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	1601101	02	03	10	20	70	100	28	40	02
2.	Basic Chemistry	1601102	02	03	10	20	70	100	28	40	02
3.	Basic Mathematics	1601103	05	03	10	20	70	100	28	40	05
4.	Communication Skill-I	1601104	02	03	10	20	70	100	28	40	02
5.	Engg. Graphics	1601105	02	03	-	-	30	30	12	12	02
6.	Computer Fundamentals	1601106	02	03	-	-	50	50	20	20	02
		Total:-	**15**				**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(A)	External(B)			
7.	Basic Physics Lab.	1601107	02	03	15	35	50	20	01
8.	Basic Chemistry Lab	1601108	02	03	15	35	50	20	01
9.	Computer Fundamental	1601109	02	03	15	35	50	20	01
10.	Basic Workshop Practice	1601110	02	06	15	35	50	20	01
		Total:-	**08**				**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)	1601111	02	25	00	25	10	01
12.	Engg. Graphics	1601112	04	06	14	20	08	02
13.	Basic Workshop Practice	1601113	04	07	18	25	10	02
	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
	No. of Periods Per Week			Full Marks	:	100	
1601101	L	T	P/S	ESE	:	70	02
	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, Aluminum 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. **3.2 Gas laws and specific heats of gases:** Boyle's law, Charles's law, Gay Lussac'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).	**02** **04**	**06** **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 PHYSICS**	**5.1 Photo electricity :** Plank's hypothesis, properties of photons, photo electric effect, 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** **03**	**08** **06**
	Total	**33**	**70**

Text/Reference Books :-

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Physics –I	V. Rajendran	Tata McGraw- Hill raw- Hill publication, New Delhi
(ii)	Applied Physics	Arthur Beiser.	Tata McGraw- Hill raw- Hill publication, New Delhi
(iii)	Engineering. Physics	R.K. Gaur & S.L. Gupta.	Dhanpat Rai Publication, New Delhi.
(iv)	Physics	Resnick and Halliday	-
(v)	Concept of Physics Part-I&II	H. C. Verma	-
(vi)	Basic Physics	Roshan Kr. Sinha	Foundation Publishing House

BASIC CHEMISTRY

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1601102	L	T	P/S	ESE	:	70	02
	02	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents (Theory)		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 / 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.	**06**	**14**
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, Accelerators, 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 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.	**09**	**18**
	Total	**32**	**70**

Text/Reference Books:-

	Titles of the Book	**Name of Authors.**	**Name of the Publisher**
(i)	Engineering Chemistry	Jain & Jain	Dhanpat Rai and Sons
(ii)	Engineering Chemistry	S.S. Dara	S. Chand Publication
(iii)	Industrial Chemistry	B.K. Sharma	Goel Publication
(iv)	Environmental Chemistry & Pollution Control.	S.S. Dara	S. Chand Publication
(v)	Basic Chemistry	Sanjay Kumar, Rahul Kumar	Foundation Publishing House

BASIC MATHEMATICS

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1601103	L	T	P/S	ESE	:	70	05
	05	-	-	TA	:	10	
	-	-	-	CT	:	20	

Contents (Name of Topics)		Hrs/week	Marks
Unit -1	**ALGEBRA** **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.	01	01
	1.2 PARTIAL FRACTION : 1.21 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
	1.3 DETERMINANT AND MATRICES : **Determinant ---------- 4 Marks** 1.3.1 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** 1.3.3 Definition of a matrix of order m x n types of matrices. 1.3.4 Algebra of matrices such as equality, addition, Subtraction, scalar multiplication and multiplication. 1.3.5 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. 1.3.7 Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion method.	12	15
	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 Trigonometric ratios of 0^0, 30^0, 45^0 etc. 2.1.3 Fundamental identities.	02	02
	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. 3.2.4 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	**63**	**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

Text/Reference Books:-

	Titles of the Book	**Name of Authors.**	**Name of the Publisher**
(i)	Mathematics for Polytechnic	S.P. Deshpande	Pune Vidyarthi Griha
(ii)	Trigonometry	S.L. Lonely	S. Chand Publication
(iii)	Higher Algebra	H.S. Hall & S.R. Knight	Metric edition, Book Palace, New Delhi
(iv)	College Algebra	Frc. G. Valles	Charotar Publication
(v)	Matrices	Aryes.	Schuam series, McGraw Hill
(vi)	Higher Engineering Mathematics	B.S. Grewal	Khanna Publications New Delhi
(vii)	Engineering Mathematics	S.S. Sastry	Prentice Hall of India
(viii)	Basic Mathematics	Sindhu Prasad	Foundation Publishing House

COMMUNICATION SKILL-I

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1601104	L	T	P/S	ESE	:	70	02
	02	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents		Hrs/week	Marks
	ENGLISH		
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		Hrs/week	Marks
	खंड–I 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।	03	05
	खंड–II व्याकरण के नियमों का ज्ञान एवं उनका प्रयोग।	02	01
	खंड–III अनुच्छेद एवं गद्यांश :– 1. अनुच्छेद लेखन 2. अपठित गद्यांश एवं प्रश्नोत्तर	02	05

खंड–IV	**औपचारिक पत्र लेखन :–** 1. कार्यालयी पत्र 2. प्रेस–सूचना 3. प्रेस–विज्ञप्ति 4. प्रतिवेदन 5. व्यावसायिक पत्र लेखन 6. नौकरी के लिए आवेदन–पत्र 7. बायोडाटा	04	05
खंड–V	**क्रियात्मक / व्यावहारिक :–** 1. शब्दों का सही उच्चारण 2. मौखिक संप्रेषण / वक्तूता शैली का विकास 3. समुचित शारीरिक भाषा का प्रयोग 4. संवाद कौशल	03	04
	• **कार्य भार (Assignments) :–** 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	20

Text/Reference Books:-

	Titles of the Book	**Name of Authors.**	**Name of the Publisher**
(i)	Contemporary English	David Green	Macmillan
(ii)	English Grammar and Composition	R.C. Jain	Macmillan
(iii)	Thesaurus	Rodgers	Oriental Longman
(iv)	Dictionary	Oxford	Oxford University
(v)	Dictionary	Longman	Oriental Longman
(vi)	English for Practical Purposes	Z.N. Patil	Macmillan
(vii)	English at Workplace	Editor Mukti Sanyal	Macmillan
(viii)	Communication Skill-I	Kajari Guha	Foundation Publishing House
(ix)	English Grammar Just for you	Rajeevan Karal	Oxford Univ. Press
(x)	A Practical Guide to English Grammar	Dr. K.P. Thakur	Bharti Bhawan
(xi)	Essentials of English Grammar	N.K. Aggarwala	Goyal Brother Prakashan
(xii)	A student's Grammar of the English language	Sidney greenbaum & Randorph	Quirk Pearson Education

ENGG. GRAPHICS

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	30	
1601105	L	T	P/S	ESE	:	30	02
	02	—	—	—		—	

Contents (Theory)		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 Point:** 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 2.3 **To 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. 2.4 **To draw involutes of circle & polygon (up to hexagon) :** 2.5 To draw a cycloid, 21 picycloids, 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) 4.3 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**

Text/Reference Books:-

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Engineering Drawing	N.D. Bhatta	Charotar Publishing House
(ii)	Engineering Drawing & Graphics +Auto CAD	K. Venugopal	New Age Publication
(iii)	Engineering Drawing	R.K. Dhawan	S. Chand Co.
(iv)	Engineering Drawing	P.J. Shah	-
(v)	Engineering Graphics	K.R. Mohan	Dhanpat Rai and Publication Co.

(vi)	Engineering Graphics	Dharmendra Kumar	Foundation Publishing House

COMPUTER FUNDAMENTALS

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1601106	L	T	P/S	ESE	:	50	02
	02	—	—	—		-	

CONTENTS		Hrs/wee	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	**03**	**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	**03**	**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.	**03**	**09**
Unit – 4	**Introduction To Internet :** What is Internet Equipment Required for Internet connection Sending & receiving Emails Browsing the WWW Creating own Email Account Internet chatting.	**02**	**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 research work, real-time, point of sale terminals, financial transaction terminals.	**02**	**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.	**03**	**09**
	Total	**16**	**50**

Text/Reference Books:-

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Comdex Computer Course kit	Vikas Gupta	Dreamtech
(ii)	Information Technology for Management	Henry Lucas	Tata McGraw Hills
(iii)	Computer Fundamentals Architecture and Organization	B. Ram	New Age International Publisher
(iv)	Computer Fundamentals	M.P. Singh	Foundation Publishing House

BASIC PHYSICS LAB

Subject Code	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1601107	L	T	P/S	ESE	:	50	01
	-	—	02	Internal Exam.	:	15	
	—	—	—	External Exam.	:	35	

Laboratory Experiments(Any ten experiments to be performed)
1. Use of vernier calipers for the measurement of dimensions of given object.
2. Use of micrometer screw gauge for the measurement of dimensions of given object
3. Determine the Young's modulus of material of wire using Searle's apparatus.
4. To observe rise in water level through capillaries of different bores.
5. Determine coefficient of viscosity of given oil using Stoke's Method.
6. Verification of Boyle's law.
7. Measurement of unknown temperature using thermocouple.
8. Determine the coefficient of linear expansion of given material of rod using Pullinger's apparatus.
9. To observe the divergence of laser light with respect to distance.
10. Plot characteristics of photoelectric cell (Photoelectric current verses intensity of light and voltage applied).
11. Comparison of Illuminating Power (Luminous intensity) of two light sources using photoelectric cell.
12. Verification of Charles's law.

BASIC CHEMISTRY LAB

Subject Code	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1601108	L	T	P/S	ESE	:	50	01
	-	—	02	Internal Exam.	:	15	
	—	—	—	External Exam.	:	35	

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	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1601109	L	T	P/S	ESE	:	50	01
	-	—	02	Internal Exam.	:	15	
	—	—	—	External Exam.	:	35	

Sr. No	List of Practicals
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 Auto Content wizard, Starting the Auto Content wizard Selecting a presentation type within the Auto Content 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	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1601110	L	T	P/S	ESE	:	50	01
	-	—	02	Internal Exam.	:	15	
	—	—	—	External Exam.	:	35	

S.No	List Of Practicals
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.

Text/Reference Books:-

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Workshop Technology	S.K. Hajara Chaudhary	Media Promotors and Publishers, New Delhi
(ii)	Workshop Technology	B.S. Raghuwanshi	Dhanpat Rai and Sons, New Delhi
(iii)	Production Technology	R.K. Jain	Khanna Publishers, New Delhi
(iv)	Workshop Technology	H.S. Bawa	Tata McGraw Hill Publishers, New Delhi
(v)	Mechanical Engineering Handbook	Kent's	John Wiley and Sons, New York

ENGLISH (LANGUAGE LAB)

Subject Code	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	25	
1601111	L	T	P/S	ESE	:	25	01
	-	—	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)

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)

ENGINEERING GRAPHICS

Subject Code	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	20	
1601112	L	T	P/S	ESE	:	20	02
	-	—	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. 5 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) i) Three different curves are to be draw using any one method. ii) Draw locus of point on any one mechanism	1) To develop ability to differentiate between conic and curves. 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.	1. To develop ability to draw different types of curves.
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	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	25	
1601113	L	T	P/S	ESE	:	25	02
	-	—	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.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

Ist Semester DIPLOMA in Agricultural Engg./ Chemical Engg./ Civil Engg./ Civil (Rural)/ Electronics Engg. / Textile Engg./Ceramics Engg./MOP/ Library& Information Science/ CDGM/Architectural Assistantship/Mechanical Engg.(Auto)/ Printing Tech./ Electro. &Comm. Engg./ Electrical & Electronics Engg./ Instrumentation & Control.

(Group-II)

(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.	Communication Skills-II	1602101	02	03	10	20	70	100	28	40	02
2.	Engg. Mathematics	1602102	04	03	10	20	70	100	28	40	04
3.	Applied Science	1602103	03	03	10	20	70	100	28	40	03
4.	Engg. Mechanics	1602104	03	03	10	20	70	100	28	40	03
5.	Engg. Drawing	1602105	02	03	10	20	70	100	28	40	02
	Total:-		**14**				**350**	**500**			

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(A)	External(B)			
6.	Communication Skills (Language Lab)	1602106	01	03	25	00	25	10	01
7.	Applied Science	1602107	04	03	20	30	50	20	02
8.	Engineering Mechanics	1602108	02	03	07	18	25	10	01
	Total:-		**07**				**100**		

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	
9.	Engineering. Drawing	1602109	04	15	35	50	20	02
10.	Workshop Practice	1602110	04	15	35	50	20	02
11.	Development of Life	1602111	02	07	18	25	10	01
12.	Professional Practice	1602112	02	07	18	25	10	01
	Total:-		**12**			**150**		
Total Periods per week Each of duration One Hours			**33**			**Total Marks = 750**		**24**

COMMUNICATION SKILLS-II

Subject Code	Theory			No of Periods in One Session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1602101	L	T	P/S	ESE	:	70	02
	02	-	-	TA	:	10	
	-	-	-	CT	:	20	

Contents			
ENGLISH			
	Name of the Topic	Hrs/Week	Marks
Unit -1	**Introduction to communication :** 1.1 Definition , Communication Cycle/Process, 1.2 The elements of communication : sender- message – channel- Receiver –Feedback & Context. 1.3 Definition of Communication Process. 1.4 Stages in the process : defining the context, knowing the audience, designing the message, encoding , selecting proper channels, transmitting, receiving, decoding and giving feedback.	**02**	**06**
Unit -2	**Types of communication :** **2.1** Formal- Informal, Verbal- Nonverbal, Vertical- Horizontal- Diagonal.	**02**	**06**
Unit – 3	**Principals of effective communication :** 3.1 Definition of Effective Communication. 3.2 Communication Barriers & how to overcome them. 3.3 Developing effective messages: Thinking about purpose, knowing the audience, structuring the message, selecting proper channels, minimizing barriers & facilitating feedback.	**02**	**06**
Unit – 4	**Non verbal- graphic communication**: 4.1 Non- verbal codes: A- Kinesics , B- Proxemics , C – Haptics D-Vocalics , E- Physical appearance. F –Chronemics , G –Artifacts Aspects of Body Language Interpreting Visuals & illustrating with Visuals like Tables, Charts & graphs.	**04**	**12**
Unit – 5	**Formal written skills :** 5.1 Office Drafting: Circular, Notice , and Memo. 5.2 Job Application with resume. 5.3 Business correspondence: Enquiry, Order letter, Complaint letter, and Adjustment letter. 5.4 Report writing: Accident report, fall in production, Progress / Investigative. 5.5 Defining & describing objects & giving Instructions.	**06**	**20**
	Total	**16**	**50**

	<u>हिन्दी</u>	**Hrs/Week**	**Marks**
खंड–I	**संप्रेषणः–** 1. परिचय एवं प्रक्रिया। 2. संप्रेषण के तत्व –प्रेषक–संदेश–चैनल–ग्राहक फीडबैक एवं संदर्भ। 3. संप्रेषण प्रक्रिया की परिभाषा। 4. संप्रेषण प्रक्रिया के सोपान– संदर्भ श्रोता समुदाय, सदर्भ का स्वरूप, माध्यम का चयन। 5. प्रस्तुति में दृश्य, चार्ट टेबुल आदि का प्रयोग।	**02**	**05**

खंड–II	**संप्रेषण के प्रकारः–** 1. औपचारिक, अनौपचारिक 2. भाषिका एवं गैर भाषिक	**02**	**05**
खंड–III	**प्रभावशाली संप्रेषण की परिभाषा प्रकार :–** 1. परिभाषा 2. संप्रेषण 3. प्रभावशाली– संदेश की तैयारी एवं स्वरूप 4. फीडबैक	**02**	**05**
खंड–IV	**मौखिक संप्रेषण एवं शारीरिक भाषा प्रकारः–** 1. तौर तरीके एवं आधारभूत शिष्टाचार 2. शारीरिक भाषा द्वारा संप्रेषण 3. मुखाकृति द्वारा संप्रेषण 4. समूहिक परिचर्चा, विवाद, वक्तृत शैली का विकास • **<u>कार्य भार (Assignments):–</u>** 1. संप्रेषण प्रक्रिया से संबंधित डायग्राम 2. संप्रेषण के प्रकार एवं स्थिति 3. विषय के अनुसार कहानी लेखन एवं अनुच्छेद लेखन 4. तकनीकी एवं वैज्ञानिक शब्दावली 5. बैंक से संबंधित शब्दावली 6. व्यावसायिक पत्र	**02**	**05**
	Total	**08**	**20**
	Grand Total (English+ Hindi)	**24**	**70**

Text/Reference Books :-

	Tilles of the Book	**Name of Authors.**	**Name of the Publisher**
(i)	Developing Communication Skills	Krushna Mohan, Meera Banerji	Macmillan
(ii)	Communication Skills	Joyeeta Bhattacharya.	Reliable Series
(iii)	Every ones guide to effective writing	Jayakaran	Apple Publishing
(iv)	Communication Skills-II	Kajari Guha	Foundation Publishing House
(v)	Effectual Communication Skills	Bhupender Kour	S.K. Kataria & Sons.
(vi)	The Functional Aspects of Communication Skills	Dr. P. Prasad	S.K. Kataria & Sons.
(vii)	Communication Skills	Leena Sen	Prentice Hall of India Pvt. Ltd.
(viii)	Professional Communication	Dr. Raavee Tripathi	S.K. Kataria & Sons.
(ix)	Technical Communication for Engineers	Shalini Verma	Vikas Publishing Home Pvt. Ltd.

ENGINEERING MATHEMATICS

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1602102	L	T	P/S	ESE	:	70	04
	04	-	-	TA	:	10	
	-	-	-	CT	:	20	

Contents		Hrs/ week	Marks
Unit -1	**Function and Limit :** **1.1 Function** 1.1.1 Definitions of variable, constant, intervals such as open, closed, semi-open etc. 1.1.2 Definition of Function, value of a function and types of functions, Simple Examples. **1.2 Limits** 1.2.1 Definition of neighborhood, concept and definition limit. 1.2.2 Limits of algebraic, trigonometric, exponential and logarithmic functions with simple examples.	**03** **06**	**05** **10**
Unit -2	**Derivatives :** **2.1** Definition of Derivatives, notations. 2.2 Derivatives of Standard Functions 2.3 Rules of Differentiation. (Without proof). Such as Derivatives of Sum or difference, scalar multiplication, Product and quotient. 2.4 Derivatives of composite function (Chain rule) 2.5 Derivatives of inverse and inverse trigonometric functions. 2.6 Derivatives of Implicit Function 2.7 Logarithmic differentiation 2.8 Derivatives of parametric Functions. 2.9 Derivatives of one function w.r.t another function 2.10 Second order Differentiation.	**12**	**18**
Unit – 3	**Statistics And Probability :** **3.1 Statistics** 3.1.1 Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. 3.1.2 Graphical representation (Histogram and Ogive Curves) to find mode and median. 3.1.3 Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations. **3.2 Probability** 3.2.1 Definition of random experiment, sample space, event, Occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). 3.2.2 Definition of Probability, addition and multiplication theorems of Probability	**08** **04**	**10** **05**

Unit – 4	**4.1 Applications Of Derivative** 4.1.1 Geometrical meaning of Derivative, Equation of tangent and Normal. 4.1.2 Rates and Motion 4.1.3 Maxima and minima 4.1.4 Radius of Curvature **4.2 Complex number** 4.2.1 Definition of Complex number. Cartesian, polar, Exponential forms of Complex number. 4.2.2 Algebra of Complex number(Equality, addition, Subtraction, Multiplication and Division) 4.2.3 De-Moivre's theorem (without proof) and simple problems. Euler's form of Circular functions, hyperbolic functions and relations between circular &hyperbolic functions	**05** **04**	**08** **04**
Unit – 05	**5.1 Numerical Solution of Algebraic Equations** 5.1.1 Bisection method, Regula-Falsi method and Newton- Raphson method. **5.2 Numerical Solution of Simultaneous Equations** 5.2.1 Gauss elimination method 5.2.2 Iterative methods-Gauss Seidal and Jacobi's method	**03** **03**	**05** **05**
	Total	**48**	**70**

Text/Reference Books :-

	Tilles of the Book	**Name of Authors.**	**Name of the Publisher**
(i)	Mathematics for Polytechnic	S.P. Deshpande	Pune Vidyarthi Griha Prakashan Pune.
(ii)	Calculus single Variable	Robert T Smith	Tata McGraw Hill
(iii)	Advanced Engineering Mathematics	Dass H.K.	S. Chand Publication, New Delhi
(iv)	Fundamentals of Mathematical Statistics	S.C. Gupta and Kapoor	S. Chand Publication New Delhi
(v)	Higher Engineering Mathematics	B.S. Grewal	Khanna Publication, New Delhi
(vi)	Applied Mathematics	P.N. Wartikar	Pune Vidyarthi Griha Prakashan, Pune.
(vii)	Engineering Mathematics	Sindhu Prasad	Foundation Publishing House

APPLIED SCIENCE

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1602103	L	T	P/S	ESE	:	70	03
	03	-	-	TA	:	10	
	-	—	-	CT	:	20	

(A) PHYSICS Contents		Hrs/week	Marks
Unit -1	**1. Kinematics** **1.1 Rectilinear Motion** Equations of Motions- $v = u+at$, $S = ut+1/2at^2$, $V^2 = u^2+2as$ (only equation), Distance traveled by particle in n^{th} second, Velocity Time Diagrams-uniform velocity, uniform acceleration and uniform retardation, equations of motion for motion under gravity. **1.2 Angular Motion** Definition of angular displacement, angular velocity, angular acceleration, Relation between angular velocity and linear velocity, Three equations of circular motion (no derivation) angular distance traveled by particle in n^{th} second (only equation), Definition of S.H.M. and S.H.M. as projection of uniform circular motion on any one diameter, Equation of S.H.M. and Graphical representation of displacement ,velocity, acceleration of particle in S.H.M. for S.H.M. starting from mean position and from extreme position.	**14**	**15**
Unit -2	**2. Kinetics** **2.1** Definitions of momentum, impulse, impulsive force, Statements of Newton's laws of motion and with equations, Applications of laws of motion—Recoil of gun, Motion of two connected bodies by light inextensible string passing over smooth pulley, Motion of lift. **2.2 Work, Power, Energy** Definition of work, power and energy, equations for P.E. K.E., Work energy principle, Representation of work by using graph, Work done by a torque(no derivation).		
Unit -3	**3. Non –destructive testing of Materials.** **3.1 T**esting methods of materials -Destructive and Nondestructive, Advantages and Limitations of N.D.T., Names of N.D.T. Methods used in industries, Factors on Which selection of N.D.T. dependents, Study of Principle, Set up, Procedure. **3.2** Working, Advantages, limitations, Applications and Application code of following N.D.T. methods -Penetrant method, Magnetic particle method, Radiography, Ultrasonic, Thermography.	**05**	**10**
Unit -4	**Acoustics and Indoor Lighting of Buildings** **4.1 Acoustics** Weber and Fetcher's law, limit of intensity and loudness, echo, Reverberation and reverberation time (Sabine's formula) **,**Timbre (quality of sound), Pitch or Frequency of sound. Factors affecting Acoustical planning of auditorium-- echo, reverberation, creep, focusing, standing wave, coefficient of absorption, sound insulation, noise pollution and the different ways of controlling these factors. **4.2 Indoor lighting** Definition of luminous intensity, intensity of illumination with their SI units, Inverse square law and Photometric equation, Bunsen's photometer— ray diagram, working and applications, Need of indoor lighting, Indoor lighting schemes and Factors Affecting Indoor Lighting.	**05**	**10**
	Total	**24**	**35**

Text/Reference Books :-

	Tilles of the Book	Name of Authors.	Name of the Publisher
(i)	Physics –I	V. Rajendran	Tata McGraw - Hill
(ii)	Applied Physics	Arthur Beiser	Tata McGraw - Hill
(iii)	Engineering Physics	R.K. Gaurand and S.L. Gupta	Dhanpatrai
(iv)	Phyiscs	Resrie and Holliday	-
(v)	Concept of Physics Part-I, II	H.C. Verma	-
(vi)	Applied science	Roshan Kr. Sinha	Foundation Publishing House

(B) CHEMISTRY **Contents**		**Hrs/ week**	**Marks**
Unit -1	**Electrochemistry** Definition of Electrolyte & Conductor, Difference between Metallic & Electrolytic Conduction, Ionisation, Degree of Ionisation & Factors Affecting Degree of Ionisation, Conductivity of Electrolytes. Definition of Electrochemical Cell, Battery, Charge, Discharge, Closed Circuit Voltage, Open Circuit Voltage, EMF, Internal Resistance, Separator, Classification of Batteries such as Primary, Secondary & Reserve with Examples. Industrial Application of Electrolysis – Metallic or Protective Factors for Selection of Method of Coating, Process of Electroplating, Electrorefining, Electrometallurgy (Applications of Electroplating), Impregnated Coating or Cementation on Base Metal Steel - Coating Metal Zn (Sheradizing),Cr (Chomozing), Al (Colorizing), Applications, Advantages & Disadvantages.	**05**	**07**
Unit -2	**Non Metallic Engineering Materials** (Plastic, Rubber, Insulators, Refractories, Composite Material, Ceramics) **1. Engineering Plastic:** Special Characteristics & Engineering Applications of Polyamides or Nylons, Polycarbonates (Like Lexan, Merlan), Polyurethanes (Like Perlon – U), Silicons, Polyacetals, Teflon, Laminated Plastic, Thermocole, Reinforced Plastic. **2. Ceramics:** Definition, Properties & Engineering Applications, Types – Structural Ceramics, Facing Material, Refractories, Fine Ceramics, Special Ceramics. **3. Refractories:** Definition, Properties, Applications & Uses of Fire Clay, Bricks, Silica Bricks. **4. Composite Materials:** Definition, Properties, Advantages, Applications & Examples.	**05**	**05**

Unit -3	**Metals & lloys** **Metals** – Metallurgy of Iron, Terms Involved in Metallurgy, Indian Resources of Fe, Imp Ores, Extraction, Smelting in Blast Furnace, Chemical Reactions in Blast Furnace, Products of Blast Furnace, their Composition, Application, Commercial Forms of Iron, (Pig Iron / Cast Iron, Wrought or Malleable Steel), their Composition, Properties & Applications, Types of Casting (Chilled Casting, Centrifugal Casting & Malleable Casting), Heat Treatment, Heat Treatment of Cast Iron & Steel. **Alloys** – Definition, Types, Ferrous Alloys – Steel, Composition, Properties & Applications of Plain Carbon Steel (Low Carbon, Medium Carbon, High Carbon & Very Hard Steel) & Alloy Steels, (Heat Resisting, Shock Resisting, Magnetic, Stainless, Tool Steel & HSS), Effect of Various Alloying Elements (Cr, W, V, Ni, Mn, Mo, Si) etc. on Steel. Non-Ferrous Alloys – Copper Alloy – Brass, Bronze, Nickel Silver or German Silver, their Composition, Properties & Applications, Aluminium Alloy – Duralumin, Bearing Alloy – Babbitt Metal, Solders – Soft Solder, Brazing Alloy, Tinamann's Solder, Nickel Alloy – Monel Metal, Low Melting Alloys – Woods Metal.	**08**	**10**
Unit -4	**Corrosion** Definition, Types, Atmospheric or Chemical Corrosion, Mechanism, Factors Affecting Atmospheric, Corrosion & Immersed Corrosion or Electrochemical Corrosion, Mechanism, Protection of Metals by Purification of Metals, Alloy Formation, Cathode Protection, Controlling the External Conditions & Application of Protective Coatings i.e. Galvanising, Tinning, Metal Spraying, Sherardizing, Electroplating, Metal Clodding, Cementation or Diffusion Method, their Definition, Procedure, Uses, Advantages & Disadvantages, Examples of Non Corrosive Materials, Protection of Corrosion by the Use of Organic Coating Like Paint, Lacquer, Enamels, Emulsion Paints, Special Paints, their Properties & Uses. Special Paints – Heat Resistant, Cellulose Paint, Coaltar Paint, Antifouling Paint their constituents & applications.	**06**	**08**
Unit -5	**Lubricant** Lubricant, Types, Lubrication Mechanism by Fluid Film, Baundary, Extreme Pressure, Physical Characteristics of Lubricants Such as Viscosity, Viscosity Index, Oilness, Volatility, Flash & Fire Point, Cloud & Pour Point, Chemical Characteristics such as Acid Value or Neutralization Number, Emulsification, Saponification Value, Selection of Lubricants for Various Types of Machineries.	**03**	**05**
	Total	**27**	**35**

Text/Reference Books :-

	Tilles of the Book	**Name of Authors.**	**Name of the Publisher**
(i)	Engineering Chemistry	Jain & Jain	Dhanpat Rai and Sons
(ii)	Engineering Chemistry	S.S. Dara	S. Chand Publication
(iii)	Industrial Chemistry	B.K. Sharma	Goel Publication
(iv)	Environmental Chemistry & Pollution Control	S.S. Dara	S. Chand Publication
(v)	Applied science	Sanjay Kumar, Rahul Kumar	Foundation Publishing House

ENGINEERING MECHANICS

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1602104	L	T	P/S	ESE	:	70	03
	03	-	—	TA	:	10	
	—	—	—	CT	:	20	

Contents		Hrs/week	Marks
Unit -1	**Force** a. **Fundamentals: -** Definitions of mechanics, statics, dynamics. Engineering Mechanics, body, rigid body, mass, weight, length, time, scalar and vector, fundamental units, derived units, S.I. units. b. **Force**: - Definition of a force, unit force, Newton, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility. c. **Resolution of a force:** Definition, Method of resolution, Types of component forces, Perpendicular components and Non-perpendicular components. d. **Moment of a force: -** Definition, measurement of moment of a force, S. I. unit, geometrical meaning of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments Varignon's theorem of moment and it's use, couple – definition, S.I. unit, measurement of a couple, properties of couple. e. **Force system: -** Definition, classification of force system according to plane and line of action f. **Composition of Forces**: - Definition, Resultant force, methods of composition of forces, I – Analytical method:– (i) Trigonometric method (law of parallelogram of forces) (ii) Algebraic method (method of resolution), II – Graphical method: - Introduction, space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent, non-concurrent and parallel force system by analytical and graphical method.	**12**	**15**

Unit -2	**Equilibrium:** 2.1 Definition, conditions of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram. 2.2 Lami's Theorem – statement and explanation, Application of Lami's theorem for solving various engineering problems. 2.3 Equilibrant – Definition, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system. 2.4 Beams – Definition, Types of beams (cantilever, simply supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged, roller), classification of loads, point load, uniformly distributed load. Reactions of a simply supported and over hanging beam by analytical and graphical method.	**10**	**15**
Unit – 3	**Friction:** 3.1 Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction angle of repose and coeff. Of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction. 3.2 Equilibrium of bodies on level plane –external force applied horizontal and inclined up and down. 3.3 Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane, horizontal and incline to inclined plane. 3.4 Ladder friction, Wedge and block.	**08**	**15**
Unit – 4	**Centroid and Centre Of Gravity:** 4.1 **Centroid:** Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure. 4.2 **Center of gravity:** Definition, center of gravity. Of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids.	**08**	**10**
Unit – 5	**Simple Machines:** 5.1 Definitions of simple machine, compound machine , load , effort , mechanical advantage , velocity ratio , input on a machine ,output of a machine ,efficiency of a machine , expression for mechanical advantage , velocity ratio and efficiency of a machine. Ideal machine, ideal effort and ideal load, friction in machines, effort lost in friction and frictional load. 5.2 Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self locking machine. 5.3 Study of simple machines : Simple axle and wheel, differential axle and wheel, Weston's differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack, pulleys : First, second and third system of pulleys, gear train, hoist mechanism.	**10**	**15**
	Total	**48**	**70**

Text/Reference Books :-

	Tilles of the Book	**Name of Authors.**	**Name of the Publisher**
(i)	Engineering Mechanics	Beer-Johnson	Tata McGraw Hill, Delhi
(ii)	Engineering Mechanics	Basu	Tata McGraw Hill, Delhi
(iii)	Vector Mechanics for Engineers Vol. - I & II	Joslph F. Shelley	Tata McGraw Hill, Delhi
(iv)	Engg. Mechanics	Ram Manohar Pandey	Foundation Publishing House

ENGINEERING DRAWING

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1602105	L	T	P/S	ESE	:	70	02
	02	-	-	TA	:	10	
	-	—	-	CT	:	20	

Contents (Theory)		Hrs/week	Marks
Unit -1	**Sectional Views.** 1.1 Types of sections 1.2 Conversion of pictorial view into sectional orthographic views (First Angle Projection Method only)	**03**	**10**
Unit -2	**Missing Views.** 2.1 Draw missing view from the given Orthographic views - simple components (First Angle Projection Method only)	**01**	**05**
Unit – 3	**Isometric Projection** 3.1 Conversion of Orthographic Views into Isometric view/projection (Including rectangular, cylindrical objects, representation of slots on sloping as well as plane surfaces).	**03**	**15**
Unit – 4	**Projections of Solids.** 4.1 Projections of Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube with their axes inclined to one reference plane and parallel to other.	**02**	**10**
Unit – 5	**Sections of Solids.** 5.1 Solids: -Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube. 5.2 Cone, Pyramid and Tetrahedron resting on their base on Horizontal Plane. 5.3 Prism, Cylinder: -a)Axis parallel to both the reference plane b) Resting on their base on HP. 5.4 Section plane inclined to one reference plane and perpendicular to other.	**03**	**10**
Unit – 6	**Developments of Surfaces.** Developments of Lateral surfaces of cube, prisms, cylinder, pyramids, cone and their applications such as tray, funnel, Chimney, pipe bends etc.	**02**	**10**
Unit – 7	**Free Hand Sketches** 7.1 Free hand sketches of nuts, bolts, rivets, threads, split pin, foundation bolts,	**02**	**10**
	Total	**16**	**70**

Text/Reference Books :-

	Tilles of the Book	Name of Authors.	Name of the Publisher
(i)	Engineering Drawing	N.D. Bhatta	Charotkar Publishing House
(ii)	Engineering Drawing	R.K. Dhawan	S. Chand Co.
(iii)	Engineering Drawing	P.J. Shah	-
(iv)	Machine Drawing	N.D. Bhatta	Charotkar Publishing House
(v)	Engineering Drawing and Graphics + Auto CAD	K. Venugopal	New Age Publication
(vi)	Engineering Graphics	K.R. Mohan	Dhanpat Rai and Publication Co.
(vii)	Machine Drawing	R.K. Dhawan	S. Chand Co.
(viii)	Engineering Drawing	Dharmendra Kumar	Foundation Publishing House

COMMUNICATION SKILLS (LANGUAGE LAB)

Subject Code	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	25	
1602106	L	T	P/S	ESE	:	25	01
	-	—	01	Internal Exam.	:	25	
	—	—	—	External Exam.	:	00	

Assignments:

1. Communication Cycle (With The Help Of Diagram)
2. Communication Situations (List Of 5 Communication situations stating the types of Communication
3. Barriers That Hinder A Particular Communication Situation. (State the type of barrier, and how to overcome them)
4. Developing A Story Or A Paragraph For The Given Topic Sentence.(in a group of 5 – 6 students)
5. Describing Various Equipments.
6. Identifying The Various Sentences With Their Type Of Writing. (e.g. Scientific, Legal, Colloquial etc.)
7. Business Letters
8. Letters Of Suggestion
9. Comparative Time Table Of 2 Students
10. Description Of Two Different Persons.(seeing the picture)
11. Letter To The Librarian, Principal
12. Report Writing.

NOTE: The above assignments are suggested to be completed in the prescribed work-book.

Text/Reference Books :-

	Tilles of the Book	Name of Authors.	Name of the Publisher
1.	Spoken English	M.C Sreevalsan.	Vikas Publishing House Pvt. Ltd
2.	English Conversation Practice	Erant Taylor	McGraw Hill Education (India) Pvt. Ltd.

APPLIED SCIENCE

Subject Code	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1602107	L	T	P/S	ESE	:	50	02
	-	—	04	Internal Exam.	:	20	
	—	—	—	External Exam.	:	30	

List of Practical:(PHYSICS)

1. To represent simple harmonic motion with the help of vertical oscillation of spring and to determine spring constant (K) (Stiffness Constant)
2. To determine time period of oscillation of compound bar pendulum and calculate acceleration due to gravity.
3. To determine the velocity of sound by using resonance tube
4. To compare luminous intensities of two luminous bodies by using Bunsen's photometer.
5. To calculate coefficient of absorption for acoustical materials
6. To determine Joule's constant (J) by electric method
7. To determine wavelength of Sodium light by using Newton's rings
8. To Verify Ampere's rule using Oersted's Experiment and find variation of intensity of magnetic field with Current and Distance.
9. To determine frequency of sound by using sonometer .
10. To calculate refractive index of material of prism using spectrometer device .
11. To determine the divergence of He-Ne laser beam.

List of Practical: (CHEMISTRY)

1 To determine neutralization point of weak acid and weak base by conductivity meter.

2 To determine end point of titration between dil. H_2SO_4 and $BaCl_2$ using conductivity meter.

3 To verify Faraday's second law of electrolysis.

4 To determine pH of given solution by using pH paper, universal indicator and pH meter.

5 To determine the strength of given hydrochloric acid solution by titrating it against sodium hydroxide solution using pH meter.

6 To determine percentage of copper from brass iodometrically.

7 To find the rate of corrosion of Al strip in acidic and basic medium graphically.

8 To determine thinner content in paint.

9 To determine acid value of given lubricant.

10 To determine viscosity of given oil by using Ostwald's viscometer.

11 To determine saponification value of given lubricant.

ENGINEERING MECHANICS

Subject Code	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	25	
1602108	L	T	P/S	ESE	:	25	01
	-	—	02	Internal Exam.	:	07	
	—	—	—	External Exam.	:	18	

Contents (Practical)	
Skills to be developed:	
1.Intellectual Skill:	A. Calculate the forces on given structure B. Interpret the results
2. Motor Skills:	A. Handle the equipment carefully B. Draw graph

Any five experiments from Group A,B and graphical solution in Group C :

Group A:

2) Verify law of polygon of forces
3) Verify law of moments
4) Verification of Lami's theorem
5) Forces in members of a jib crane.
6) Comparison of coefficient of friction of various pair of surfaces and
7) determination of angle of repose
8) Equilibrium of parallel forces – simply supported beam reactions.
9) Experimental location of center of gravity of plane plate of uniform thickness.

Group B: To find MA, VR, Efficiency, Ideal Effort, Effort lost in friction for various loads and establish law of machine and calculate maximum efficiency.

Also check the reversibility of a machine (Any five):

1) Differential axle and wheel
2) Weston's differential pulley block
3) Geared pulley block
4) Single purchase crab
5) Double purchase crab
6) Worm and worm wheel
7) Two sheave and three sheave pulley block
8) Screw jack.

Group C: A 2 Size drawing sheets containing graphical solutions for –

1) Concurrent force system : Two problems
2) Parallel force system : Two problems
3) Reactions of a beam : Two problems

ENGINEERING DRAWING

Subject Code	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1602109	L	T	P/S	ESE	:	50	02
	-	—	04	Internal Exam.	:	15	
	—	—	—	External Exam.	:	35	

Practical		
List of Practical	**Skills to be Developed**	
	Intellectual skill	**Motor Skill**
1.Sectional View **-** (Total 2 Sheets) Two objects by First Angle Projection Method – (1 Sheet) Redraw the same sheet using CAD - (1 Sheet)	1)To interpret sectional views of given object.	Develop ability to draw Sectional views Using computer.
2. Isometric projection : - (Total 2 sheets) Two objects one by true scale and another by isometric scale - (1 sheet) Draw **one** sheet having two problems in each sheet using CAD – (Plot any one)	1) Develop ability to differentiate between isometric view and isometric projections. 2) To differentiate between Isometric scale and true scale.	Develop ability to draw isometric views and isometric projections from given orthographic views of an object using computer.
3. Missing Views Two problems by first angle projection method - (1 Sheet)	1) To interpret the missing view from given orthographic views.	1) To develop ability to draw missing view from given orthographic views.
4. Projection of solids : Two problems on two different solids, one by axis of solid inclined to HP and parallel to VP and another problem by axis of solid inclined to VP and parallel to HP. – (1 Sheet)	1) To interpret the different Positions of solids with reference planes. 2) To develop ability to differentiate between true length of axis and apparent length of axis. 3) To develop ability to differentiate between true shape and apparent shape of solids.	1) To draw projections of different solids when axis is inclined or perpendicular to one of the reference plane.
5. Section of solids : Two problems on different solids. One problem, section plane inclined to HP and perpendicular to VP and in another problem, section plane inclined to VP and Perpendicular to HP. - (1 Sheet)	1) To differentiate between true shape and apparent shape of section. 2) To interpret the positions of section plane with reference planes.	1) To develop ability to draw sectional orthographic views of given solids, when it is cut by section plane in different position with reference planes. 2) Ability to draw true shape of section.
6. Development of surfaces : Any two problems on development of surfaces of different objects. - (1 Sheet)	1) Able to interpret the development of surfaces of different solids.	1) Ability to draw the development of surfaces of different objects in different shapes.
7. Free Hand Sketches : Any six figures on different topics. - (1 Sheet)	1) To differentiate between scale drawing and free hand drawing. 2) To differentiate between various parts of machine like nuts, bolts, screws, different threads, couplings etc.	1) Develop ability to draw orthographic views of different machine elements.

WORKSHOP PRACTICE

Subject Code	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1602110	L	T	P/S	ESE	:	50	02
	-	—	04	Internal Exam.	:	15	
	—	—	—	External Exam.	:	35	

Details of Practical		Hrs/week
Unit -1	**CARPENTERY SHOP:** • Any one composite job from the following involving different joint, turning and planning, surface finishing by emery paper, varnishing etc. like square stool, tea table, center table, chaurang, table lamp bed sofa-set, book rack. Cabinet, notice board, shows cases, tables chairs etc. Note:1] One job of standard size (Saleable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 6-8 hours of actual working 4] Student shall calculate the cost of material and labor cost for their job from the drawing.	
Unit -2	**WELDING SHOP** • Any one composite job from involving butt joint lap joint welding process, from the following like Grill, door, window frame, waste paper basket, Chappel stand, Corner flower stand chair , table frame (square pipe 25 mm) cooler frame (folding type) **Note:** 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work . 3] Job allotted should comprise of 6-8 hours of actual working operations. 4] Student shall calculate the cost of material and labor required for their job from the drawing.	
Unit – 3	**SMITHY SHOP** • Demonstration of different forging tools and Power Hammer. • Demonstration of different forging processes, likes shaping, caulking fullering, setting down operations etc. • One job like hook peg, flat chisel or any hardware item. • **Note**: 1]One job of standard size (Saleable/marketable article shall be preferred) 2] Job allotted should comprise of 4-6 hours of actual working operations. 3] Student shall calculate the cost of material and labor required for their job from the drawing.	
Unit – 4	**PLUMBING SHOP :** • Demonstration of PVC pipe joint with various fittings. • Exercise for students on preparing actual pipeline layout for G.I. Pipe or PVC pipe. Preparing actual drawing and bill of material. Note:1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 6-8 hours of actual working 4] Student shall calculate the cost of material and labor cost for their job from the drawing.	

Unit – 5	***SHEET METAL SHOP*** • One composite job from the following: Letter box, Trunk, Grain Container, Water-heater Container, Bucket, Waste Paper Basket, Cooler Tray, Water-draining Channel, etc. (including soldering and riveting) Note: 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 4-6 hours of actual working ions. 4] Student shall calculate the cost of material and labor cost required for their job from the drawing.	
Unit – 6	**Demonstration of power tools and practice of utility items.** • Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. • Making of electrical switchboard with 2 sockets and piano buttons and with electrical wiring. • Any other item as per the requirement of college/Deptt./	
	Total	**64**

DEVELOPMENT OF LIFE

Subject Code 1602111	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	ESE	:	25	
	-	—	02	Internal Exam.	:	07	
	—	—	—	External Exam.	:	18	

S.No	The Term Work Will Consist Of Following Assignments.
1	**Library search:-** Visit your Institute's Library and enlist the books available on the topic given by your teacher. Prepare a bibliography consisting name of the author, title of the book, Publication and place of publication.
2	Enlist the magazines, periodicals and journals being available in your library. Select any one of them and write down its content. **Choose a topic for presentation.**
3	Attend a seminar or a guest lecture, listen it carefully and note down the important points and prepare a report of the same.
4	Visit to any one place like historical/office/farms/development sites etc. and gather information through observation, print resources and interviewing the people.
5	(a) Prepare your individual time table for a week – (b) List down your daily activities. (c) Decide priorities to be given according to the urgency and importance of the activities.
6	Keep a diary for your individual indicating- planning of time, daily transactions, collection of good thoughts, important data, etc
7	Find out the causes of your stress that leads tension or frustration. Provide the ways to Avoid them or to reduce them.
8	Undergo the demonstration on yoga and meditation and practice it. Write your own views, feeling and experiences on it.
Note:- These are the **suggested assignment** for guide lines to the subject teacher. However the subject teachers can select, design any assignment relevant to the topic, keeping in mind the objectives of this subject.	

PROFESSIONAL PRACTICE

Subject Code	Term Work			No of Period in one session :			Credits
1602112	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	ESE	:	25	
	-	—	02	Internal Exam.	:	07	
	—	—	—	External Exam.	:	18	

Sr. No.	Activities
01	**Industrial Visits:** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form part of the term work. Visits to **any two** of the following : i) Nearby Petrol Pump.(fuel, oil, product specifications) ii) Automobile Service Station (Observation of Components / aggregates) iii) Engineering Workshop(Layout, Machines) iv) Dairy Plant / Water Treatment Plant
02	Lectures by Professional / Industrial Expert / Student Seminars based on information search to be organized from any THREE of the following areas : i) Pollution control. ii) Non destructive testing. iii) Acoustics. iv) Illumination / Lighting system. v) Fire Fighting / Safety Precautions and First aids. vi) Computer Networking and Security. vii) Topics related to Social Awareness such as – Traffic Control System, Career opportunities, Communication in Industry, Yoga Meditation, Aids awareness and health awareness.
03	**Group Discussion :** The students should discuss in a group of six to eight students and write a brief report on the same as a part of term work. Two topics for group discussions may be selected by the faculty members. Some of the suggested topics are – i) Sports ii) Current news items iii) Discipline and House Keeping iv) Current topics related to mechanical engineering field.
04	**Student Activities:** The students in a group of 3 to 4 will perform **any one** of the following activities (others similar activities may be considered Activity : i) Collect and study IS code for Engineering Drawing.. ii) Collecting information from Market: Nomenclatures and specifications of engineering materials. iii) Specifications of Lubricants. iv) Draw orthographic projections of a given simple machine element using and CAD software