट लेखन		
	8. शब्दावली		
	कुल–	**14 घन्टा**	**20 अंक**

ENGG. GRAPHICS

Subject Code	Theory			No of Period in one session :			Credits
01105/ 02205	No. of Periods Per Week			Full Marks	:	30	2
	L	T	P/S	ESE	:	30	
	02	—	—				

Contents		Hrs/week	Marks
Unit -1	Drawing Instruments and their uses 1.1 Letters and numbers (single stroke vertical) 1.2 Convention of lines and their applications. 1.3 Scale (reduced, enlarged & full size) plain scale and diagonal scale. 1.4 Sheet layout. 1.5 Introduction to CAD (Basic draw and modify Command). 1.6 Geometrical constructions.	05	05
Unit -2	Engineering curves & Loci of Points. 1.2 To draw an ellipse by 2.1.1 Directrix and focus method 2.1.2 Arcs of circle method. 2.1.3 Concentric circles method. 2.2 To draw a parabola by: 2.2.1 Directrix and focus method 2.2.2 Rectangle method 2.3To draw a hyperbola by: 2.3.1 Directrix and focus method 2.3.2 passing through given points with reference to asymptotes 2.3.3 Transverse Axis and focus method. 2.4To draw involutes of circle & polygon (up to hexagon) 2.5 To draw a cycloid, 21picycloids, hypocycloid 2.6 To draw Helix & spiral. 2.7 Loci of Points: 2.7.1 Loci of points with given conditions and examples related to simple mechanisms.	09	08
Unit – 3	Orthographic projections 3.1 Introduction to Orthographic projections. 3.2 Conversion of pictorial view into Orthographic Views (First Angle Projection Method Only) 3.3 Dimensioning technique as per SP-46	06	06
Unit – 4	Isometric projection 4.1 Isometric scale 4.2 Conversion of orthographic views into isometric View/projection(Simple objects) Projection of Straight Lines and Planes. (First Angle Projection Method only)	05	05
Unit – 5	5.1 Lines inclined to one reference plane only and limited to both ends in one quadrant. 5.2 Projection of simple planes of circular, square, rectangular, rhombus, pentagonal, and hexagonal, inclined to one reference plane and perpendicular to the other.	07	06
	Total	**32**	**30**

COMPUTER FUNDAMENTAL

Subject Code 01106/ 02206	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	2
	L	T	P/S	ESE	:	50	
	02	—	—			-	

Cont		Hrs/week	Marks
Unit -1	**Fundamentals Of Computer** Introduction Components of PC The system Unit Front part of system Unit Back part of system Unit CPU Memory of computer Monitor Mouse, Keyboard, Disk, Printer, Scanner, Modem, Video, Sound cards, Speakers	**3**	09
Unit -2	**Introduction To Windows 2000/Xp** Working with window Desktop Components of window Menu bar option Starting window Getting familiar with desktop Moving from one window to another Reverting windows to its previous size Opening task bar buttons into a windows Creating shortcut of program Quitting windows	**3**	09
Unit – 3	**GUI Based Editing, Spreadsheets, Tables & Presentation** Application Using MS Office 2000 & Open Office.Org Menus Opening of menus, Toolbars: standard toolbars, formatting toolbars & closing of menus Quitting Document, Editing & designing your document Spreadsheets Working & Manipulating data with Excel Changing the layout Working with simple graphs & Presentation Working With PowerPoint and Presentation	**3**	09
Unit – 4	**Introduction To Internet** What is Internet Equipment Required for Internet connection Sending &receiving Emails Browsing the WWW Creating own Email Account	**2**	07
Unit – 5	**Usage of Computer System in various Domains** Computer application in Offices, books publication, data analysis ,accounting , investment, inventory control, graphics, database management, Instrumentation, Airline and railway ticket reservation, robotics, artificial intelligence, military, banks, design and	**2**	07

Unit – 6	**Information technology for benefits of community** Impact of computer on society Social responsibilities Applications of IT Impact of IT Ethics and information technology Future with information technology	**3**	09
	Total Hours	**16**	

BASIC PHYSICS LAB

Subject Code	Theory			No of Period in one session :			Credits
01107/ 02207	No. of Periods Per Week			Full Marks	:	50	1
	L	T	P/S	ESE	:	50	
	-	—	02	Internal Exam.	:	15	
				External Exam.	:	35	

Suggested List of Laboratory Experiments :	
S.No	**Laboratory Experiments(Any ten experiments to be performed)**
1	1. Use of vernier calipers for the measurement of dimensions of given object.
2	2. Use of micrometer screw gauge for the measurement of dimensions of given object
3	3. Determine the Young's modulus of material of wire using Searle's apparatus.
4	4. To observe rise in water level through capillaries of different bores.
5	5. Determine coefficient of viscosity of given oil using Stoke's Method.
6	6. Verification of Boyle's law.
7	7. Measurement of unknown temperature using thermocouple.
8	8. Determine the coefficient of linear expansion of given material of rod using Pullinger's apparatus.
9	9. To observe the divergence of laser light with respect to distance.
10	10. Plot characteristics of photoelectric cell (Photoelectric current verses intensity of light and voltage applied).

BASIC CHEMISTRY LAB

Subject Code	Theory			No of Period in one session :			Credits
01108/ 02208	No. of Periods Per Week			Full Marks	:	50	1
	L	T	P/S	ESE	:	50	
	-	—	02	Internal Exam.	:	15	
				External Exam.	:	35	

1. **List of Experiments:(Any ten experiments to be performed)**

01 – 07 Qualitative Analysis of **Seven Solutions,** Containing One Basic & One Acidic Radical Listed below

Basic Radicals:

Pb^{+2}, Cu^{+2}, Al^{+3}, Fe^{+2}, Fe^{+3}, Cr^{+3}, Zn^{+2}, Ni^{+2}, Ca^{+2}, Ba^{+2}, Mg^{+2}, K^{+}, NH_4^{+}.

Acidic Radicals:

Cl^{-}, Br^{-}, I^{-}, CO_3^{-2}, SO_4^{-2}, NO_3^{-}.

8 To Determine E.C.E. of Cu by Using $CuSO_4$ Solution & Copper Electrode

9 To Determine the % of Fe in the Given Ferrous Alloy by $KMnO_4$ Method.

10 To Prepare a Chart Showing Application of Metals like Fe, Cu, Al, Cr, Ni, Sn, Pb, Co.

11 To Prepare Phenol Formaldehyde Resin (Bakelite)

12 To Determine Carbon Monoxide Content in Emission from Petrol Vehicle.

13 To Determine Dissolved Oxygen in a Water Sample.

COMPUTER FUNDAMENTAL

Subject Code	Theory			No of Period in one session :			Credits
01109/ 02209	No. of Periods Per Week			Full Marks	:	50	1
	L	T	P/S	ESE	:	50	
	-	—	02	Internal Exam.	:	15	
				External Exam.	:	35	

Practical's	
Sr. No	**List of Practical's**
1.	Working with Windows 2000 desktop ,start icon, taskbar, Recycle Bin, My Computer icon ,The Recycle Bin and deleted files Creating shortcuts on the desktop
2.	The Windows 2000 accessories WordPad – editing an existing document Use of Paint – drawing tools The Calculator, Clock
3.	The Windows Explorer window, concept of drives, folders and files? Folder selection techniques, Switching drives, Folder creation Moving or copying files, Renaming, Deleting files ,and folders
4.	Printing Installing a printer driver Setting up a printer Default and installed printers Controlling print queues Viewing installed fonts
	The clipboard and 'drag and drop' Basic clipboard concepts Linking vs. embedding
5.	Moving through a Word document menu bar and drop down menus toolbars
6.	Entering text into a Word 2000 document, selection techniques Deleting text
7.	Font formatting keyboard shortcuts
8.	* Paragraph formatting Bullets and numbering
9.	* Page formatting What is page formatting? Page margins Page size and orientation Page breaks, Headers and footers
10.	Introducing tables and columns
11.	Printing within Word 2000 Print setup Printing options Print preview
12.	* Development of application using mail merge Mail merging addresses for envelopes Printing an addressed envelope and letter
13.	Creating and using macros in a document
14.	* Creating and opening workbooks Entering data
15.	Navigating in the worksheet Selecting items within Excel 2000 Inserting and deleting cells, rows and column Moving between worksheets, saving worksheet, workbook
16.	Formatting and customizing data
17.	Formulas, functions and named ranges
18.	Creating, manipulating & changing the chart type
19.	Printing, Page setup, Margins Sheet printing options, Printing a worksheet
20.	* Preparing presentations with Microsoft Power Point. Slides and presentations, Opening an existing presentation , Saving a presentation

21.	Using the AutoContent wizard ,Starting the AutoContent wizard Selecting a presentation type within the AutoContent wizard Presentation type Presentation titles, footers and slide number
22.	* Creating a simple text slide Selecting a slide layout Manipulating slide information within normal and outline view Formatting and proofing text Pictures and backgrounds drawing toolbar AutoShapes Using clipart Selecting objects Grouping and un-grouping objects The format painter
23.	* Creating and running a slide show Navigating through a slide show Slide show transitions Slide show timings Animation effects
24.	* Microsoft Internet Explorer 5 & the Internet Connecting to the Internet The Internet Explorer program window The on-line web tutorial Using hyper links Responding to an email link on a web page
25.	Searching the Internet Searching the web via Microsoft Internet Explorer Searching the Internet using Web Crawler Searching the Internet using Yahoo Commonly used search engines
26.	Favorites, security & customizing Explorer Organizing Favorite web sites Customizing options – general, security, contents, connection, programs, advanced
27.	* Using the Address Book Adding a new contact Creating a mailing group Addressing a message Finding an e-mail address
28.	Using electronic mail Starting Outlook Express Using the Outlook Express window Changing the window layout Reading file attachment Taking action on message-deleting, forwarding, replying
29.	* Email & newsgroups Creating and sending emails Attached files Receiving emails Locating and subscribing to newsgroups Posting a message to a newsgroup
30.	Chatting on internet Understating Microsoft chat environment Chat toolbar

BASIC WORKSHOP PRACTICE

Subject Code	Theory			No of Period in one session :			Credits
01110/ 02210	No. of Periods Per Week			Full Marks	:	50	1
	L	T	P/S	ESE	:	50	
	-	—	02	Internal Exam.	:	15	
				External Exam.	:	35	

S.No	Details Of Practical Contents
1	**WOOD WORKING SHOP:** • Demonstration of different wood working tools / machines. • Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. • One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
2	**WELDING SHOP** : • Demonstration of different welding tools / machines. • Demonstration on Arc Welding, Gas Welding, gas cutting and rebuilding of broken parts with welding. • One simple job involving butt and lap joint.
3	**FITTING SHOP**: • Demonstration of different fitting tools and drilling machines and power tools • Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. • One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.
4	**PLUMBING SHOP**: • Demonstration of different plumbing tools • Demonstration of different operations in plumbing, observing different pipe joints and pipe accessories. Different samples of PVC pipes and PVC pipe fittings. • One job on simple pipe joint with nipple coupling for standard pipe. Pipe threading using standard die sets.
5	**SHEET METAL SHOP:** • Demonstration of different sheet metal tools / machines. • Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing , soldering and riveting. • One simple job involving sheet metal operations and soldering and riveting.

ENGLISH LANGUAGE LAB

Subject Code	Theory			No of Period in one session :			Credits
01111/ 02211	No. of Periods Per Week			Full Marks	:	25	1
	L	T	P/S	ESE	:	25	
	-	—	02	Internal Exam.	:	25	
				External Exam.	:	-	

	The term work will consist of 6 assignments: The assignments should be written in A4 size note books (100 pages ruled)
1.	**List of Assignments:** **1** Building of Vocabulary — (3 Hours) (2 assignments) **a)** 25 words for each assignment from the glossary given in the text book at the end of each chapter **b)** Technical Jargons — (2 Hours) (1 assignment) Identify 10 technical words from the respective branches. Resource — (Encyclopedia/Subject Books) **2** Grammar (4 Hours) 2 assignments. **a)** Insert correct parts of speech in the sentences given by the teachers. (16 sentences—Two each, from the different parts of speech) **b)** Punctuate the sentences given by the teachers. (10 sentences) **3** Conversational skills: Role plays (8 hours) **a)** Students are going to perform the role on any 6 situations, by the teacher. **b)** Dialogue writing for the given situations. (2 assignments) **4** Write Paragraphs on given topics (6 hours) (2 assignments) **a)** Four types of paragraphs to be written in **two assignments** covering two types in one assignment. **5** News paper report writing (4hours) (2 assignments) **a)** Write any two events from the news paper as it is. **b)** Write any two events on the situations given by the teacher. **6** Errors in English (4 hours) (2 assignments) **a)** Find out the errors and rewrite the sentences given by the teacher. (20 sentences)

ENGG. GRAPHICS

Subject Code	Theory			No of Period in one session :			Credits
01112/ 02212	No. of Periods Per Week			Full Marks	:	20	2
	L	T	P/S	ESE	:	20	
	-	—	04	Internal Exam.	:	06	
				External Exam.	:	14	

	Skills to be developed	
	Intellectual skills	**Motor Skills**
1.Introduction to graphics - (1 Sheet) Draw the following using CAD 1.1 Rectangle with given dimensions 1.2 Circle with given dimensions and hatch 1.3 Pentagon with line command 1.4 Hexagon with given dimensions 1. Draw one figure containing circle tangent, arc and dimensioning.	2. To develop ability to solve problems on geometrical constructions.	3. To develop ability to draw the geometrical constructions by computer.
2. Engineering curves & Loci of points - (1 Sheet)	1) To develop ability to differentiate between conic and curves.	1. To develop ability to draw different types of curves.
i) Three different curves are to be draw using any one method. ii) Draw locus of point on any one mechanism	2) To develop ability to identify the type of locus from the nature of surface and the position of generating circle. 3) Able to interpret the given mechanisms and locus of points.	
3. Orthographic projections - (Total 2 Sheets) Two objects by first angle projection method – (1 Sheet) Redraw the same sheet using CAD – (1 Sheet)	1) Develop ability to interpret first angle projection method. 2) To interpret and able to solve problem on orthographic projection of given object.	4. Develop ability to draw orthographic projections by first angle projection method
4. Isometric projection - (Total 2 sheets) Two objects one by true scale and another by isometric scale. (simple objects) - (1 sheet) Redraw the same sheet using CAD - (1 sheet)	1) Develop ability to differentiate between isometric view and isometric projections. 2) To differentiate between Isometric scale and true scale.	1. Develop ability to draw isometric views and isometric projections from given orthographic views of an object using computer.
5. **Projections of line and planes.** – (1 Sheet) Two problems on Projection of lines and two problems on Projection of Planes.	1) To develop ability to differentiate between true length and apparent length. 2) To interpret the position lines and plane with reference plane.	1) Able to draw Orthographic Projections of line and planes.
List of Practice Oriented Projects: - 1) To draw layout of visited Industry, College using CAD 2) To draw orthographic projection of given machine element using CAD		

BASIC WORKSHOP PRACTICE

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	20	2
01113/ 02213	L	T	P/S	ESE	:	25	
	-	—	04	Internal Exam.	:	07	
				External Exam.	:	18	

Contents (Details Of Theory Contents)		Hrs/week
Unit -1	**CARPENTRY SHOP** 1. Introduction. 2. Various types of woods. 3. Different types of tools, machines and accessories.	
Unit -2	**WELDING SHOP** : 1. Introduction 2. types of welding, ARC welding, Gas welding, Gas Cutting. 3. welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece. 4. different types of flame. 5. Elementary symbolic representation, 6. Safety precautions in welding safety equipments and its use in welding processes.	
Unit – 3	**FITTING SHOP**: 1. Introduction	
	2. Various marking, measuring, cutting, holding and striking tools. 3. Different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc. 4. Working Principle of Drilling machine, Tapping dies its use. 5. Safety precautions and safety equipments.	
Unit – 4	**PLUMBING SHOP**: 1. Introduction. 2. Various marking, measuring, cutting, holding and striking tools. 3. Different G.I. pipes, PVC pipes, flexible pipes used in practice. 4. G. I. pipes and PVC pipes fittings and accessories, Adhesive solvents-chemical action, Piping layout.	
Unit – 5	**SHEET METAL SHOP.** 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions.	
	Total	
Skill to be developed:		
	Intellectual Skills: 1. Ability to read job drawing 2. Ability to identify and select proper material, tools, equipments and machine. 3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.	

	Motor Skills: 1. Ability to set tools, work piece, and machines for desired operations. 2. Ability to complete job as per job drawing in allotted time. 3. Ability to use safety equipment and follow safety procedures during operations. 4. Ability to inspect the job for confirming desired dimensions and shape. 5. Ability to acquire hands-on experience.

Notes: 1] The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.
2] The workshop diary shall be maintained by each student duly signed by instructor of respective shop

Sr.No.	Details Of Practical Contents
01	**WOOD WORKING SHOP:** • Demonstration of different wood working tools / machines.
	• Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. • One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
02	**WELDING SHOP** : • Demonstration of different welding tools / machines. • Demonstration on Arc Welding, Gas Welding, gas cutting and rebuilding of broken parts with welding. • One simple job involving butt and lap joint.
03	**FITTING SHOP**: • Demonstration of different fitting tools and drilling machines and power tools. • Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc. • One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.
04	**PLUMBING SHOP**: • Demonstration of different plumbing tools • Demonstration of different operations in plumbing, observing different pipe joints and pipe accessories. Different samples of PVC pipes and PVC pipe fittings. • One job on simple pipe joint with nipple coupling for standard pipe. Pipe threading using standard die sets.
05	**SHEET METAL SHOP:** • Demonstration of different sheet metal tools / machines. • Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, soldering and riveting. • One simple job involving sheet metal operations and soldering and riveting.