STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN AUTOMOBILE ENGINEERING / MECH. ENGG.(AUTO)

(Effective from Session 2016-17 Batch)

THEORY

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME							
			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	Credits
1.	Applied Mathematics-II	1615301	04	03	10	20	70	100	28	40	03
2.	Mechanical Engineering Drawing	1625302	03	03	10	20	70	100	28	40	03
3.	Mechanics of Solids	1625303	02	03	10	20	70	100	28	40	02
4.	Mechanical Engineering Material	1625304	03	03	10	20	70	100	28	40	03
5.	Automobile Transmission Systems	1633305	02	03	10	20	70	100	28	40	02
		Total :-	**14**				**350**	**500**			

PRACTICAL

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME					
			Periods per Week	Hours of Exam.	Practical (ESE) Internal(A)	Practical (ESE) External(B)	Total Marks (A+B)	Pass Marks in the Subject	Credits
6.	Mechanics of Solids Lab.	1625306	02	03	15	35	50	20	01
7.	Automobile Transmission Systems Lab.	1633307	02	03	15	35	50	20	01
8.	Manufacturing Technology Lab.	1625308	04	03	15	35	50	20	03
Total :-			**08**				**150**		

TERM WORK

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME				
			Periods per Week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	Credits
9.	Mechanical Engineering Drawing (TW)	1625309	04	15	35	50	20	02
10.	Development of Life Skills – II (TW)	1625310	03	07	18	25	10	02
11.	Professional Practices- III (TW)	1625311	04	07	18	25	10	02
Total :-			**11**			**100**		**24**
Total Periods per week Each of duration One Hour			**33**	Total Marks = **750**				

APPLIED MATHEMATICS -II

(CIV/CIV(RURAL)/MECH./MECH.(AUTO)/AUTO. ENGG)

Subject Code 1615301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS :THEORY

	Name of the Topic	Hrs/week	Marks
Unit -1	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems.	**10**	**18**
	1.5 **Applications of definite integrals.** 1.5.1 Area under the curve. Area bounded by two curves, 1.5.2 Volume of revolution. 1.5.3 Centre of gravity of a rod, plane lamina. 1.5.4 Moment of Inertia of uniform rod, rectangular lamina 1.5.5 Theorems of parallel and perpendicular axes.	**08**	**10**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. **2.3 Applications of Differential equations.** 2.3.1 Rectilinear motion (motion under constant and variable acceleration) 2.3.2 Simple Harmonic Motion.	**10**	**10**
Unit - 3	**Probability Distribution** 3.1 Binomial distribution. 3.2 Poisson's distribution. 3.3 Normal distribution 3.4 Simple examples corresponding to production process.	**08**	**12**
Unit - 4	**Numerical Methods** **4.1 Solution of algebraic equations** Bisection method, Regulafalsi method and Newton – Raphson method. **4.2 Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss Seidal and Jacobi's methods.	**06**	**06**
	Total	**48**	**70**

Text/Reference Books:		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Advanced	Murray R Spiegel	Schaum outline series
Mathematics for Engineers and Scientist		McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India New Dehli
Numerical methods for Engg. 4^{th} ed.	Chapra	Tata McGraw Hill
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.
Applied Mathematics	R. Jasse Phagan	
Introduction to foundations of applied mathematics.	Mark. H. Holmes	
Applied Mathematics	Rajendra Pal, S.N. Malik	Foundation Publishing

MECHANICAL ENGINEERING DRAWING

(MECHANICAL ENGINEERING GROUP)

Subject Code 1625302	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Contents: Theory

Name of the Topic		Hrs/wee k	Marks
Unit -1	**Auxiliary views:** - Study of auxiliary planes, Projection of objects on auxiliary planes. Completing the regular views with the help of given auxiliary views (Use first angle method of projection)	**08**	**12**
Unit -2	**Intersection of solids:-** Curves of intersection of the surfaces of the solids in the following cases (a) Prism with prism, Cylinder with cylinder, Prism with Cylinder When (i) the axes are at 90□ □and intersecting (ii) The axes are at 90□ □and Offset (b) Cylinder with Cone When axis of cylinder is parallel to both the reference planes and cone resting on base on HP and with axis intersecting and offset from axis of cylinder	**08**	**12**
Unit - 3	**Developments of Surfaces:-** Developments of Lateral surfaces of cube, prisms, cylinder, pyramids, cone and their applications such as tray, funnel, Chimney, pipe bends etc.	**08**	**10**
	Conventional Representation:- 1. Standard convention using SP – 46 (1988) (a) Materials C.I., M.S, Brass, Bronze, Aluminum, wood, Glass, Concrete and Rubber (b) Long and short break in pipe, rod and shaft. (c) Ball and Roller bearing, pipe joints, cocks, valves, internal / external threads. (d) Various sections- Half, removed, revolved, offset, partial and aligned sections. (e) Knurling, serrated shafts, splined shafts, and chain wheels. (f) Springs with square and flat ends, Gears, sprocket wheel (g) Countersunk & counterbore. (h) Tapers	**04**	**08**
	Limits, Fits and Tolerances:- 1. Characteristics of surface roughness- Indication of machining symbol showing direction of lay, roughness grades, machining allowances, manufacturing methods. 2. Introduction to ISO system of tolerencing, dimensional tolerances, elements of interchangeable system, hole & shaft based system, limits, fits & allowances. Selection of fit. 3. Geometrical tolerances, tolerances of form and position and its geometric representation. 4. General welding symbols, sectional representation and symbols used in Engineering practices	**04**	**06**

	Details to Assembly:- 1. Introduction- 2. Couplings – Universal couplings & Oldham's Coupling 3. Bearing – Foot Step Bearing & Pedestal Bearing 4. Lathe tool Post 5. Machine vice & Pipe Vice 6. Screw Jack 7. Steam Stop Valve	**08**	**12**
	Assembly to Details:- 1. Introduction – 2. Pedestal Bearing 3. Lathe Tail Stock 4. Drilling Jig 5. Piston & connecting rod 6. Gland and Stuffing box Assembly 7. Valve – Not more than eight parts 8. Fast & loose pulley	**08**	**10**
	Total	**48**	**70**

Text / Reference Books:

Titles of the Book	**Name of Authors**	**Name of the Publisher**
Machine Drawing	N.D.Bhatt	Charotar Publication, Anand
Code of practice for general engineering drawing.	IS Code SP 46 (1988)	Engineering Drawing Practice for School and colleges
Production Drawing	L.K.Narayanan, P.Kannaich, K.VenkatReddy	New Age International Publication
Machine Drawing	P.S.Gill	S.K.Kataria and Sons
Engineering Graphics (For Topic on Auxiliary Views)	M.L.Dabhade	--
Machine Drawing	Sidheshwar	Tata McGraw Hill
The Mechanical Engineering Drawing	Paul Green	
Machine drawing	K.L Narayana	

MECHANICS OF SOLIDS

(MECHANICAL ENGINEERING GROUP)

Subject Code 1625303	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	ESE	:	70	
	02	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS: THEORY

Name of the Topic		Hrs/week	Marks
Unit -1	**Mechanical Properties of Materials, Simple stresses & Strains:-** 1.1 Types of loads, Simple stresses & strains viz. tensile, compressive, Shear, Crushing, Thermal stresses, Hoop stresses & corresponding strains, Volumetric Strain, Bulk modulus, Hook's law, Young's modulus, Modulus of Rigidity, stress-strain curves for ductile & brittle materials, Poisson's ratio. 1.2 Concept of stresses & strains in thin cylindrical & spherical shells subjected to internal pressure. 1.3 Concepts of Buckling – Rankine's & Euler's formulae for buckling load for columns / shafts under compression, concepts of equivalent length for various end conditions. 1.4 Concepts of Deflection & slope of beams – relation between bending moment & slope. Deflection of simply supported beams and cantilever beams subjected to point load. (No derivation) (Problems on compressive & tensile stresses, Thermal stresses, butt & lap riveted joints, simple cases of buckling).	10	18
Unit -2	**Strain Energy:-** 2.1 Concept, derivation & use of expression for deformation of axially loaded members under gradual, sudden & impact load. 2.2 Strain energy due to self-weight.	03	04
Unit -3	**Bending Moment & Shear Force:-** 1.1 Shear force, bending moment & relation between them. 1.2 Shear force & bending moment diagrams for simply supported beam & cantilevers subjected to point loads & Uniformly distribution load, concept of Uniformly varying load & couples acting on beam. 1.3 Location of point of contraflexure. (Problems to be based on simply supported & cantilever beams with point load & UDL only)	08	10
Unit -4	**Moment of Inertia:-** 4.1 Definition of Moment of inertia, Moment of inertia of different laminae, radius of gyration. 4.2 Parallel & perpendicular axis theorem. 4.3 Moment of inertia of rectangular, circular, semicircular. Triangular, Hollow Rectangular, symmetrical I - Section, Channel section, Tee- section, angle section about centroidal axis. 4.4 Polar moment of inertia.	03	08
Unit -5	**Bending & Shear stresses:-** 5.1 Theory of simple bending, equation of bending. 5.2 Assumptions in the theory of bending, moment of resistance, section modulus & neutral axis. 5.3 Shear stresses – concepts of direct & transverse shear stress.	06	08

Unit -6	**Combination of Bending & Direct stresses** 6.1 Axial load, eccentric load, direct stresses, bending stresses maximum & minimum stresses. 6.2 Application of the above concepts for machine parts such as offset links, C-clamp, Bench vice, Drilling machine frame, stresses at base of a short column, condition for no tension at extreme fibres, total stress variation diagrams. (Simple problems on above applications).	**08**	**10**
Unit -7	**Principal Planes & Principal Stresses:-** 7.1 Definition of principal plane & principal stresses. 7.2 Expression for normal and tangential stress, maximum shear stress. 7.3 Stresses on inclined planes. 7.4 Position of principal planes & planes of maximum shear. 7.5 Graphical solution using Mohr's circle of Stresses.	**06**	**06**
Unit -8	**Torsion:-** 8.1 Concept of Pure Torsion, Torsion equation for solid and hollow circular shafts. Assumptions in theory of pure Torsion. 8.2 Comparison between Solid and Hollow Shafts subjected to pure torsion (no problem on composite and non homogeneous shaft)	**04**	**06**
	Total	**48**	**70**

Text / Reference Books:		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Strength of Material	Andrew Pytel Fedrinand L. Singer	Addison-Wesley An imprint of Addison Wesley Longman, Inc. Forth edition
Strength of Material	G.H.Ruder	ELBS with Macmillan third edition
Strength of Material	B.K.Sarkar	Tata McGraw hill New Delhi
A Text Book strength of Material	Dr. R. K.Bansal	Laxmi Publication New Delhi
Strength of Material	S Ramamrutham	Dhanpat Rai & Publication New Delhi
Strength of Material	R.S.Khurmi	S.Chand Company Ltd. Delhi
Materials Science	G.K.Narula K.S.Narula	Tata McGraw hill New Delhi
Mechanics and strength of materials	Vitor Dias Da Silva	
Mechanics of materials	Beer, Johnston & dewolf	

MECHANICAL ENGINEERING MATERIALS

(MECHANICAL ENGINEERING GROUP)

Subject Code 1625304	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS : THEORY

	Name of the Topic	Hours	Marks

UNIT-1.	**Engineering Materials and their Properties**
	1.1 Introduction, Classification and Application of Engineering materials, I.S specification of materials like plain carbon steel, Grey Cast iron, low alloy steels & bearing Materials.
	• Properties of metals
	  • Physical Properties – Structure, Density, Melting point.
	  • Mechanical Properties – Strength, elasticity, ductility, malleability, plasticity, toughness, hardness, hardenability, brittleness, fatigue, thermal conductivity, electrical conductivity, thermal coefficient of linear expansion
	• Introduction to Corrosion, types of Corrosion, Corrosion resisting materials.
		06	**08**

UNIT-2.	**Ferrous Metals and Alloys** • Characteristics and application of ferrous metals • Phase equilibrium diagram for Iron and Iron Carbide. • Flow diagram for production of Iron and Steel, Classification, composition and uses of cast iron, effect of sulphur, silicon and phosphorous. • Classification, composition and application of low carbon steel, medium carbon steel and high carbon steel with their chemical composition. • Alloy Steels: - Low alloy steel, high alloy steel, tools steel & stainless steel. Effect of various alloying elements such as – Chromium, nickel, manganese, molybdenum, tungsten, vanadium. • Tool Steels: - High speed Steels (HSS), Hot & cold Working dies, shear, punches etc., properties & applications. • Magnetic materials: - Properties & Applications of commonly used magnetic materials (Permanent magnets and temporary magnets). • Special Cutting Tool Materials – Diamond, Stelites & Tungsten Carbide	**12**	**18**
UNIT-3.	**Non Ferrous Metals and Alloys** • Properties, applications & chemical compositions of Copper alloys (naval brass, muntz metal, Gun metal & bronzes), Aluminium alloys (Y-alloy & duralumin) & bearing materials like white metals, leaded bronzes & copper lead alloys. • Desired properties of bearing materials.	**06**	**10**
UNIT-4.	**Heat Treatment of Steels** 4.1 Introduction to Heat treatment processes such as Annealing, subcritical annealing, Normalizing, Hardening, Tempering (Austempering & Martempering) - Principle, Advantages, limitations and applications. 4.2 Surface Hardening - Methods of surface hardening, i) case hardening ii) Flame Hardening, iii) Induction Hardening, iv) Nitriding, v) Carburizing - Principle, advantages, limitations and applications	**08**	**14**

UNIT-5.	**Non Metallic Materials** 5.1 Polymeric Materials – Introduction to Polymers- types, characteristics, properties and uses of Thermoplastics, Thermosetting Plastics & Rubbers. 5.2 Thermoplastic Plastics - characteristics and uses of ABS, Acrylics, Nylons and Vinyls 5.3 Thermosetting Plastics - Characteristics and uses of polyesters, Epoxies, Melamines & Bakelites. 5.4 Rubbers – Neoprene, Butadiene, Buna & Silicons – Properties & applications. 5.5 Properties and applications of following Engineering Materials – Ceramics, Abrasive, Adhesive and Insulating materials such as Cork, Asbestos, Thermocole and Glass Wool 5.6 Introduction to Composite Materials – Laminated & Fibre reinforced materials - Structure, Properties & Applications.	**08**	**10**
UNIT-6.	**Powder Metallurgy & Nondestructive Testing** 6.1 Advantages, limitations and applications of Powder Metallurgy for engineering products. Brief Description of Process of Powder Metallurgy – Powder making, blending, compacting, sintering, infiltration & impregnation. 6.3 Applications of Powder metallurgy for tungsten carbide tip tools & porous bearing. 6.4 Importance of Non-destructive testing, Difference between Destructive and Nondestructive testing. 6.5 Nondestructive testing methods - Radiography (X-Ray & Gamma Ray), Ultrasonic crack detection, Dye penetrant test, Magnaflux test – Comparison & applications.	**08**	**10**
	Total	**48**	**70**

Text/Reference Books:

Titles of the Book	Name of Authors	Name of the Publisher
A Text Book of Material Science and Metallurgy	O.P.Khanna	Dhanpat Rai and Sons [1999]
Material Science And Metallurgy	Dr.V.D. Kodgire	Everest Publishing House [1990]
Material Science and Engineering	R.K.Rajput	S.K.Katari and Sons [2002 reprint 2003]
Material Science and Processes	S.K.Hazra and Choudhari	Indian Book Distribution Co. [1982]
Engineering Materials Properties and Selection	Kenneth G. Budinski and Micheal K. Budinski	Pearson Education, New Delhi
ASME Material Manuals	ASME	
Introduction to Physical metallurgy	Sidney H. Avner	Tata Mc Graw Hill edition (2^{nd})
Mechanical Engineering Materials	R.M. Pandey, Umesh Kumar	Foundation Publishing

AUTOMOBILE TRANSMISSION SYSTEMS

(AUTOMOBILE ENGINEERING GROUP)

Subject Code 1633305	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	ESE	:	70	
	02	—	—	TA	:	10	
				CT	:	20	

CONTENTS: THEORY

Name of the Topic		Hrs/week	Marks
Unit -1	**Vehicle layout and Chassis frame:-** 1.1 Classification and specifications of Chassis- 2-Wheeler, Passenger car, Commercial Vehicle. 1.2 Vehicle layout & its types—2 Wheel Drive- Front Engine Front Wheel Drive, Rear Engine Rear Wheel Drive, Front Engine Rear Wheel Drive & 4 Wheel Drive. 1.3 Major assemblies – their locations and functions. 1.4 Various loads acting on chassis frame. 1.5 Type of frames, frames construction, and material- 2 wheeler and 4 - wheeler.	**08**	**12**
Unit -2	**Clutches:-** 2.1 Principle and necessity of Clutch. 2.2 Various types of clutches used in Automobiles – single plate, multiplate clutches - dry & wet clutches, centrifugal clutch, Semi-centrifugal clutch, diaphragm clutch. 2.3 Materials used for clutch lining. 2.4 Hydraulic & mechanical clutch linkage, Cable operated clutch linkage. 2.5 Fluid coupling- principle, construction and working.	**10**	**14**
Unit - 3	**Gear Boxes:-** 3.1 Principle and necessity of Gear Box. 3.2 Types, construction and working of gear boxes & their layouts such as sliding mesh, constant mesh, synchromesh type, vario - drive, transfer case. 3.3 Gear ratios with the help of power flow diagrams. 3.4 Gear shift mechanism. 3.5 Overdrive 3.6 Concepts of automatic gear box. 3.7 Torque Converter- principle, construction and working	**10**	**14**
Unit – 4	**Propeller shafts, universal joints & slip joints:-** 4.1 Necessity and function of Propeller Shaft. 4.2 Constant velocity Joints- Inboard & outboard Joints- Rzeppa Joint, Tripod Joint. 4.3 Universal joint and slip joint. 4.4 Hotchkiss drive and torque tube drive.	**06**	**08**
Unit – 5	**Final drive:-** 5.1 Principle, Necessity and function of final drive and differential. 5.2 Working of differential and differential lock. Backlash in differential. 5.3 Types of rear axles such as semi - floating, three quarter floating and full floating type. 5.4 Transmission in two wheeler- chain drive and belt drive. 5.5 Spur differential construction.	**08**	**14**

Unit – 6	**Wheels and Tyres** 6.1 Types of wheels, rims and tyres. 6.2 Tyre materials, construction. 6.3 Necessity and types of treads. 6.4 Tyre inflation and its effect. Tyre rotation and nomenclature	**06**	**08**
	Total	**48**	**70**

Text / Reference Books:-		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Motor automotive technology	Anthony Schwaller	Delmar Publisher Inc.
Automotive service	Tim Gills	Delmar Publisher Inc.
Automobile Engineering Vol. II	Anil Chikkara	Satya Prakashan New Delhi
Automobile Mechanics	Crouse / Anglin.	TATA McGraw – HILL
Automobile Engineering Vol.-I	Kirpal Singh	Standard Publication
The Automobile	Harbans Singth Royat	S. Chand Publication
Automobile Engineering	R.B. Gupta	Satya Prakashan New Delhi
Automotive Mechanics	S. Srinivisan	TATA McGraw – HILL
Automotive Technology	H M SETHI	TATA McGraw– HILL
A text book of Automobile Engineering	R.K Rajput	
Transmission Chassis & releted systems	John Whipp	

MECHANICS OF SOLIDS LAB

(MECHANICAL ENGINEERING GROUP)

Subject Code 1625306	Practical			Full Marks	:	50	Credits
	No. of Periods Per Week			ESE	:	50	
	L	T	P/S	Internal	:	15	01
	-	—	02	External	:	35	

Contents: *Practical*

Skills to be developed:

Intellectual Skill:

1 Identification of different parts of machine and their function.

2 Interpretation failure patterns of different metal under different action.

3 Extrapolating test result or observation during test.

4 Testing different metals and comparison of experimental result.

Motor Skill:

1 Sketch of standard specimen, arrangement for test on respective machines.

2 Measurement of different parameters.

3 Handling Instrument.

4 Observing behavior of different metal during test.

List of Laboratory Experiments :-

S.No	
1	• Study and demonstration of Universal Testing Machine & its attachments.
2	• Study & demonstration of Extensometer.
3	• Tension Test on mild steel, Aluminium & compression test on cast iron on Universal Testing Machine.
4	• Direct Shear Test of mild steel on Universal Testing Machine.
5	• Brinell Hardness Test on Mild Steel.
6	• Rockwell hardness Test on Hardened Steel.
7	• Izod & Charpy - Impact tests of a standard specimen.
8	• Torsion Test on Mild steel bar.
9	• Assignments: Drawing sheet on shear force & bending Moment diagrams for a given loading (At least four problems.). a) Estimation of principal stresses and maximum shear strain for a given combined loading by analytical & Mohr's circle method. (At least two problems.).

AUTOMOBILE TRANSMISSION SYSTEMS LAB
(AUTOMOBILE ENGINEERING GROUP)

Subject Code 1633307	Practical			Full Marks	:	50	Credits
	No. of Periods Per Week			ESE	:	50	01
	L	T	P/S	Internal	:	15	
	-	—	02	External	:	35	

Contents: Practical

Intellectual skill:

1. Identify concepts applied.
2. Identify parts like clutch, gear box, universal joints, propeller shaft, final drive, wheels & tyres.
3. Classify the system according to their application.
4. Detect fault by observation & trial.
5. Take reading from various instruments like chassis dynometer.

Motor skill:

1. Sketch the different devices.
2. Handle tools, equipment, and instrument.
3. Observe the behaviors of various system under various parameters.

List of Practical/ Assignments:

1. Draw various vehicle layouts for- two wheelers, three wheeler and four wheelers and compare them.
2. Open a single plate dry clutch assembly and sketch exploded view.
3. Open a multi-plate clutch used in two wheelers, observe the operating linkages and sketch the system.
4. Open any two types of gear boxes observe gear shifting, gear ratio and sketch the system & compare them.
5. Open & observe automatic transmission devices such as torque converter, various drive.
6. Open & observe universal joints such as Hooks universal joint.
7. Open the differential, sketch the unit with bearing locations.
8. Assembly & disassembly of any one type of rear axle.
9. Open any two types of tyres, wheels and rims, observe and sketch.

MANUFACTURING TECHNOLOGY LAB

(MECHANICAL ENGINEERING GROUP)

Subject Code 1625308	Practical			Full Marks	:	50	Credits
	No. of Periods Per Week			ESE	:	50	03
	L	T	P/S	Internal	:	15	
	-	—	04	External	:	35	

Contents: Practical

Skills to be developed:

Intellectual skills:

1) To develop concept of pattern making.
2) To understand the safety aspects to be followed on the shop floor.
3) To understand the different types of patterns & to compare them.
4) To know the different types of sands used in sand moulding.

Motor Skills:

1) To prepare solid pattern.
2) To use pattern for preparing moulds.
3) To operate & control lathe machine.
4) To operate & control drilling machine.
5) To follow the safety precautions on the shop floor.

List of Practical:-

1. Preparing one wooden pattern per student as per given drawing.
2. Develop one pattern for a given job considering all aspects of pattern making for group of 4 to 6 student. Job shall involve spit pattern with core, core print.
3. Preparation of a sand mould for any one of the above patterns.
4. Estimation of cost for the casting using the above pattern and mould.
5. One job for each student involving different lathe and drilling machine operations.
6. Assignment on selection of materials and required properties for automobile

MECHANICAL ENGG. DRAWING- TW

(MECHENICAL ENGG. GROUP)

Subject Code 1625309	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	Internal	:	15	
	-	—	04	External	:	35	

CONTENTS: TERM WORK

Skills to be developed:

Intellectual Skills:

1. Understand interpenetration of soil.
2. Interpret limits, fits and tolerances on a given drawing.
3. Visualize assembly of components from given details.
4. Interpret Conventional symbols as per IS code SP46.
5. Identify different materials and their properties.

Motor Skills:

1. Draw front view and top view of solids Penetrating one with other.
2. Conventionally represent limit, fits and tolerances on a given drawing as per the manufacturing processes.
3. Give surface roughness values and symbols on a part drawing..
4. Setting and use of different drawing equipments.
5. Record bill of materials in assembly drawing.
6. Use computer aided drafting package.

List of Term Work:

(Use first angle method of projection)

1. **Intersection of Solids**
   (i) One Sheet containing atleast two problems.
   (ii) Atleast four problems for home assignment in sketch book.
2. **Development of surfaces**
   Any two problems on development of surfaces of different objects. (one Sheet)
3. **Auxiliary views**
   One sheet containing two problems
   At least two problems as home assignment in sketch book
4. Conventional Representation as per SP – 46 (1988) - one sheet
5. Limit, Fit, Tolerances and Machining Symbols – one sheet
6. Assembly to detailed drawings of components including conventional representation of tolerances and surface finish symbols:
   One sheet covering any one assembly and its details
   At least two problems as home assignment in sketch book
7. Details to Assembly Draw One sheet covering any one assembly and its details.
   Solve at least two problems as home assignment in sketchbook.
8. Two problems on assembly drawings using any CAD Package (Assembly containing maximum 6 to 7 components- minimum 12 hours)

DEVELOPMENT OF LIFE SKILLS-II -TW

(MECHANICAL ENGG. GROUP)

Subject Code 1625310	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	02
	L	T	P/S	Internal	:	07	
	—	—	03	External	:	18	

Contents : Term Work		Hrs/week
	Name of Topics	**HOURS**
Unit-1	**SOCIAL SKILLS** SOCIETY, SOCIAL STRUCTURE, DEVELOP SYMPATHY AND EMPATHY.	**01**
Unit-2	Swot Analysis – Concept , How to make use of SWOT.	**01**
Unit-3	**Inter personal Relation** Sources of conflict, Resolution of conflict , Ways to enhance interpersonal relations.	**02**
Unit-4	**Problem Solving** 4 **STEPS IN PROBLEM SOLVING,** 4.1 IDENTIFY AND CLARIFY THE PROBLEM, 4.2 INFORMATION GATHERING RELATED TO PROBLEM, 4.3 EVALUATE THE EVIDENCE, 4.4 CONSIDER ALTERNATIVE SOLUTIONS AND THEIR IMPLICATIONS, 4.5 CHOOSE AND IMPLEMENT THE BEST ALTERNATIVE, 6)REVIEW 5 **Problem solving technique**.(any one technique may be considered) **5.1** Trial and error, 2) Brain storming, 3) Lateral thinking	**02**
Unit-5	**Presentation Skills** Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. PRESENTATION SKILL – STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board	**03**
Unit-6	**Group discussion and Interview technique** – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making **INTERVIEW TECHNIQUE** NECESSITY, TIPS FOR HANDLING COMMON QUESTIONS.	**03**
Unit-7	**Working in Teams** UNDERSTAND AND WORK WITHIN THE DYNAMICS OF A GROUPS. TIPS TO WORK EFFECTIVELY IN TEAMS, ESTABLISH GOOD RAPPORT, INTEREST WITH OTHERS AND WORK EFFECTIVELY WITH THEM TO MEET COMMON OBJECTIVES, TIPS TO PROVIDE AND ACCEPT FEEDBACK IN A CONSTRUCTIVE AND CONSIDERATE WAY , LEADERSHIP IN TEAMS, HANDLING FRUSTRATIONS IN GROUP.	**02**

Unit-8	**Task Management** INTRODUCTION, TASK IDENTIFICATION, TASK PLANNING ,ORGANIZING AND EXECUTION, CLOSING THE TASK	**02**
	Total	**16**

List of Assignment: (Any Eight) :-

1) SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats.Following points will be useful for doing SWOT.

a) Your past experiences,

b) Achievements,

c) Failures,

d) Feedback from others etc.

2) Undergo a test on reading skill/memory skill administered by your teacher.

3) Solve the puzzles.

4) Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)

5) Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.

6) Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme.####

7) Conduct an interview of a personality and write a report on it.

8) Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed

9) Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

Mini Project on Task Management. Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management.

Text /Reference Books :

Titles of the Book	Name of Authors	Name of the Publisher
Adams Time management	Marshall Cooks	Viva Books
Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Pretice Hall of India, Pvt Ltd
Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
Decision making & Problem Solving	by Adair, J	Orient Longman
Develop Your Assertiveness	Bishop , Sue	Kogan Page India
Make Every Minute Count	Marion E Haynes	Kogan page India
Organizational Behavior	Steven L McShane and Mary Ann Glinow	Tata McGraw Hill
Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, Pvt Ltd
Presentation Skills	Michael Hatton (Canada – India Project)	ISTE New Delhi
Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
Target setting and Goal Achievement	Richard Hale ,Peter Whilom	Kogan page India
Time management	Chakravarty, Ajanta	Rupa and Company
Working in Teams	Harding ham .A	Orient Longman
Development of Life Skill-II	Sudha Ranjan	Foundation Publishing

INTERNET ASSISTANCE

1. http://www.mindtools.com
2. http://www.stress.org
3. http://www.ethics.com
4. http://www.coopcomm.org/workbook.htm
5. http://www.mapfornonprofits.org/
6. http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7. http://eqi.org/
8. http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9. http://www.mapnp.org/library/ethics/ethxgde.htm
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. http://members.aol.com/nonverbal2/diction1.htm
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. http://snow.utoronto.ca/Learn2/modules.html
14. http://www.quickmba.com/strategy/swot/

PROFESSIONAL PRACTICES-III- TW

(MECHANICAL ENGG. GROUP)

Subject Code 1625311	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	
	L	T	P/S	Internal	:	07	02
	—	—	04	External	:	18	

Contents :Term Work		Hrs/week
Chapter	**Activities**	Hours
Unit-1	**Industrial Visits** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. **TWO** industrial visits may be arranged in the following areas / industries : 2 Manufacturing organizations for observing various manufacturing processes including heat treatment 3 Material testing laboratories in industries or reputed organizations 4 Auto workshop / Garage 5 Plastic material processing unit 6 ST workshop / City transport workshop	**08**
Unit-2	Lectures by Professional / Industrial Expert be organized from **ANY THREE** of the following areas : 3 Use of a plastics in automobiles. 4 Nonferrous Metals and alloys for engineering applications 5 Surface Treatment Processes like electroplating, powder coating etc. 6 Selection of electric motors. 7 Computer aided drafting. 8 Industrial hygiene. 9 Composite Materials. 10 Heat treatment processes. 11 Ceramics 12 Safety Engineering and Waste elimination	**08**

Unit-3	**Individual Assignments :** **Any two** from the list suggested 4 Process sequence of any two machine components. 5 Write material specifications for any two composite jobs. 6 Collection of samples of different plastic material or cutting tools with properties , specifications and applications. 7 Preparing models using development of surfaces. 8 Assignments on bending moment , sheer forces , deflection of beams and torsion chapters of strength of material. 9 Select different materials with specifications for at least 10 different machine components and list the important material properties desirable. 10 Select 5 different carbon steels and alloy steels used in mechanical engineering applications and specify heat treatment processes employed for improving the properties. Also give brief description of the heat treatment processes. 11 List the various properties and applications of following materials – a. Ceramics b. fiber reinforcement plastics c. thermo plastic plastics d. thermo setting plastics e. rubbers. OR Conduct **ANY ONE** of the following activities through active participation of students and write report 12 Rally for energy conservation / tree plantation. 5 Survey for local social problems such as mal nutrition, unemployment, cleanliness, illiteracy etc. 6 Conduct aptitude , general knowledge test , IQ test 6 Arrange **any one** training in the following areas : 6.1 Yoga. B) Use of fire fighting equipment and First aid Maintenance of Domestic appliances	**08**
Unit-4	**Modular courses (Optional) :** A course module should be designed in the following areas for max. 12 hrs. Batch size – min. 15 students. Course may be organized internally or with the help of external organizations. 7 Forging Technology. 8 CAD-CAM related software. 9 Welding techniques. 10 Personality development. 11 Entrepreneurship development.	**08**

Unit-5	**3-D Design using software** Computer screen, coordinate system and planes, definition of HP,VP, reference planes How to create them in 2nd/3rd environment. Selection of drawing site & scale. Commands of creation of Line, coordinate points, Axis, Poly lines, square, rectangle, polygon, sp line, circles, ellipse, text, move, copy, offset, Mirror, Rotate, Trison, Extend, Break, Chamfer, Fillet, Curves, Constraints fit tangency, perpendicularity, dimensioning Line convention, material conventions and lettering. The Student should draw – different orthographic Views (including sections), Auxiliary views according to first/ Third angle method of projection. (Minimum two sheets, each containing two problems) after learning the contents as above.	**16**
	Total	**48**

Text /Reference Books :

Titles of the Book	Name of Authors	Name of the Publisher
Professional Practices-III	Sudha Ranjan	Foundation Publishing

List of Term Work: (Any Eight)

1) SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.

a) Your past experiences, b) Achievements, c) Failures, d) Feedback from others etc.

2) Undergo a test on reading skill/memory skill administered by your teacher.

3) Solve the puzzles.

4) Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)

5) Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.

6) Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme. #####

7) Conduct an interview of a personality and write a report on it.

8) Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed

9) Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The term work will consist of any eight assignments. Mini Project on Task Management. Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for
III SEMESTER DIPLOMA IN AGRICULTURAL ENGINEERING

(Effective from Session 2016-17 Batch)

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.	Applied Mathematics-I	1600301	04	3	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	1600302	03	3	10	20	70	100	28	40	03
3.	Surveying and Levelling	1611303	03	3	10	20	70	100	28	40	03
4.	Refrigeration & Air-Conditioning	1611304	03	3	10	20	70	100	28	40	03
5.	Principles of Agricultural Production	1611305	03	3	10	20	70	100	28	40	03
		Total:-	**16**				**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.	Computer Programming Through 'C' Lab.	1600306	6	3	15	35	50	20	03
7.	Surveying & Levelling Lab.	1611307	4	3	15	35	50	20	02
		Total:-	**10**				**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	
8.	Refrigeration & Air-Conditioning (TW)	1611308	3	15	35	50	20	02
9.	Principles of Agricultural Production (TW)	1611309	4	30	70	100	40	02
		Total:-	**07**			**150**		
Total Periods per week Each of duration One Hours = 33						**Total Marks = 750**		**24**

APPLIED MATHEMATICS -I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code 1600301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents :Theory		Hrs/week	Marks
Unit -1	**Integration:** 2.1 Definition of integration as anti-derivative. Integration of standard function. 2.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 2.3 Methods of Integration. • Integration by substitution • Integration of rational functions. • Integration by partial fractions. • Integration by trigonometric transformation. • Integration by parts. 2.4 Definite Integration. • Definition of definite integral. • Properties of definite integral with simple problems. 2.5 Applications of definite integrals. • Area under the curve. • Area between two curves. • Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l), (-l, l), (0, 2\pi), (-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**Numerical Methods** 5.1 **Solution of algebraic equations** Bisection method. Regula-falsi method. Newton – Raphson method. 5.2 **Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	05 05	07 **07**
	Total	**48**	**70**

Text /Reference Books:		
Name of Authors	**Titles of the Book**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session : 42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

Contents : Theory			Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		[03]	[08]
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		[06]	[10]
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		[07]	[10]
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		[06]	[08]
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Operator.		
	04.03	If statement, if-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		[06]	[10]

Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.	**[06]**	[06]
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	**[03]**	[08]
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	**[05]**	[08]
	Total	**42**	**70**

Text / Reference Books -

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India. - R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill. - E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education. - A. Kamthane
5. Programming with C. First Edition, 1997, Tara McGraw hill. - Venugopla and Prasad
6. The C Programming Language, Second Edition, 2001, Prentice Hall of India. - B. W. Kernighan & D.M. Ritchie
7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - R. Subburaj
8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami
9. Elements of C, Khanna Publishers, Delhi. - M. H. Lewin
10. Programming in C. - Stephen G. Kochan
11. Programming in C, khanna Publishers, Delhi. - B. P. Mahapatra
12. Let us C, BPB Publication, New Delhi. - Yashwant kanetkar
13. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa
14. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
15. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth
16. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
17. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
18. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

SURVEYING AND LEVELLING

Subject Code 1611303	Theory			No of Period in one session :40			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

The course content of surveying has been designed to provide adequate information to develop competency in a learner to enable prepare maps by conducting chain & compass surveying and prepare land by levelling.

Objective:

Surveying is an essential component of the day to day work of an Agricultural Engineering Tehnician. The job includes detailed surveying, plotting of survey data, preparation of survey maps etc. The course content of surveying includes the basic concept horizontal linear and angular measurements and conducting surveys involving horizontal linear and angular measurement with stress on familiarization with various equipment used. It also includes vertical linear measurements to indicate the profile of the land surface by leveling has also been covered in details.

Contents : Theory		Hrs/week	Marks
Unit -1	**INTRODUCTION** 1.1 Definition, Aims and Objectives of Surveying 1.2 Classification of Surveying. 1.3 Principles of Surveying. 1.4 Precision And Accuracy of Measurements	**[02]**	[03]
Unit -2	**LINEAR MEASURMENTS** 2.1 Methods of Measuring Distance, Their Merits And Demerits, Suitability. 2.2 Instruments for Measuring Distance: Tape, Chain And Accessories, Their Merits and Demerits, Suitability.	**[03]**	[05]
Unit -3	**Chaining** 3.1 Equipment And Accessories for Chaining Description (Demonstration In Class/Lab), Use And Purpose. 3.2 Method of chaining, Raging, chaining on slope. 3.3 Field Problems-Setting perpendicular with chain & Tape, Chaining Across Different Types of Obstacles: Numerical Problems. 3.4 Errors And Mistakes In linear Measurement-Classification, Sources of Errors And Remedies. 3.5 Correction To measured lengths Due To-Incorrect Length, Temperature Variation, pull, sag, Numeriaical problem Applying corrections. 3.6 Precaution During Chaining, Maintenance of Equipment.	**[05]**	**[08]**
Unit -4	**CHAIN SURVEYING** 4.1 Purpose of chain surveying, Principles of chain Surveying-Well Conditioned And III Conditioned Triangles. 4.2 Method of chaining, Ranging, Chaining on slope. 4.3 Reconnaissance Survey-Method, Index Map, Reference Sketch. 4.4 Selection of Survey station, Base Line, Tie Lines, Check Lines. 4.5 Offsets- Necessity, Perpendicular And Oblique Offsets, Setting Offsets with chain & Tape, (Demonstration In Field), Merits & Demerits, Suitability, Sources of Error & Remedies, Limiting Length of offsets. 4.6 Method of Chain Surveying, Locating Objects, Recording, Entry In field Book. 4.7 Plotting- Selection of Scale, Conventional Signs, Plotting on Drawing sheet from field Book Data. 4.8 Errors In chain surveying-causes & Remedies, Precautions During Chain Surveying.	**[05]**	**[08]**

Unit -5	**ANGULAR MEASUREMENT:** 5.1 Measurement of Angles with chain & tape, with compass. 5.2 Compass- Types-Surveyor's Compass, Prismatic Compass, Features, Parts (Detailed Description to be Covered in Practical), Merits & Demerits, Suitability of Different Types, Testing & Adjustment of Compass. 5.3 Designation of Angles-Concept of Meridians-Magnetic, True Arbitrary Concept of Bearing-Whole Circle Bearing, Quadrantal Bearing, Reduced Bearing, Suitability of Application, and Numerical Problems on Conversion of Bearings. 5.4 Effects of Earths Magnetism. 5.5 Errors In Angle Measurement with Compass- Sources & Remedies, Precaution During Use of Compass, Maintenance of Compass.	**[05]**	**[08]**
Unit -6	**CHAIN AND COMPASS SURVEYING:** 6.1 Principles of Traversing-Open & Closed Traverse, Advantages & Disadvantages Over Chain Surveying. 6.2 Methods of Traversing-locating objects, Field Book Entry. 6.3 Local Attraction-Causes, Detection, Errors Correction, Numerical Problems on Application of Correction Due To Local Attraction. 6.4 Plotting of Traverse-Check of Closing Error In Closed & Open traverse, Bowditch's Correction. 6.5 Errors In Chain & Compass Surveying-Sources & remedies, Precaution During Chain & Compass Surveying. 6.6 Computation of Area From Plotted Survey Map-Planimeter, Features, Use of Mensuration Techniques-Average Ordinate Rule, Trapezoidal Rule, Simpson's Rule.	**[05]**	**[08]**
Unit -7	**LEVELLING:** 7.1 Purpose of Levelling. 7.2 Definition of Terms Used In Levelling- Concepts of Level Surface, Horizontal Surface, Vertical Surface, Datum, R.L, B.M. 7.3 Description of Essential Features And Uses of Different Types of Leveling Instruments. 7.4 Concepts of Line of Collimation, Axis of Bubble Tube, Axis of Telescope, Vertical Axis. 7.5 Leveling Staff-Types, Features And Use. 7.6 Temporary Adjustments of Level, Taking Reading with Level. 7.7 Concept of Bench Mark, BS, IS, FS, CP, Hi. 7.8 Principles of Levelling-Simple Levelling, Differential Levelling. 7.9 Field Data Entry- Level Book-Height of Collimation Method And Rise & Fall Method, Comparison, Numerical Problems on Reduction of Levels Applying Both Methods, Arithmetic Checks. 7.10 Different Types of Levelling, Use And Methods-Fly Leveling, Check Levelling, Profile Levelling-Longitudinal Section And Cross-Sections. 7.11 Plotting of Profiles. 7.12 Effects of Curvature And Refraction. 7.13 Reciprocal Leveling-Principles, Methods, Precise Leveling. 7.14 Difficulties in leveling, Errors In Leveling And Precaution. 7.15 Sensitiveness of Bubble Tube, Determination of Sensitiveness. 7.16 Permanent Adjustments of Different Types of Levels. 7.17 Setting Grades And Stakes, Out Grades of Sewers And Related Problems.	**[08]**	**[10]**

Unit -8	**PLANE TABLE SURVEYING** Principle Accessories of plane table. Orientation. Procedure of Setting up plane table over a station. Methods of plane tabling. Errors and precautions. Procedure of plane table traversing. Advantages and disadvantages of plane tabling.	**[03]**	**[08]**
Unit -9	**COMPUTATION OF AREA AND VOLUME:** Introduction Computation Problems on computing area from field notes Computation of area from field plan The mid ordinate rule Simpson's rule Formula for calculation of volume Worked-Out problems	**[02]**	**[05]**
Unit -10	**THEODULITE SURVEY** Parts of transit theodolite Temporary setting of theodolite Permanent setting of theodolite Measurement of horizontal & Vertical Angles Method of repetition Method of reiteration	**[04]**	**[07]**
	Total	**42**	**70**

Text / Reference Books -

SL. NO.	NAME OF BOOK	WRITER'S NAME	PUBLISHER'S NAME
1.	Surveying & Levelling Vol.I	T.P.Kanetkar & S.V.Kulkarni	Griha Prakash, Pune
2.	Surveying Vol.I	B.C Punmia	Laxmi Publications, Delhi-6
3.	A text book of surveying and leveling	R. agor; Khanna	Khanna Publishers, Delhi-6
4.	Surveying & Levelling	Hussain & Nagraj	S.Chand & Co, Delhi
5.	Ground Water	H.M Raghunath	
6.	Surveying & Levelling	S.C Rangwala	Charotar Book Stall, Pune
7.	Plane Surveying.	A.De	S. Chand & Co.

REFRIGERATION AND AIR-CONDITIONING

Subject Code	Theory			No of Period in one session : 42			Credits
	No. of Periods Per Week			Full Marks	:	100	
1611304	L	T	P/S	ESE	:	70	03
	03	—	—	TA	:	10	
				CT	:	20	

Rationale & Objective:

Keeping in view the recent developments in Science and present needs of Agriculture, the curriculum of Refrigeration & Air-Conditioning has been revised so that the Engineers or Technicians may have a better knowledge of Refrigeration & Air-Condition, especially regarding the application of the subject in various fields of Agriculture. An emphasis, in this direction, has been made in the curriculum.

The following topics are so chosen that through their contents the students become able to develop knowledge, skill and technical attitude. It will enable them to distinguish, differentiate, analyse and solve the refrigeration and air-conditioning problems.

Contents : Theory

Group (A) REFRIGERATION			Hrs/week	Marks
Unit -1	**PRINCIPLE OF THERMODYNAMICS**		[04]	[10]
	01.01	Pressure		
	01.02	Thermodynamic systems		
	01.03	Property, state, path and process		
	01.04	Internal energy, Flow energy and work		
	01.05	Specific heat, sensible heat and latent heat		
	01.06	Quality of vapours		
	01.07	Enthalpy and Entropy		
Unit -2	**METHOD OF REFRIGERATION**		[05]	[08]
	02.01	Ice refrigeration		
	02.02	Refrigeration by expansion of air		
	02.03	Unit of refrigeration		
Unit -3	**AIR REFRIGERATION SYSTEMS**		[07]	[10]
	03.01	Reversed Carnot Cycle		
	03.02	Bell-Coleman refrigeration system (simple numericals)		
	03.03	Advantages and disadvantages of Bell-Coleman Cycle		
Unit -4	**SIMPLE VAPOUR COMPRESSION SYSTEM**		[07]	[10]
	04.01	Block diagram of Vapour Compression System		
	04.02	Vapour Compression System		
	04.03	Wet Compression		
	04.04	Dry Compression single stage only		
Unit -5	**REFRIGERANTS**		[04]	[06]
	06.01	Classification of refrigerants. e.g NH_3, $F\text{-}_{11}$, F_{12}-F_{22} and its physical properties only		

Group –B (AIR-CONDITIONING)				
Unit -6	**PSYCHROMETRY**		**[05]**	**[08]**
	01.01 Meaning of air-conditioning			
	01.02 Psychrometric chart and study of different curves or lines			
	01.03 Summer Air-conditioning 01.04 Winter Air-conditioning	line diagram only		
Unit -7	**REQUIREMENTS OF COMFORT AIR-CONDITIONING (INTRODUCTION ONLY)**		**[04]**	**[08]**
	03.01 Elements of comfort air-conditioning			
	03.02 Thermodynamics human body-Metabolic heat only			
Unit -8	**HOUSEHOLD REFRIGERATORS, COLD STORAGE, AIR COOLER AND WINDOWS AIR-CONDITIONERS:**		**[06]**	**[10]**
	06.01 Household Refrigerator , line diagram only			
	06.02 Cold Storage line diagram only			
	06.03 Air Cooler			
	06.04 Window Air-Conditioners line and schematic diagram only			
		Total	**42**	**70**

Text / Reference Books -

1. Refrigeration Air-Conditioning - S.C. Arora, S. Domkundwar
2. Refrigeration Air-Conditioning - R.S. Khurmi
3. Refrigeration Air-Conditioning - P.L. Ballaney

PRINCIPLES OF AGRICULTURAL PRODUCTION

Subject Code	Theory			No of Period in one session : 42			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	
1611305	03	—	—	TA	:	10	03
				CT	:	20	

Rationale:

From Mechanisation is the application of engineering and technology in agricultural operations to do a job in a better way to improve productivity. This includes development, application and management of all mechanical aids for field production, Water control, material holding, storing and processing. Before knowing these, diploma students are required to know about agricultural operations, procedures and practices.

Contents : Theory		Hrs/week	Marks
Unit -1	**INTRODUCTION** 01.01 Introductory idea about Agricultural Engineering and its relation to crop production 01.02 Basic information about Agricultural operations with Agricultural Implements and Machineries	[02]	[06]
Unit -2	**SOIL** 02.01 Classification of soils 02.02 Soil formation 02.03 Composition of soil 02.04 Soil fertility and plant nutrients	[03]	[06]
Unit -3	**CROP ROTATION AND SYSTEM OF CROPPING** 03.01 Crop rotation 03.01.01 Principles of crop rotation 03.01.02 Advantages of crop rotation 03.02 System of cropping 03.02.01 Mixed cropping 03.02.02 Multiple cropping 03.02.03 Inter cropping 03.02.04 Their principles and advantages	[04]	[08]
Unit -4	**TECHNIQUES OF RAISING FIELD CROPS** 04.01 Cereals 04.01.01 Paddy 04.01.02 Wheat 04.01.03 Maize 04.02 Legumes 04.02.01 Soyabean 04.02.02 Moong 04.02.03 Arhar 04.02.04 Gram 04.03 Cash Crops 04.03.01 Sugar cane 04.03.02 Potato 04.04 Oil Seeds 04.04.01 Rape seed and Mustard 04.04.02 Sunflower 04.04.03 Groundnut	[16]	[16]

Unit -5	**TECHNIQUES OF RAISING HORTICULTURAL CROPS** 05.01 Fruit crops 05.01.01 Mango 05.01.02 Papaya 05.01.03 Guava 05.01.04 Banana 05.01.05 Litchi 05.02 Vegetable crops 05.02.01 Cole Crops 05.02.02 Root-Crops 05.02.03 Lady's finger 05.02.04 Tomato 05.02.05 Brinjal 05.03 Flowering crops 05.03.01 Rose 05.03.02 Dhalia 05.03.03 Chrysanthemum	[07]	[16]
Unit -6	**WEEDS AND THEIR CONTROL** 06.01 Characteristics of weeds 06.02 Harmful effects of weeds 06.03 Usefulness of weeds 06.04 Classification of weeds 06.05 Medium of weeds seed dispersal 06.06 Method of weed control	[04]	[08]
Unit -7	**MISCELLANEOUS** 07.01 Methods of irrigation 07.02 Water management practices 07.03 Soil management practices 07.04 Seed 07.04.01 Characteristics of good seed 07.04.02 Types of seeds 07.04.03 Seed treatment 07.05 Methods of fertilizer application 07.06 Dry farming	[06]	[10]
	Total-	**42**	**70**

Text / Reference Books -

1 Modern Techniques of Raising Field Crops - Chidda Singh.

2 Principles and practices of Agronomy - S.S.Singh.

3 Handbook of Agricultural Science - S.S.Singh

4 Weed and Weedicide - Dr. Rao

5 Principles and practices of Horticulture - Pujari Lal

6 Principles of Agricultural Engineering - Dr. J. Sahay

7 Principles of Agricultural Engineering - Irshad Ali

8 A text book of soil science - T.D.Biswas and .K. Mukherjee

9 Nature and properties of soil - N.C.Brady

10 Hand Book of Agriculture - I.C.A.R. Publication.

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	
1600306	L	T	P/S	ESE	:	50	03
	—	—	06	Internal	:	15	
				External	:	35	

Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Eight experiments to be performed in the laboratory:

Contents : Practical		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	12	
Unit-2	Programming exercise on case Control Statement.	12	
Unit-3	Programming exercise on Decision Control Statement.	12	
Unit-4	Programming exercise on looping.	12	
Unit-5	Programming exercise on recursion technique.	12	
Unit-6	Programming exercise on Structure.	12	
Unit-7	Programs on array implementation.	12	
	Total	**84**	

Text / Reference Books -

1. How to solve it by Computer, Prentice Hall of India, 1992. - R.G. Dromey.
2. The C Programming Language, Prentice Hall of India, 1989. - B.W. Kernighan & D.M. Ritchie.
3. The C Programming Language, Prentice Hall of India, 1989. - Cooper, Mullish
4. Application Programming in C. Macmillain International editions, 1990. - Richa'd Johnson- Baugh & Martin Kalin
5. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
6. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth.
7. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
8. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi - R. Subburaj
10. Programming with C language, Tata McGraw Hill, New Delhi. - C. Balaguruswami
11. Elements of C, Khanna Publishers. Delhi - M. H. Lewin
12. Programming in C - Stephan G. Kochan.
13. Programming in C, Khanna Publishers. New Delhi - B.P. Mahapatra
14. Let us C, BPB Publication. New Delhi - Yashwant Kanetkar
15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

SURVEYING & LEVELLING LAB.

Subject Code 1611307	Practical			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Rational :

The course content of surveying has been designed to provide adequate information to develop competency in a learner to enable prepare maps by conducting chain & compass surveying and prepare land by levelling.

Objective:

Surveying is an essential component of the day to day work of an Agricultural Engineering Technician. The job includes detailed surveying, plotting of survey data, preparation of survey maps etc. The course content of surveying includes the basic concept horizontal linear and angular measurements and conducting surveys involving horizontal linear and angular measurement with stress on familiarization with various equipment used. It also includes vertical linear measurements to indicate the profile of the land surface by levelling has also been covered in details.

Contents : Practical Eight experiments to be performed in the laboratory:		Hrs/week	Marks
Unit -1	**LINER MEASUREMENTS** 1.1 Study of Essential features of different types of chain and tapes with neat sketch, Aims and Objectives of Surveying.	[03]	
Unit-2	**CHAINING** 2.1 Testing and adjusting of a matric chain 2.2 Measurements of distance between two points with chain including direct ranging. 2.6 Setting out of different types of triangles with chain and tape. 2.4 Measurement of distance between two points by chaining across a sloping ground by using stepping method and by a Clinometer. 2.5 Measurement of distance by chaining across obstacles on the chain line-A. Pond 2. Building. 3. Stream/River	[10]	
Unit-3	**CHAIN SURVEYING** 3.1 Setting Perpendicular offsets to various object from a chain line using- Tape, 2. Cross Staff, 3 Optical Square 3.2 Setting /Offsets from a chain line using tape	[05]	
Unit-4	**ANGULAR MEASUREMENTS** 4.1 Study of features and parts of a prismatic compass and a surveyor compass by drawing neat sketches. 4.2 Testing and Adjustment of Prismatic Compass and Surveyors Compass. 4.3 Measurement of bearings of lines and Determination of included angles using prismatic compass and surveyor compass.	[08]	
Unit-5	**CHAIN AND COMPASS SURVEYING** 5.1 Setting out of a closed traverse of five sides using prismatic compass given bearing of one line and included angles and lengths of sides. 5.2 Conducting Chain and Compass traverse surveying in a given plot of area and recording data in the field book. 5.3 Preparation of Survey map by plotting individually and to find the plotted area.	[08]	

Unit-6	**LEVELLING** 6.1 Study of Essential features and parts of different types of levels. 6.2 Study of different types of leveling staffs. 6.3 Making temporary adjustment of levels. 6.4 Determining reduced levels of five given points taking staff reading with level . 6.5 Determining the difference of level between two points the readings are filled in level books and to apply arithmetic check. 6.6 Conduct fly leveling between two distant point with respect to RL of a given bench mark by both height of collimation and rise and fall method and applying arithmetic check. 6.7 Finding RL of 1. Rood, 2. Chajja with reference to given bench mark. 6.8 Conduct profile leveling along the given alignment for road/Canal for 150 meter length. 6.9 Plotting of the profile of the alignment surveyed in 6.8 and drawing the grade of alignment.	[10]	
Unit -7	**THEODOLITE SURVEY** 8.1 Study of different parts of a transit theodolite with neat sketch. 8.2 Temporary adjustment of a transit theodolite. 8.3 Measure of horizontal angle with theodolite by method of reiteration. 8.3 Measurement of vertical angles to know the height of an elevated ground.	[06]	
	Total	**50**	

Text / Reference Books -

Sl. No.	Name of Book	Writer's Name	Publisher's Name
1.	Surveying & Levelling Vol.I	T.P. Kanetkar & S.V.Kulkarni	Griha Prakash, Pune
2.	Surveying Vol.I	B.C Punmia	Laxmi Publications, Delhi-6
3.	A text book of surveying and levelling	R.agor; Khanna	Khanna Publisher's Delhi-6
4.	Surveying & Levelling	Hussain & Nagraj	S.Chand & Co, Delhi
5.	Ground Water	H.M Raghunath	
6.	Surveying & Levelling	S.C Rangwala	Charotar Book Stall, Pune
7.	Plane Surveying	A.De	S. Chand & Co.

REFRIGERATION AND AIR-CONDITIONING -TW

Subject Code	Term Work			No of Period in one session : 42			Credits
	No. of Periods Per Week			Full Marks	:	50	
1611308	L	T	P/S	Internal	:	15	02
	—	—	03	External	:	35	

Rationale & Objective:

Keeping in view the recent developments in Science and present needs of Agriculture, the curriculum of Refrigeration & Air-Conditioning has been revised so that the Engineers or Technicians may have a better knowledge of Refrigeration & Air-Condition, especially regarding the application of the subject in various fields of Agriculture. An emphasis, in this direction, has been made in the curriculum.

The following topics are so chosen that through their contents the students become able to develop knowledge, skill and technical attitude. It will enable them to distinguish, differentiate, analyse and solve the refrigeration and air-conditioning problems.

S.No.	Topics	Periods
GROUP A (REFRIGERATION)		
01	Principles of Thermodynamics	(03)
02	Method of Refrigeration	(03)
03	Air Refrigeration Systems	(06)
04	Simple Vapour Compression System	(06)
05	Refrigerants	(04)
		(22)

S.No.	Topics	Periods
	GROUP B (AIR-CONDITIONING)	
01	Introduction to Psychrometry	(04)
02	Different Psychrometric Processes	(05)
03	Requirements of Comfort Air-conditioning (only introduction)	(03)
04	Air-conditioning Systems (introduction only)	(03)
05	Household Refrigerators, Cold Storage, Air cooler and Window Air-conditioners	(05)
		(20)

Contents : Term Work

Group- A (REFRIGERATION)		Hrs/week	Marks
Unit -1	**PRINCIPLE OF THERMODYNAMICS** 01.01 Pressure 01.02 Thermodynamic systems 01.03 Property, state, path and process 01.04 Internal energy, Flow energy and work 01.05 Specific heat, sensible heat and latent heat 01.06 Quality of vapours 01.07 Enthalpy and Entropy	[03]	
Unit -2	**METHOD OF REFRIGERATION** 02.01 Ice refrigeration 02.02 Evaporative refrigeration 02.03 Refrigeration by expansion of air 02.04 Steam jet refrigeration system 02.05 Dry ice refrigeration system 02.06 Unit of refrigeration	[03]	
Unit -3	**AIR REFRIGERATION SYSTEMS** 03.01 Reversed Carnot Cycle 03.02 Bell-Coleman refrigeration system (simple numericals) 03.03 Advantages and disadvantages of air refrigeration system	[06]	

Unit -4	**SIMPLE VAPOUR COMPRESSION SYSTEM** 04.01 Ideal Vapour compression 04.02 Vapour Compression System 04.03 Wet Compression 04.04 Dry Compression } single stage only 04.05 Superheated compression (simple numerical only)	[06]	
Unit -5	**REFRIGERANTS** 06.01 Classification of refrigerants. 06.02 Different properties of NH_3, CO_2, SO_2 refrigerants.	[04]	
	Group-B (AIR-CONDITIONING)		
Unit -6	**PSYCHROMETRY** 01.01 Meaning of air-conditioning 01.02 Psychrometry and psychrometric properties 01.03 Psychrometric relations 01.04 Psychrometric chart	[04]	
Unit -7	**DIFFERENT PSYCHROMETRIC PROCESSES** 02.01 Sensible cooling and heating 02.02 Adiabatic humidification and dehumidification (simple numericals) 02.03 Summer air-conditioning, winter air-conditioning and year round conditioning	[05]	
Unit -8	**REQUIREMENTS OF COMFORT AIR-CONDITIONING (INTRODUCTION ONLY)** 03.01 Elements of comfort air-conditioning 03.02 Thermodynamics human body 03.03 Ventilation and Ventilation standard	[03]	
Unit -9	**AIR-CONDITIONING SYSTEM (INTRODUCTION ONLY)** 04.01 Central air-conditioning system 04.02 Unitary air-conditioning system 04.03 Problems in air-conditioning system	[03]	
Unit -10	**HOUSEHOLD REFRIGERATORS, COLD STORAGE, AIR COOLER AND WINDOWS AIR-CONDITIONERS** 06.01 Household Refrigerator 06.02 Cold Storage line diagram only 06.03 Air Cooler 06.04 Window Air-Conditioners	[05]	
	Total	**42**	

Text / Reference Books -

1 Refrigeration Air-Conditioning - S.C. Arora S. Domkundwar

2 Refrigeration Air-Conditioning - R.S. Khurmi

3 Refrigeration Air-Conditioning - P.L. Ballaney

PRINCIPLES OF AGRICULTURAL PRODUCTION -TW

Subject Code 1611309	Term Work		No of Period in one session : 50				Credits
	No. of Periods Per Week		Full Marks		:	100	02
	L	T	P/S	Internal	:	30	
	-	-	04	External	:	70	

Rationale:

A diploma student of Agricultural Engineering has to install and maintain agricultural and irrigational equipments. He is required to know about cropping patterns, prevailing in the state and country. He is also required to assess the water and fertilizer requirements, about different crop diseases, insects and pests, methods of seedbed preparation and sowing etc.

Objective:

The subject has been designed to develop the skill in an Agricultural Engineering student, so that he is able to:

- identify weeds
- protect plants from insects, pests and diseases
- know about the package practices for crop plants.

Contents : Term Work		Hrs/week	Marks
Unit-1	Study about scientific names of major crops of cereals, pulses, oil seeds, fibre crops, sugar cane, tuber and root crops, spices and condiments, forage grasses, forage legumes and plantation crops.	[04]	
Unit-2	Study about characteristics and suitability of various fertilizer for various crops.	[04]	
Unit-3	Study about methods of fertilizer application.	[04]	
Unit-4	Study about plant deficiencies symptoms.	[04]	
Unit-5	Study about schedule for seed treatment of major crops.	[04]	
Unit-6	Study about main diseases, its symptoms and control measures for major crops.	[05]	
Unit-7	Study about major pests of stored products.	[04]	
Unit-8	Study about main insects and its control measures for major crops.	[05]	
Unit-9	Study about weed control practices for important crops.	[04]	
Unit-10	Study about the schedule of important agro-techniques for major crops .	[04]	
Unit-11	Study about most prominent varieties for major crops.	[04]	
Unit-12	Study about crop rotation for major crops.	[04]	
	Total	**50**	

Books Recommended:

1	Handbook of Agricultural Science	-	S.S.Singh Kalyani Publishers, New Delhi
2	Hand Book of Agriculture	-	I.C.A.R. Publication.
3	Principles and practices of Agronomy	-	S.S.Singh Kalyani Publishers, New Delhi
4	Modern Techniques of Raising Field Crops	-	Chhida Singh Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN ARCHITECTURAL ASSISTANTSHIP

(Effective from Session 2016-17 Batch)

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.	Perspective, Sciography & Free hand Sketch	1637301	03	03	10	20	70	100	28	40	03
2.	Building Materials	1637302	04	03	10	20	70	100	28	40	03
3.	Architectural Design & Drawing-I	1637303	04	04	10	20	70	100	28	40	05
4.	Computer Application in Architecture	1637304	04	03	10	20	70	100	28	40	03
5.	Climatology	1637305	04	03	10	20	70	100	28	40	03
		Total:-	**19**				**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.	Free Hand sketching	1637306	06	03	30	70	100	40	03
7.	Computer Application in Architecture Lab.	1637307	04	03	15	35	50	20	02
Total:-			**10**				**150**		

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	
8.	Architectural Design & Drawing-I (TW)	1637308	04	30	70	100	40	02
Total- 04						**100**		
Total Periods per week Each of duration one Hours **= 33**						**Total Marks = 750**		**24**

PERSPECTIVE & SCIOGRAPHY

Subject Code 1637301	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

This subject will help the students to understand various facts, concepts and procedures of perspective drawing. The subject will also help in making models of different materials, free hand sketching of monuments etc.

Objective:

The student will be able to: -

1) Understand different methods of drawing perspective views
2) Understand free hand coloured drawings of buildings and monuments
3) Make models
4) Sketch free hand coloured perspective.

Contents : Theory

	Name of the Topic	Hrs/week	Marks
Unit -1	**Perspective** 1.1 Characteristics of perspective construction, determining vanishing points 1.2 Two point perspective – Two point perspective of a simple building with or without overhang roof, two points perspective of a small house 1.3 Relationship between station point (spectator), picture plane and perspective. Comparative study of perspective by changing position of station point from one side and front of picture plane 1.4 Shadows in perspective – Front lighting, side lighting, back lighting, point lighting from one light source and reflections in perspective 1.5 Only simple square edge figures not to include rounded or curved bodies 1.6 Birds eye view	15	21
Unit -2	**Water Colour Washes** 2.1 Washes : - i) Flat wash ii) Graded washes colour iii) Graded washes(two colour) iv) Grades washes (three colour) v) Grades washes with a verical shine in the center vi) Grades washes with digonal shine vii) Glare wash viii) Two glare washes – one over the other 2.2 skies – Three types 2.3 Architectural trees 2.4 Simple building landscapes	15	21

Unit -3	**Mural Design** 3.1 Mural design and collage	08	11
Unit -4	**Free Hand Sketching** 4.1 Free hand exercise of different types of lines (horizontal, vertical, diagonal grid) 4.2 Free hand sketching of sets of figures and objects. 4.3 Free hand sketching of human figures, trees, furniture and vehicals etc. 4.4 Free hand sketching of small building with shade and shadow. 4.5 Free hand sketches of various scenes such as railway station, Parking, bus stand, market place etc.	12	17
	Total	**50**	70

Books:

1 Philip J Lawson, Practical Perspective Drawing, Mc Graw Hill Book Coropration, London

2 W. Abbott, Theory and practice of perspectives,Balckie & sons Ltd. London

3 Civil A Farey Architectural Drawing Perspective & rendering` B.T.Batsford Ltd. London

4 James More head Hadnbook of Perspective drawing Elsever Press, Inc. Texas

5 Robert W. Gill Rendering with pen and ink Thames & Hudson Ltd., London

6 Bernaud Atkines The water colour techniques of Architectural rendering Walter T. Foster

7 Shah, Kale, Patki Perspective Drawing Tata Mc Graw Hill Publication Ltd, Delhi

BUILDING MATERIALS

Subject Code 1637302	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

Rationale:

This subject will help the students to make aware of the primary and modern building materials used in construction, their properties, types and common usage

. **Objective:**

The student will be able to: -

1) Understand different methods of drawing perspective views
2) Understand free hand coloured drawings of buildings and monuments
3) Make models
4) Sketch free hand coloured perspective.

Contents : Theory

Name of the Topic		Hrs/week	Marks
Unit -1	BRICK: Composition, Sizes, Properties and Classification of bricks, Tests for bricks. Substitutes for bricks.	06	07
Unit -2	STONES: Classification of stones. Common building stones used in India.Characteristics and use of stones.	08	09
Unit -3	METALS: Pig iron, cast iron, wrought iron – types, properties, steel –properties, types, market form of steel and uses of steel in construction, properties of mild steel and hard steel, defects in steel	06	07
Unit -4	TIMBER: Qualities of timber for construction. Seasoning, Storage and Preservation of timber. Use of different types wood in various parts of building. Industrial timber: veneers, plywood, fiberboard, etc.	06	07
Unit -5	LIME: Classification of lime. Fat and hydraulic lime – properties and use. CEMENT: Composition of ordinary cement. Function of cement cement mortar. Different grades of mortar, their compositions & properties.	06	07
Unit -6	SAND: Sources of Sand, Classification, Test of Sand. Grades of sand and their uses MORTAR: Types of mortar – lime mortar, mud mortar, lime-surkhi mortar, cement mortar. Different grades of mortar, Preparation of cement mortar. Use and selection of mortar for different construction work.	08	10
Unit -7	CONCRETE: Compositions and grades of concrete. Various steps in concrete construction – batching, mixing, transporting, compacting, curing, shuttering, jointing. Tests and quality control of concrete. Design Mix of concrete.	10	11

Unit -8	Polymens /Plastic properties of plastic, Types and use of Plastics in building construction.	05	06
Unit -9	Non –ferrous metal: Aluminium, copper and important alloys like brass, bronze etc-brief description of uses, corrosion or both ferrous and non-ferrous metals, types and preventive measures.	05	06
Unit -10	Miscellaneous materials-Glass, Fibre glass, cork, linoleum, Gypsum, ceramic products	05	06
	Total	**60**	70

Books:

1	. B. C. Punmia- *Building Materials and Construction.*
2	Bindra & Arora- *Building Materials and Construction*
3	S C Rangwaala - *Building Materials*

ARCHITECTURAL DESIGN & DRAWING-I

Subject Code 1637303	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	05
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

RATIONALE

Free hand sketching, colouring and rendering like sketching, shades and shadows, lettering and printing forms important components of Architecture discipline. Graphic presentation forms a core subject for preparing perspective drawings, scale drawings, three dimensional views, furniture drawings and layouts. Therefore, this course aims at equipping the students with the skills of graphic presentation and other above mentioned areas.

Teachers are expected to lay considerable stress on practical work so that students attain sufficient skills in sketching, lettering and printing and desired competencies for preparing good quality perspectives of interior and exterior of buildings in different media

Teachers are also expected to stress upon appropriate line work, properties, dimensioning lettering and printing. Diploma holders in Architectural Assistantship find employment with private architects and also majority of them go for self-employment. Therefore, they are required to develop aptitude/skills to design residential, commercial and other public buildings.

Teachers while imparting instructions/giving assignments to students are expecting to teach various elements of design like form function, balance, light of shadow, shape, plane, volume, line, rhythm, proportions, textures and other such related elements. Teachers are also expected to show various types of designs of small building to develop and appreciation for this subject.

Teachers should also motivate students to maintain sketch book/portfolio of all the assignments given to the students.

Contents :Theory

	Name of the Topic	Hrs/week	Marks
Unit -1	**Drawing Techniques** 1.1 Use of Architectural Instruments 1.2 Use of Pencil – tones – texture 1.3 Use of Colour – tones – texture	06	7
Unit -2	**Composition of 2D & 3D** 2.1 Composition of 2D surfaces in tone, colours and textures 2.2 Principles of design 2.3 Elements of design 2.4 Composition of 3D surfaces 2.5 Problems based on principles & elements of Architecture	12	15
Unit -3	**Proportion of Components of Human Body** The proportions of the different components of the human body; Examples from Le Corbusier Modular Man, , Vastu Pursha Mandala	06	7
Unit -4	**Human Activities** Requirement of space (2-D, 3-D) for various human activities (Single and multiple uses of spaces such as queues etc.	06	7

Unit -5	**Furniture Standards** Furniture standards (sizes of domestic and public furniture); Toilet and Kitchen equipment - sizes and standards; Doors and windows - sizes, standards and locations.	**06**	**7**
Unit -6	**Vehicles** Vehicles in motion, parking along with turning radii for two-wheelers, cars, buses, vans etc. Standard road width.	**04**	**4**
Unit -7	**furniture** Standards for drinking fountains, waiting queues at bus stops, garden seats, waste bins, telephone booths, street lights, foot paths, public walkways, railing etc.	**06**	**7**
Unit -8	Graphic Representation of plant material (ground cover, foliage, shrubs, trees) human figures and vehicles.	**04**	**4**
Unit -9	Development of architectural drawing from given sketch design of building involving two or more floors and split levels	**10**	**12**
	Total	**60**	**70**

RECOMMENDED BOOKS

1. Time Saver Standards for Building Types by Joseph De Chiara and John Callendera
2. Architects Data by Neufert
3. Space, Time and Order by DK Ching
4. Time Saver Standards for Building Types by Joseph De Chiara and John Callendera
5. Architects Data by Neufert
6. Space, Time and Order by DK Ching

COMPUTER APPLICATION IN ARCHITECTURE

Subject Code 1637304	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

RATIONALE

In the present times an architectural assistant should be capable of drafting drawings on the computer as most of the architects lay greater stress on computerized drawings for their ease of drafting, editing, managing and presentation. At the end of the course the students should be able to make 2-D architectural drawings for presentation and construction purposes. The student should get familiar with the latest AutoCAD software

Note: Relevant theory may be taught along with practical exercises as sessional records in each topic.

Contents :Theory

Name of the Topic		Hrs/week	Marks
Unit -1	Introduction to 2-D CAD • Input devices • Graphics • Starting AutoCAD • Inside the drawing editor • Commands in the menus (Tool bars) • Accessing Commands • Entity selection • Entering coordinates • Folders for organizing drawings and files	08	**9**
Unit -2	Introduction to 2-D CAD • Input devices • Graphics • Starting AutoCAD • Inside the drawing editor • Commands in the menus (Tool bars) • Accessing Commands • Entity selection • Entering coordinates • Folders for organizing drawings and files	08	**9**
Unit -3	Drawing Commands • Line • Poly line/Double line. • Arc • Ellipse • Polygon • Rectangle • SP line • Circle • Sketch. • Hatch • Donuts	14	**17**

Unit -4	Viewing an Existing Drawing • Zoom • Pan • Redraw and Regen all • Regen Auto • View	**08**	**9**
Unit -5	Modifying an Existing Drawing • Undo Redo/Oops • Trim • .Move • Offset • Rotate • Array • Stretch • Divide • Champher • Erase • Break • Copy, multiple copy • Mirror (Mirror test) • .Change (change properties) • Extend • Explode • Blip mode • Scale • Fillet	**14**	**17**
Unit -6	Making and Inserting Blocks • Blocks • Insert block • Base • Using library for blocks • W-block • X-ref • Explode	**08**	**9**
	Total	**60**	**70**

CLIMATOLOGY

Subject Code 1637305	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

RATIONALE

Understanding of the basic principles of climatology and environment are very important for diploma holders in Architectural Assistantship. The knowledge of this subject will be very useful in the design of buildings.

Teachers are expected to impart instructions of the above course keeping in view the effect of above course in the design of buildings

Contents :Theory

	Name of the Topic	Hrs/week	Marks
Unit -1	**Earth and Global Climate:** • Introduction to climatology • Elements of climate (Wind, temp, humidity, precipitation, pressure). • Different climate zones & Classification of tropical climate	12	14
Unit -2	**Relationship of Climate and Comfort** • Micro-Macro climatic effects. • Concept of comfort zone and bio climatic chart. • Relation of climatic elements to comfort	10	12
Unit -3	**Sun & Building Design** • Orientation for Sun • Sun chart (sun-path diagram) • Design of louvers (horizontal & Vertical) • Natural lighting/Day lighting • Introduction and objectives of solar passive design and thermal comfort.	14	16
Unit -4	**Wind & Building Design** • Orientation for Wind. • Ventilation Technique • Stack effect and thermally induced air current • Passive Solar Cooling • Air movement around the building	14	16
Unit -5	**Architectural Application** • Building orientation & Placement • Effect of Landscaping Site selection and site planning	10	12
	Total	60	70

REFERENCE BOOKS

1. Tropical Architecture by CP Kukreja
2. Environmental Engg. And Management by Suresh K. Dhameeja.
3. Ecology by E.P. Odem.
4. Design with climate by Arvind Krishan and others

FREE HAND SKETCHING

Subject Code 1637306	Practical			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	100	
	—	—	06	Internal	:	30	
				External	:	70	

RATIONALE:-

Contents : Practical

List of Experiment:-		Hrs/week	Marks
Unit -1	Introduction of Free hand Sketching of Monuments and buildings in different techniques and medium	**10**	**14**
Unit -2	India Gate	**10**	**14**
Unit -3	Red Fort	**10**	**14**
Unit -4	Qutub Minar	**05**	**07**
Unit -5	Toran (Gateway)	**05**	**07**
Unit -6	Taj Mahal	**10**	**14**
	Total	**50**	**70**

COMPUTER APPLICATION IN ARCHITECTURE LAB.

Subject Code 1637307	Practical			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	ESE	:	100	
	—	—	04	Internal	:	30	
	-	-	-	External	:	70	

RATIONALE

In the present times an architectural assistant should be capable of drafting drawings on the computer as most of the architects lay greater stress on computerized drawings for their ease of drafting, editing, managing and presentation. At the end of the course the students should be able to make 2-D architectural drawings for presentation and construction purposes. The student should get familiar with the latest Auto CAD software

Contents :Practical

List of Experiment:-		Hrs/week	Marks
Unit -1	Introduction to 2-D CAD Exercise: Creating folders and sub folders	**8**	**16**
Unit -2	Creating and saving a new Drawing Exercise: Setting up a new drawing with units, limits etc	**7**	**14**
Unit -3	Drawing Commands Exercise: Making a composition of different geometrical shapes using various drawing commands	**10**	**20**
Unit -4	Viewing an Existing Drawing Exercise: Viewing, zooming of existing drawing made in section3.	**10**	**20**
Unit -5	Modifying an Existing Drawing Exercise: a) Modifying composition made in Section 3 b) Making plan, elevation and section of simple building	**8**	**16**
Unit -6	Making and Inserting Blocks Exercise Inserting furniture, fixtures, trees etc. in the plans, sections and elevations made in section 5.	**7**	**14**
	Total	**50**	**100**

ARCHITECTURAL DESIGN & DRAWING-I - TW

Subject Code 1637308	Term Work			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	Internal	:	30	
	—	—	04	External	:	70	

RATIONALE

Architectural Designs drawing is basic of architecture. It prepares the students to become a good architectural assistant. It helps in learning further aspects of architectural drawings. Also this subject will help the students to understands and attain basic skills of Architectural Drawing in order to graphically represent what they learn in other subjects.

Objectives:

The Students will be able to :

1) Understand drafting skills and techniques
2) Develop the given sketch design in to final drawing
3) Develop bubble diagram in to final drawings
4) Prepare various types of 2 Dimensional drawings in CAD
5) Design simple buildings as per requirements

DETAILED CONTENTS

Note: a) All dimensions in all segments to be related to human figures.
b) Dimensions should be resolved from actual measurements.
c) Minimum of 10 sheets should be made in the semester

CONTENTS : TERM WORK

	List of Term Work	Hrs/week	Marks
Unit -1	**Drawing Techniques** 1.4 Use of Architectural Instruments 1.5 Use of Pencil – tones – texture 1.6 Use of Colour – tones – texture	**08**	**09**
Unit -2	**Composition of 2D & 3D** 2.1 Composition of 2D surfaces in tone, colours and textures 2.2 Principles of design 2.3 Elements of design 2.4 Composition of 3D surfaces 2.5 Problems based on principles & elements of Architecture	**07**	**09**
Unit -3	**Proportion of Components of Human Body** The proportions of the different components of the human body; Examples from Le Corbusier Modular Man, Vitruvius Marco Pollione, Vastu Pursha Mandala	**05**	**06**
Unit -4	**Human Activities** Requirement of space (2-D, 3-D) for various human activities (Single and multiple uses of spaces such as queues etc.)	**05**	**06**
Unit -5	**Furniture Standards** Furniture standards (sizes of domestic and public furniture); Toilet and Kitchen equipment - sizes and standards; Doors and windows - sizes, standards and locations.	**05**	**06**
Unit -6	**Vehicles** Vehicles in motion, parking along with turning radii for two-wheelers, cars, buses, vans etc. Standard road width.	**08**	**09**

Unit -7	**Street furniture** Standards for drinking fountains, waiting queues at bus stops, garden seats, waste bins, telephone booths, street lights, foot paths, public walkways, railing etc.	**07**	**08**
Unit-8	Graphic Representation of plant material (ground cover, foliage, shrubs, trees) human figures and vehicles.	**08**	**09**
Unit -9	Development of architectural drawing from given sketch design of building involving two or more floors and split levels	**07**	**08**
	Total	**60**	**70**

RECOMMENDED BOOKS

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2. Architects Data by Neufert
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STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN COSTUME DESIGN & GARMENT TECHNOLOGY

(Effective from Session 2016-17 Batch)

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.	Basics of Costume Design & Garment Making	1642301	03	03	10	20	70	100	28	40	03
2.	Software skills	1642302	03	03	10	20	70	100	28	40	03
3.	Textile Science	1642303	03	03	10	20	70	100	28	40	03
4.	Visualization and Representation	1642304	03	03	10	20	70	100	28	40	03
5.	Clothing Construction	1642305	04	03	10	20	70	100	28	40	03
		Total:-	**16**				**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.	Software Skills Lab	1642306	06	03	15	35	50	20	03
7.	Visualization and Representation Lab	1642307	04	03	15	35	50	20	02
8.	Clothing Construction Lab.-I	1642308	04	03	15	35	50	20	02
Total:- 14							**150**		

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.	Design Concepts & Details (TW)	1642309	03	30	70	100	40	02
Total:- 03						**100**		
Total Periods per week Each of duration one Hours **= 33**						**Total Marks = 750**		**24**

BASICS OF COSTUME DESIGN & GARMENT MAKING

Subject Code	Theory			No of Period in one session : 42			Credits
	No. of Periods Per Week			Full Marks	:	100	
1642301	L	T	P/S	ESE	:	70	03
	03	—	—	TA	:	10	
				CT	:	20	

Rationale: This course is designed to acquaint the students with the basic understanding of the principles of costume design and the psychology of clothing. It will develop skills in students related to design development which emerges through a process of character analysis, based on the script and directorial concept.

Objectives: Students will be able to:
1. Understand different concepts of costume, fashion & design.
2. Understand elements of arts, principles of fashion design & different divisions in clothing industry.
3. Know about fashion & clothing industry.
4. Exposed to different concepts & terminologies used in fashion & clothing industry.

CONTENTS: THEORY

	Name of the Topic	Hrs/Week	Marks
Unit-1	**Introduction to Costume Design and Garment Making** 1.1 Basic concepts of Costume Design and Garment Making. 1.2 **Brief history of Indian garments from ancient to modern times:** Harrappa and Mohenjodaro, Vedic Age, The Persian influence, The Greek influence, The Purdah system, Origin of the Royal Attire. Salwar – Kameez – The decades- old Indian Attire Garment. 1.3 Brief information regarding: Ancient Egyptian dress, Ancient Greek dress, Ancient Roman dress, Dress in the French Revolution, The art of traditional Chinese dress. 1.4 Importance of Costume Design in our life. 1.5 Design Process: Analysis, Design collaboration, Costume research, Preliminary sketching and colour layout, Final sketches. 1.6 Production process: Pattern Drafting or Draping. 1.7 Costume Designer. 1.8 Difference between costume design and fashion design.	12	20
Unit–2	**Elements & Principles** 2.1 Elements of arts: Line, form, shape, value, colour, texture. * Colour schemes. Colour co-ordination 2.2 Principles of design: Balance, emphasis, harmony, proportions & repetition 2.3 Elements of costume & fashion design. 2.3.1 Structural designs- darts, tucks, pleats. 2.3.2 Decorative designs- prints, trims, embellishments.	06	10
Unit-3	**Fashion & Clothing Terminologies** 5.1 Clothing concept: Definition & principles, Objectives of clothing technology. 5.2 Clothing terminologies- baggies, bell- bottom, blazer, blouse, bow, ties, circle skirt, drapes, innerwear, jeans, lingerie's, polo shirt, seamless garment, wrap around skirt. 5.3 Fashion terminologies- fashion cycle, contemporary, conservative & continental costumes, surfer look, masculine, mod looks, formal wear, casual wear, classic, ethic, city wears, boutique, haute-o-couture, prêt –a-porter, mass production.	06	10

Unit–4	**Product categorization** 4.1 Textiles 4.2 Accessories/lifestyle products, Leather goods and footwear 4.3 Apparel - Menswear/Womenswear/Kidswear 4.4 Trims and Accessories for the Fashion Industry 4**.5 Various categories of menswear, womenswear and childrenswear** 4.5.1 Menswear – shirt, trousers, formal jackets suit and sporty suit 4.5.2 Womenswear – dresses, blouses, skirts, trousers, kameezes, saris and blouses 4.5.3 Kids wear – categories of children for 0 – 15 years and various garments like frocks, skirts, blouses, trousers, dungarees, jackets etc. 4.5.4 **Sizing Systems** 4.5.5 Standard Measurements 4.5.6 Standard Sizing 4.6. Age group relationship to design.	09	15
	Total	**33**	**70**

List of Recommended Books

S. No.	Title of Books	Author	Publication
1	Traditional Indian Costume and Textile	Dr. Parul Bhatnagar	Abhishek publication, Chandigarh
2	Indian Textiles	John Gillow & Nicholas Barnard	
3	Textile and embroidery of India	John Irvin	Marry Publications, Bombay.
4	Elements of fashion and design	Lehnert Gertrud	West Duxbury Manchesters. 1995
5	Inside the fashion business	Kitty G. Dickerson	Person Education Pvt. Ltd. Singapore. 2004

SOFTWARE SKILLS

Subject Code 1642302	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale: Computers play a vital role in present day life, more so, in the professional life of any student. In order to enable the students to use the computers effectively in Design softwares, this course offers the modern day skills along with graphics application in design.

Objective: The objectives of this course are to make the students enable to:

- Effectively learn how to use Photoshop, Corel Draw and Illustrator for editing skills
- Use the various toolboxes and colour changing techniques.
- Photo editing skills

CONTENTS : THEORY

	Name of the Topic	Hrs/week	Marks
Unit -1	Photo shop: Layers blending modes, Transform tools masking image adjustment Layers styles clone Stand filters changing canvas size, use rulers and guides inverse selection feather creating a new layer.	**11**	
Unit -2	**Corel draw** Works Space and fonts, using the tool box, using the color, Drawing and Editing objects using a template, Vector effects **RGB CMYK colors,** adding 3-D Effects to text and objects	**11**	
Unit -3	**Adobe Illustrator** Pen tool, master clipping masks , path finder panel shape builder tool shape mode appearance panel how to use brushes layers, swatch library , pattern options, textures	**11**	

TEXTILE SCIENCE

Subject Code 1642303	Theory			No of Period in one session : 42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

RATIONALE : Rapid changes and progress in textile industry has led to the advancement in the fabrics selected for manufacturing garments. Manufacturing of fiber and textiles for apparel, household and industrial use has great business opportunity. This course on Textile Science provides in-depth knowledge on different fibres available in the market, its mechanical production or engineering of fibres, the chemistry and physics involved in producing and testing fibres, principles of dyeing, printing and its operations, materials, equipment and process. This course will provide sound foundation for students undertaking course in costume designing and garment making.

Objectives: Students will be able to:

1. Select suitable textile fibres for a given application on the basis of physical and chemical properties.
2. Explain the characteristics of different types of fabrics based on type of yarn, weaves and other fabric construction processes.
3. Select appropriate dyes and printing method for given textile fibre and fabric respectively.

CONTENTS : THEORY

	Name of the Topic	Hrs/Week	Marks
Unit-1	**Introduction** 1.1 Terms and definition: Textile, Textile Science, Fibres, filaments, yarns (spun yarns, filament yarns), sewing threads, Fabrics (woven, knitted, non-woven, etc.), Garment. 1.2 Importance of textile science in our life.	02	05
Unit–2	**Textile fibres** 2.1 Introduction and classification of textile fibres. 2.2 General fiber properties 2.3 Brief introduction about manufacturing processes, physical & chemical properties, their suitability in garment of following textile fibres: Cotton, Silk, Wool, Polyester, Viscose rayon, Acrylic, Nylon. 2.4 Identification of important textile fibres (Feeling and burning test).	10	15
Unit–3	**Yarns** 3.1 Brief outline of the process involved in the conversion of fibres into yarn. 3.2 Different types of yarn, their properties and suitability for garment. 3.3 Yarn twist. 3.4 Yarn count (definition, unit of yarn count, system of yarn count).	06	10
Unit–4	**Conversion of yarn into fabric** 4.1 Definition, objectives and principles of various methods of fabric formation – weaving, knitting, non-woven. End use of fabrics produced by these methods. 4.2 **Woven Fabric** 4.2.1 Basic loom, loom mechanisms and function of its various parts, warp & weft yarns. **4.2.2 Woven design fundamentals:** Introduction, classification of woven structures, methods of weave representation, weave repeat, basic elements of woven design, types of draft plan and denting plans. Basic weaves and its modification (Plain weave, Twill weave, Satin and weaves). Brief idea about decorative weaves. Draft and peg-plan of weave.	12	20
Unit–5	**Chemical Processing of Textile** 6.1 Introduction to various wet-processing treatments such as singeing, desizing, scouring, bleaching, mercerization. 6.2 **Dyeing:** Dyes & its classification, Principles & Properties of dyes, Application of natural and Synthetic dyes on different fibres and their blends. Different dyeing techniques. Introduction to dyeing machinery. Defects in dyeing and their remedies. **6.3 Textile Printing:** Introduction, Difference between dyeing and printing. Methods of Printing such as Block Printing, Stencil Printing, Screen Printing, and Roller printing. Styles of Printing: Direct style of Printing, Resist style of Printing, Tie & dye, Batik Printing, Discharge style of Printing. **6.4 Finishing of fabrics:** Principle of finishing of natural, man-made fibres and blended fabrics. Wash-n-wear, crease-resistant anti-shrink, water-repellent, rot and mildew proofing, flame-proofing finishes, etc.	12	20
	Total	**42**	**70**

List of Recommended Books:-

S. No.	Title of Books	Author	Publication
1	Textile science	Marjery Joseph.	Holt rinechart and wiston 1992
2	Introductory textile science	Marjory L. Joseph	
3	Textiles Fiber to Fabric	Bernard P. Corbman	McGraw-Hill Book Co.–Singapore-International Edition
4	Fundamentals of textiles and their care.	Sushila Dantyagi.	Orient blackswan pvt.ltd.2012
5	Modern textile	Do rothy S. Lyle.	Mcmillan publishing.co. 1982
7	Dyeing and Synthetic fabrics	R.S Paryag.	
8	Technology of Dyeing	V.A Shenai	Sevak Publishers, Mumbai.

VISUALIZATION & REPRESENTATION

Subject Code 1642304	Theory			No of Period in one session : 42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale: This course is designed to develop artistic aptitude in students in order to sustain in the field of garment/fashion design. It helps in developing the basic foundation that are essential for costume design and garment making.

Objectives: The students will be able to:

1. Understand & develop different elements of art.
2. Apply elements and principles of design for structural and applied design.
3. Learn different colour harmonies & use the colours as per the need of designing.

CONTENTS : THEORY

	Name of the Topic	Hrs/Week	Marks
Unit-1	**Introduction** 1.1 Drawing tools & material, Sketching tools and material. 1.2 **Elements of Costume:** 1. Necklines & Collars, 2 Sleeves & Cuffs, 3 Skirts & Pockets. 1.3 Silhouette: Concept, Definition, Types of silhouette with their features.	05	10
Unit-2	**Element of Art & design.** 2.1 Line: Concept, definition, Types of lines, Line movements, Aspects of line, its physical and psychological effects on human figure. (Horizontal, Vertical, Diagonal, Curve, Zigzag) 2.2 Space: Definition, Cues influencing perception of shape and space, physical and psychological effect of space. 2.3 Shape and form: Definition, different types, Attributes of shape and form. 2.4 Texture: Definition and concept of texture, Types of textures, Psychological and physical effect of Texture. 2.5 Colour: Concept, definition, psychological and physical effects of colour, Primary, secondary and tertiary colour, neutral colour. Dimension of colour (Hue, Value & Intensity), Colour wheel, Selecting colours, Using of colours, Colour schemes, Qualities of colour.	14	20
Unit–3	**Principles of Art & design.** 3.2 Harmony (Unity)— Definition, concept, effects (physical & psychological). 3.3 Balance - Definition, concept, types of balance, physical & psychological effects of balance. 3.4 Emphasis - Definition, concept, physical & Psychological effects of emphasis. 3.5 Proportion (Scale)- Definition, concept, physical & psychological effects of proportion. 3.6 Repetition- Definition and physical & psychological effects of repetition. 3.7 Parallelism- Definition and effects of parallelism. 3.8 Sequence- Definition and effects of Sequence. 3.9 Alternation- Definition and effects of Alternation. 3.10 Gradation- Definition and effects of Gradation. 3.11Transition- Definition and effects of Transition. 3.12 Radiation - Definition and effects of Radiation. 3.13Rhythm- Definition and effects of Rhythm. 3.14Concentricity- Definition and effects of Concentricity. 3.15 Contrast - Definition and effects of Contrast.	14	25
Unit-4	**Elements of Colour** 3.1 Introduction, Fundamental basis of colour, Theories of colour (Light theory and Pigment theory of colour), Visual effects of various colours. 3.2 Modification of colours - concept, need & requirements. 3.3 Colour Contrast and Colour Harmony – Concept, Need & Requirements, and Different types.	05	10
	Total	**42**	**70**

List of Recommended Books

S. No.	Title of Books	Author	Publication
1	Visual design in dress	Marian L Devis.	Prentice-hall, Inc.
2	Individuality in clothing selection	Mary Kefgan	M/c Milan
3	Colour and line in dress	Hemstead	Lawrance Prantice Hall
4	Fashion design illustration-Men	Pattrick John Ircland	B.T. Batsford Ltd. London
5	M/c calls' Sewing in colour	Hamlyn	Hamlyn
7	How you look and dress?	Byrta Carson	Mc graw hill book co.1949

CLOTHING CONSTRUCTION

Subject Code 1642305	Theory			No of Period in one session : 42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

RATIONALE: There are various types of garments available in the market. Students should know the construction of these garments in a systematic way. This course will provide sound foundation for garment manufacturing techniques and is designed to develop skills in students related to body measurements using appropriate tools, sewing by non-automatic machine, application of appropriate constructional stitches, and preparation of fabric for clothing construction.

Objectives: The students will be able to:

i. Prepare the garment as per measurement using appropriate tool, machine and technique.

CONTENTS : THEORY

UNIT	Name of the Topic	Hrs/ Week	Marks
Unit–1	**Non-Automatic tools for garment manufacturing** **1.1 Measuring Tools:** Function, use and care of the following tools: Measuring tape, Tailor's square, Right angled triangle, Calculator, French curve Set, Set square, Curve Rules. **1.2 Marking tools:** Function, use and care of the following tools: Paper, Pencil, Fiber pens, Rubber, Compass, Tracing wheel, Pins, Tailor's chalk, Pattern notcher, Pattern punch, Pattern books, Pattern weights, Model stands. **1.3 Cutting tools:** Function, use and care of the following tools: Small shears, Big shears, Cutters, Pinking shears, Stitch opener. **1.4 Sewing tools:** Function, use and care of the following tools: Bobbin & Bobbin case, Machine sewing needles, Hand sewing needles. **1.5 Miscellaneous tools:** Function, use and care of the following: Thimble, Pin cushions, Thread, Ironing board, Iron, Bobbin winder.	07	10
Unit–2	**Sewing Machine** 3.1 History of sewing machine 3.2 Types of sewing machine 3.3 Parts and functions of sewing machine 3.4 Operation of sewing machine 3.5 Care & maintenance of sewing machine 3.6 Problems of stitch formation, problems of pucker and problems of damage to the fabric along the stitch line. 3.7 Sewing area.	08	12
Unit–3	**Body Measurement** 4.1 Knowledge of various landmarks on the body, required for making garments. 4.2 Techniques of taking body measurements. 4.2.1 Directly from the body.(Vertical & Horizontal) 4.2.2 Indirectly form the readymade garments. 4.2.3 From standard size charts. 4.2.4 Technique of calculating all the measurements from chest measurement.	04	07
Unit-4	**Fabric** 5.1 Fabric widths, 5.2 Grain lines 5.3 Preparation of fabric for clothing construction: Straightening, Tearing, Shrinking. 5.4 Different types of fabrics and its application in clothing.	04	05

Unit–5	**Clothing Construction** **6.1 Hand stitches** 6.1.1 Basting: Even basting, Uneven basting. 6.1.2 Running stitch 6.1.3 Different types of hemming stitches: Blind hemming stitch, Simple hemming stitch. **6.2 Machine stitches:** **6.2.1** Plain Seam, Curved Seam, Cornered, To join an inward corner, Trimming, To trim corner, Clipping, Hand overcast, Zigzagged, Bias bound, Net bound, French seam, Flat felled seam, Self bound seam, Corded seams, Lapped seams, Fagotted seam, Double top stitched seam, Welt seam, Tuck seam, Slot seam. 6.2.2 Seaming special fabrics (Velvet, Net, Georgette). 6.2.3 Fullness techniques: Darts, Tucks, Pleats, Gathering, Shirring, Smocking, Ruffles.	07	14
Unit–6	**Fullness techniques** 8.1 Definition of fullness 8.2 Techniques of controlling fullness through different varieties of darts, tucks, pleats, gathers, shearing, smocking and ruffles.	03	05
Unit–7	**Use of components** 9.1 Knowledge of various components such as lace, braid, elastic, hook and loop fastening, Velcro, seam binding and tape, eyelets, zip fasteners, buttons, tack buttons, snap fasteners and rivets.	01	05
	Total	**42**	**70**

List of Recommended Books

S. No.	**Title of Books**	**Author**	**Publication**
1	Macall's sewing in colour	Hamlyn	Hamlyn
2	Singer sewing Book	Glady Cunning	Golden Pr
3	Complete guide to sewing		Reader digest
4	Clothing construction	Evelyn A. Mansfield	Houghton miffin 1953
5	The technology of clothing manufacture	Harold Carr and Barbara Latham	John Wiley & sons. 1994
6	The Art of Sewing	Thomas (anna jacob)	UBS Publication distributer Ltd.
7	Home dress making	Isabel Sutherland Ed	Pan Craft Book

SOFTWARE SKILLS LAB

Subject Code 1642306	Practical			No of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
				External	:	35	

Rationale: Computers play a vital role in present day life, more so, in the professional life of any student. In order to enable the students to use the computers effectively in Design softwares, this course offers the modern day skills along with graphics application in design.

Objective: The objectives of this course are to make the students enable to:

- Effectively learn how to use Photoshop, Corel Draw and Illustrator for editing skills
- Use the various toolboxes and colour changing techniques.
- Photo editing skills

Eight experiments to be performed in the laboratory:

Contents : Practical

List of Experiment:-		Hrs/week	Marks
Unit -1	Photoshop	12	
Unit-2	Corel draw.	12	
Unit-3	Adobe Illustrator.	12	
	Total	**84**	

VISUALIZATION & REPRESENTATION LAB

Subject Code 1642307	Practical			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

CONTENTS :PRACTICAL

	List of Experiment	Hrs/ Week	Marks
Unit-1	**Prepare given types of drawing by hand** 1.1 Nature drawing. 1.2 Object drawing. 1.3 Free hand drawing. 1.4 Memory drawing.	04	
Unit-2	**Calligraphy writing by hand (All alphabet).** 2.1 Gothic letters. 2.2 Roman letters.	12	
Unit–3	Effect of different types of line. (Types as per the theory portion.)		
Unit–4	**Shape**. 4.1 **Prepare the sheet showing following equal sided flat shapes by hand** 4.1.1 Square, Circle, Equilateral Triangle, Pentagon, Hexagon, Octagon. **4.2 Prepare the sheet showing following Unequal sided flat shapes manually** 4.2.1 Rectangle, Parallelogram, Heart, Diamond, Teardrop, Marquis, Ogive, Star, Paisley, Club, Spade, Pear, Kidney.	12	
Unit-5	Preparation of the sheets showing shapes that fit snugly together (6.1 to 6.6) and the shapes that don't fit together but create other shapes between them (6.7 to 6.10) (Do it by hand) 5.1 Squares, Hexagon, Ogives, Diamonds, Triangles, Paisleys in to the circle, Octagon, Star, Circle, Square & Rectangle, Squares	02	
Unit-6	**Form.** (Do it by hand) 6.1 Preparation of sheet showing Equal sided three dimensional form 6.1.1 Sphere, Cube 6.2 Preparation of the sheet showing Unequal sided three dimensional forms. 6.1.1 Cylinder, Cone, Pyramid, Box, Bell, Dome, Ovoid, Barrel, Hourglass, Trumpet.	05	
Unit-7	Preparation of sheet showing following Textures. (any medium) 7.1 Rough texture, 7.2 Smooth texture, 7.3 Transparent	02	
Unit-8	**Principles of design** **8.1 Preparation of sheet showing the effect of Balance in following areas manually.** 8.1.1 Balance in line path, space, space & shape, value, texture, pattern. **8.2 Preparation of the sheet showing Emphasis in relation to the elements of design manually.** 8.2.1 Emphasis of line thickness, shape, form, space, light, texture, pattern. **8.3 Preparation of sheets showing Rhythm and its relationship with elements of design manually.** 8.3.1 Rhythm in line – Wavy, Zigzag, Single, Swirled, Jagged. 8.3.2 Rhythm in shape – Saw tooth, Diamond, Undulating. 8.3.3 Rhythm in pattern **8. 4 Preparation of sheets showing the effect of Radiation in relation to elements of design manually**. 8.4.1 Radiation in line & space, shape & space, Pattern, Radiation from an axis. **8.5 Preparation of sheets showing the effect of Transition in relation to elements of design manually**. 8.5.1 Transition in line, space, shape & space, texture, shape & texture. **8.6 Preparation of sheets showing effect of Gradation manually**. 8.6. 1 Gradation in line, space, shape, space & shape, texture, pattern. **8.7 Preparation of sheets showing the effect of Repetition manually**. 8.7. 1 Repetition in line, space, shape, pattern, texture.	11	
Unit-9	Reducing and Enlargement of design.	03	
Unit-10	To prepare Structural and Applied design on sheet by hand.	03	
Unit-11	**Colour.** 11.1 Preparation of sheet showing colour wheel. 11.2 Preparation of sheet showing tints and shades. 11.3 Preparation of sheet showing colour schemes with reference to theory.	06	
	Total	**60**	

CLOTHING CONSTRUCTION LAB –I

Subject Code 1642308	Practical			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

CONTENTS : PRACTICAL

	List of Experiment	Hrs/ Week	Marks
Unit-1	Prepare a labeled outline diagram of sewing machine.	04	
Unit-2	Take body measurement of another person and note it in the file.	04	
Unit–3	Prepare sample of hand stitches (covered in theory) on given fabric.	08	
	Prepare samples of machine stitches (covered in theory) on given fabric.	15	
Unit-4	Prepare samples of neck line finishing using piping and shape facing (any three)	04	
	To make samples of pockets (Patch, side and cut)	05	
Unit-5	Prepare samples of fullness technique (Simple dart, fish dart, vertical tuck, horizontal tuck, knife pleat, box pleat, inverted box pleat, gathering by hand and machine, smocking, and ruffles)	10	
Unit-6	Fix components such as zip, button and button hole, hook and eye and Velcroas directed on given garment	10	
	Total	**60**	

DESIGN CONCEPTS & DETAILS -TW

Subject Code 1642309	Term Work			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	Internal	:	30	
	—	—	03	External	:	70	

RATIONALE: This course will provide hands on experiences to students specifically related to design concepts associated with Clothing construction, Art and design and Textile science .The content covered in the courses of Clothing construction , Art and design and Textile science help the students in carrying out the design aspects through illustration. Students will be able to learn through this course about structural designs, applied design and the drape of the fabric.

Objectives: The students will be able to:

i. Illustrate different types of design effects required for costume design and dress making by drawing and sketching.

CONTENTS : TERM WORK

	List of Term Work	Hrs/ Week	Marks
Unit-1	1.1 Draw different types of darts.	04	
	1.2 Draw different types of tuck.	04	
	1.3 Draw different types of pleats: Accordion or Crystal, Knife pleats, Box pleats, Inverted box pleats.	04	
	1.4 Draw different types of Ruffles: Circular ruffles, Straight ruffles	04	
	1.5 Draw different types of Trimmings · Top stitching, Tucking, Fagotting, Insertion, Shirring, Braiding, Cording, Rick-rack, Bias binding, Quilting, Smocking, Ribbon, Laces, Edging, Eyelet, Plaiting.	10	
Unit-2	2.1 Draw different types of buttons, Plackets openings.	05	
Unit-3	3.1 Sketching Stripes, Checks or Plaids.	02	
	3.2 Draw following Fabric falls and drapes · Crape, Soft and Sheer, Lace, Tulle and net, Organdies, Satin, Velvet, Taffeta.	04	
	3.3 Draw following Textures and Patterns: Diagonal, Herringbone, Basket weave, Glen plaids, Corduroy.	04	
Unit-4	4.1 Draw different types of motifs.(5 Motifs each) · Natural · Floral motifs · Animal motifs · Geometric Design · Abstract Design · Man-made motifs · Decorative motifs · Nursery Design · Polka dot Design	15	
Unit-5	5.1 Sketch only outline of different types of faces such as round, oval, triangular, square and basic drawing of hand with fingers.	04	
	Total	**60**	

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN CERAMIC ENGINEERING

(Effective from Session 2016-17 Batch)

THEORY

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGS CHEME	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.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	1600302	03	03	10	20	70	100	28	40	03
3.	Ceramic and Raw Materials	1613303	03	03	10	20	70	100	28	40	03
4.	Glass Technology – I	1613304	03	03	10	20	70	100	28	40	03
5.	Enamel Technology	1613305	03	03	10	20	70	100	28	40	03
		Total:- 16					**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.	Computer Programming through 'C' Lab.	1600306	06	03	15	35	50	20	03
7.	Ceramic Processes Workshop-I	1613307	04	03	15	35	50	20	02
8.	Ceramic Engineering Workshop Practice – I (Glass & enamel)	1613308	03	04	15	35	50	20	02
9.	Ceramic Engineering Lab.-I	1613309	02	03	15	35	50	20	01
		Total:- 15					**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	
10.	Ceramic Engineering Workshop Practice – I (Glass & Enamel) (TW)	1613310	02	15	35	50	20	01
		Total:- 02				**50**		
Total Periods per week Each of duration one Hours **= 33**						**Total Marks = 750**		**24**

APPLIED MATHEMATICS -I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code 1600301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents :Theory		Hrs/week	Marks
Unit -1	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems. 1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area between two curves. 1.5.3 Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l), (-l, l), (0, 2\pi), (-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**<u>Numerical Methods</u>** 5.1 Solution of algebraic equations Bisection method. Regularfalsi method. Newton – Raphson method. 5.2 **<u>Solution of simultaneous equations containing 2 and 3 unknowns</u>** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	**05** **05**	**07** **07**
	Total	**48**	**70**

Text /Reference Books:		
Name of Authors	**Titles of the Book**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

Contents : Theory			Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		[03]	
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		[08]	
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		[08]	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		[07]	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Perator.		
	04.03	If statement, it-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		[07]	

Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.	**[07]**	
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	**[04]**	
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	**[06]**	
	Total	**50**	

Text / Reference Books -

1.	Programming with C. Second Edition. Tata McGraw-Hill, 2000	-	Byron Gottfried
2.	How to solve by Computer, Seventh Edition, 2001, Prentice hall of India.	-	R.G. Dromey
3.	Programming with ANSI-C, First Edition, 1996, Tata McGraw hill.	-	E. Balaguruswami
4.	Programming with ANSI & Turbo C. First Edition, Pearson Education.	-	A. Kamthane
5.	Programming with C. First Edition, 1997, Tara McGraw hill.	-	Venugopla and Prasad
6.	The C Programming Language, Second Edition, 2001, Prentice Hall of India.	-	B. W. Kernighan & D.M. Ritchie
7.	Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi.	-	R. Subburaj
8.	Programming with C Language, Tara McGraw Hill, New Delhi.	-	C. Balagurswami
9.	Elements of C, Khanna Publishers, Delhi.	-	M. H. Lewin
10.	Programming in C.	-	Stephen G. Kochan
11.	Programming in C, khanna Publishers, Delhi.	-	B. P. Mahapatra
12.	Let us C, BPB Publication, New Delhi.	-	Yashwant kanetkar
13.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa
14.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
15.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth
16.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
17.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
18.	Pointers in C, BPB publication, New Delhi.	-	Yashwant Kanetkar

CERAMIC AND RAW MATERIALS

Subject Code 1613303	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale :

Ceramic is inorganic based Technology with a num numbs of Industrial and Domestic Products such as Refractory, Cement, Crockeries & Glass etc. The course offers the Knowledge of Ceramic Spectrums in totality.

Objective:

The Objective of this course is to make the student aware of

- Ceramic
- Raw Materials
- Products
- Uses

	Contents : Theory	Hrs/week	Marks
Unit -1	**INTRODUCTION OF CERAMIC** Introduction with its History and uses.	[05]	
Unit -2	**CERAMIC PRODUCH:** Refractory, Pottery, Glass, Enamel, Cement, etc.	[10]	
Unit -3	**RAW MATERIALS:** Silicate Chemistry, Formation, Geology, mineralogy.	[10]	
Unit -4	**TYPE OF RAW MATERIALS** Plastic raw materials _ clays, non- clay plastic raw materials _ Talk etc. Non Plastic raw materials_ Refractories, fluxes, Colouring agents.	[15]	
Unit -5	**OTHER RAW MATERIALS :** Building materials, Chemical and Technical Ceramic material, Specialized Laboratory and Engineering wares materials, Electrical Industry Ceramic material, Construction and Refectory raw materials, Insulator raw materials, Special Products raw materials etc.	[20]	
	Total	**60**	

Text/Reference Books:

Sl. No.	Title		Author
1	Industrial Ceramics	-	F. Singerand S.S. Singer
2	Hand book of glass technology	-	Dr. R. Chavan
3	Porcelain Enamels	-	A.I. Andrews
4	Modern Pottory Manufacture	-	H.N. Bose
5	Refractories	-	M.L. Mishra
6	Elements of Ceramics	-	F.H. Norton
7	Refractories	-	F.H. Norton

GLASS TECHNOLOGY - I

Subject Code 1613304	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

RATIONALE:
Glass is an important Ceramic Engineering subject dealing with Glass Products such as sheet glass. Bullet proof glass, tumbler glass, safety glass, optical glass, and ophthalmic glass etc. The subject imparts knowledge on its making by using different kind of furnaces. It also deals with the raw materials used in Glass Industry.

OBJECTIVE:
The Objective is to know about:
01. Glass and its type.
02. Raw Materials and colourants.
03. Principles of Glass Making.
04. Glass Furnaces.

	Contents : Theory	Hrs/week	Marks
Unit -1	**INTRODUCTION :** Definition, History and uses of Glass.	[10]	
Unit -2	**CLASSIFICATION OF GLASS:** Soda Lime Silica Glass, Potash Lime Silica Glass, Potash Lead Glass, Borosilicate Glass, Phosphate Silicate Glass, White and Coloured Glass, Safety Glass and Sandwich Glass etc. Network Glass such as: Fluoride Glass, Aluminosilicate Glass, Phosphate Glass and Borate Glass etc. Colloidal Glass and Glass Ceramic.	[10]	
Unit -3	**RAW MATERIALS AND COLOURANTS:** Glass Raw Materials such as: Silica, Soda Ash, Boric Oxide, Phosphoric Oxide, Sodium Oxide, Potassium Oxide, Lithium Oxide, Calcium Oxide, Barium Oxide, Lead Oxide, Aluminium Oxide, Titanium Oxide, Zinc Oxide and Magnesium Oxide etc - Origin and their properties. Colourants used for Glass such as: Chromium,. Vanadium,. Nickel, Cobalt, Copper, Magnese, Iron, Sulphur, Carbon, Silver, Gold and Selenium etc. Decolorizers used for glass.	[15]	
Unit -4	**PRINCIPLES OF GLASS MAKING:** Batch and Batch Calculation, Glass Problems and Solutions. Storage and Mixing of Raw Materials, Cullet, Flux, Oxidizing and Reducing Agent, Fining and Annealing of Glass.	[15]	
Unit -5	**GLASS FURNACES:** Tank Furnace, Pot Furnace, Float Glass Furnace and Annealing Lehr.	[10]	
	Total	**60**	

Text/Reference Books:

Sl. No.	Title		Author
1	Hand Book of Glass Technology	-	Dr. R. Charan
2	Modern Glass Practice	-	S.R. Scholes
3	Hand Book of Glass Manufacture Vol – I and II	-	F.V. Tooley
4	Glass Melting Tank Furnace	-	R. Gunther
5	Coloured Glasses	-	W.A. Weyl

ENAMEL TECHNOLOGY

Subject Code 1613305	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

RATIONALE:
Enamel is Ceramic Engineering based product which is made by fusing powdered glass to a substrate by firing. It is used as external coating as well besides its use as high temperature resistant materials in equipment. It is also used as tray or utensils because of its clean and hygienic quality.

OBJECTIVE:
The Objective is to know about:
01. Enamel and its Type.
02. Raw Materials.
03. Preparation of frit, Enamel slip, Metal Surface for Enamelling.
04. Enamel Composition, Making of Enamel Wares.

Contents :Theory		Hrs/week	Mark
Unit -1	**Introduction** Definition, History and uses of Enamel.	[10]	
Unit -2	**RAW MATERIALS AND COMPOSITION OF ENAMEL**: Raw Materials: Availability physical and chemical properties. Composition of: Enamel and Frit.	[10]	
Unit -3	**PREPARATION OF ENAMEL AND RELATED MATERIALS**: Preparation of: Frit Mill Additions, Electrolytes, Enamel Slip, Metal (Steel and Cast Iron) Surface for Enameling. Milling and Mill Equipment.	[15]	
Unit -4	**APPLICATION**: Application of Enamel Slip using various Processes.	[10]	
Unit -5	**FURNACE AND FIRING**: Smelter for Frit Making, Enameling Furnace, Firing Technique and Detail.	[10]	
Unit -6	**DEFECTS AND REMEDIES**: Defect, Cause and Remedy of: Pinhole, Peeling, Crack. Chipping, Fish Scaling, Blistering, Hair Lining, Jumping Off, Reboiling, Rusting, Tearing, Warping etc.	[05]	
	Total	**60**	

Books Recommended:

Sl. No.	Title		Author
1	Porcelain Enamels	-	A.I. Andrew
2	Technology of Enamel	-	V.V. Vargin
3	Element of Ceramics	-	F. H. Norton

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code 1600306	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
				External	:	35	

Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Eight experiments to be performed in the laboratory:

Contents : Practical		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	12	
Unit-2	Programming exercise on case Control Statement.	12	
Unit-3	Programming exercise on Decision Control Statement.	12	
Unit-4	Programming exercise on looping.	12	
Unit-5	Programming exercise on recursion technique.	12	
Unit-6	Programming exercise on Structure.	12	
Unit-7	Programs on array implementation.	12	

Text / Reference Books -

1. How to solve it by Computer, Prentice Hall of India, 1992. - R.G. Dromey.
2. The C Programming Language, Prentice Hall of India, 1989. - B.W. Kernighan & D.M. Ritchie.
3. The C Programming Language, Prentice Hall of India, 1989. - Cooper, Mullish
4. Application Programming in C. Macmillain International editions, 1990. - Richa'd Johnson- Baugh & Martin Kalin
5. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
6. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth.
7. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
8. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi - R. Subburaj
10. Programming with C language, Tata McGraw Hill, New Delhi. - C. Balaguruswami
11. Elements of C, Khanna Publishers. Delhi - M. H. Lewin
12. Programming in C - Stephan G. Kochan.
13. Programming in C, Khanna Publishers. New Delhi - B.P. Mahapatra
14. Let us C, BPB Publication. New Delhi - Yashwant Kanetkar
15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

CERAMIC PROCESSES WORKSHOP

Subject Code 1613307	Practical			No of Period in one session : 90			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	TA	:	15	
				CT	:	35	

Rationale :

The rationale behind this workshop is to familiarize the student with various conventional and modern process techniques used in making various ceramic product.

Objective:

The objective is to converse the student with

- Processing techniques used in pottery making.
- Process adopted in making refractories.
- Glass forming methods by using process techniques and machine.
- Enamel forming and application.
- Cement and concrete application.
- Decoration techniques with finishing.
- Mould making etc.

Contents :Theory		Hrs/week	Mark
Unit -1	Introduction of shaping, moulding, casting, pressing and all other processes.	[30]	
Unit -2	Cement and concrete application.	[20]	
Unit -3	Decoration and finishing of pottery and other ceramic wares techniques	[25]	
Unit -4	Mould making	[20]	
	Total	**90**	

Books Recommended:

1	The craft of Ceramic	-	Ceza de vegh and Alber Mande
2	Industrial Ceramic	-	Singer and Singer

CERAMIC ENGINEERING WORKSHOP PRACTICE – I
(GLASS AND ENAMEL)

Subject Code 1613308	Practical			No of Period in one session : 90			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	03	Internal	:	15	
				External	:	35	

RATIONALE:
This Workshop is kept mainly to get students work with hand on various process involved in making glass and Enamel products. It provides practical knowledge on operations required to be carried out in industry on laboratory scale.

OBJECTIVE:
The Objective is to know about:

1. Work with hand and practice the shaping techniques.
2. Familiarize with the machine used for the purpose.
3. Practicing various care and precautions required for getting good products without defects.

	Contents : Practical	Hrs/week	Mark
	GLASS		
Unit -1	**PREPARATION OF RAW MATERIALS**: For: soda Lime Silica Glass, Potash Glass and Coloured Glass etc.	[10]	
Unit -2	**FORMATION AND MIXING OF BATCH**: For all kind of Glasses with Frit and Colours and Mixing of the Prepared Batch.	[10]	
Unit -3	**MELTING OF GLASS**: In Pot Furnace of different Batch.	[15]	
Unit -4	**DECORATION OF GLASS**: Decoration of Glass using methods of Etching etc.	[10]	
	ENAMEL:		
Unit -1	**METAL SURFACE PREPARATION**: Such as: Cleaning, Pickling and Neutralization etc.	[15]	
Unit -2	**FRIT PREPARATION AND MELTING**: Making of Frit Batch. Mixing. Charging in Smelter. Melting and Quenching.	[10]	
Unit -3	**ENAMEL SLIP MAKING WITH FRIT AND APPLICATION**: Enamel slip Making using Frit and Enamel Composition. Application by: Dipping, Brushing etc.	[10]	
Unit -4	**DRYING AND FIRING OF ENAMEL WARE**: Drying using Dryer. Firing using Muffle Furnace.	[10]	
	Total	**90**	

Text/ Reference Books:

1	Hand Book of Glass Technology	-	Dr. R. Charan
2	Porcelain Enamel	-	A. I. Andrew

CERAMIC ENGINEERING LAB - I

Subject Code 1613309	Practical			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

RATIONALE:

Ceramic Engineering Laboratory has been kept for studying properties of Clay and carrying out various lab tests on pottery, Refractory, Glass, Enamel materials and Products.

OBJECTIVE:

The Objective is to provide exposure towards laboratory practices carried out to:

1. Know Physical Properties of Clay.
2. Determine Properties of Pottery Clay.
3. Determine Properties of Refractory, Glass and Enamel Materials and Products.

Contents : Practical		Hrs/week	Marks
Unit -1	**STUDY CLAY**: Study The Physical Proportion of Clay.	[12]	
Unit -2	**DETERMINATION OF PROPERTIES:- POTTERY MATERIALS:** Water Content in Clay, Shrinkage of Clay and Plasticity of Clay etc.	[12]	
Unit -3	**DETERMINATION OF PROPERTIES: REFRACTORY MATERIALS**: Apparent Porosity, Specific Gravity and Bulk Density of refractory Bricks etc.	[12]	
Unit -4	**DETERMINATION OF PROPERTIES:- GLASS MATERIALS**: Sieve analysis of Glass Sand, Density of Glass and Thermal Endurance of Glass etc.	[12]	
Unit -5	**DETERMINATION OF PROPERITIES: ENAMEL MATERIALS**: Study the Defects in Enamel and Thermal Expansion etc.	[12]	
	Total	**60**	

Text/ Reference Books:

1	Porcelain Enamel	-	A.I. Andrew
2	Hand book of Glass Technology	-	Dr. R. Charan
3	Modern Pottery manufacture	-	H. N. Bose
4	Refractories	-	M. L. Mishra

CERAMIC ENGG. WORKSHOP PRACTICE - I
(GLASS AND ENAMEL) - TW

Subject Code	Term Work			No of Period in one session : 30			Credits
	No. of Periods Per Week			Full Marks	:	50	
1613310	L	T	P/S	Internal	:	15	01
	—	—	02	External	:	35	

RATIONALE:
This Workshop is kept mainly to get students work with hand on various process involved in making glass and Enamel products. It provides practical knowledge on operations required to be carried out in industry on laboratory scale.

OBJECTIVE:
The Objective is to know about:

1. Work with hand and practice the shaping techniques.
2. Familiarize with the machine used for the purpose.
3. Practicing various care and precautions required for getting good products without defects.

Contents : Term Work		Hrs/week	Mark
	GLASS		
Unit -1	**PREPARATION OF RAW MATERIALS**: For: soda Lime Silica Glass, Potash Glass and Coloured Glass etc.	[03]	
Unit -2	**FORMATION AND MIXING OF BATCH**: For all kind of Glasses with Frit and Colours and Mixing of the Prepared Batch.	[04]	
Unit -3	**MELTING OF GLASS**: In Pot Furnace of different Batch.	[05]	
Unit -4	**DECORATION OF GLASS**: Decoration of Glass using methods of Etching etc.	[03]	
	ENAMEL:		
Unit -1	**METAL SURFACE PREPARATION**: Such as: Cleaning, Pickling and Neutralization etc.	[05]	
Unit -2	**FRIT PREPARATION AND MELTING**: Making of Frit Batch. Mixing. Charging in Smelter. Melting and Quenching.	[04]	
Unit -3	**ENAMEL SLIP MAKING WITH FRIT AND APPLICATION**: Enamel slip Making using Frit and Enamel Composition. Application by: Dipping, Brushing etc.	[02]	
Unit -4	**DRYING AND FIRING OF ENAMEL WARE**: Drying using Dryer. Firing using Muffle Furnace.	[04]	
	Total	**30**	

Text/ Reference Books:

1	Hand Book of Glass Technology	-	Dr. R. Charan
2	Porcelain Enamel	-	A. I. Andrew

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN CHEMICAL ENGINEERING

(Effective from Session 2016-17 Batch)

THEORY

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME							
			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	Credits
1.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Technology of Inorganic Chemicals	1614302	03	03	10	20	70	100	28	40	03
3.	Industrial Chemistry	1614303	04	03	10	20	70	100	28	40	04
4.	Mechanical Operation	1614304	03	03	10	20	70	100	28	40	03
5.	Stoichiometry	1614305	03	03	10	20	70	100	28	40	03
		Total :- 17					**350**	**500**			

PRACTICAL

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME					
			Periods per Week	Hours of Exam.	Practical (ESE)		Total Marks (A+B)	Pass Marks in the Subject	Credits
					Internal(A)	External(B)			
6.	Technology of Inorganic Chemicals Lab	1614306	02	03	15	35	50	20	01
7.	Industrial Chemistry Lab	1614307	02	03	15	35	50	20	01
8.	Mechanical Operation Lab	1614308	02	03	15	35	50	20	01
		Total :-	**06**				**150**		

TERM WORK

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME				
			Periods per Week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	Credits
9.	Stoichiometry (TW)	1614309	02	07	18	25	10	01
10.	Development of Life Skills-II (TW)	1614310	04	15	35	50	20	02
10.	Professional Practices-III (TW)	1620311	04	07	18	25	10	02
		Total :-	**10**			**100**		
Total Periods per week Each of duration One Hour		**33**	Total Marks =		**750**			**24**

APPLIED MATHEMATICS -I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code 1600301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

CONTENTS: THEORY

	Name of Topics	Hrs/week	Marks
Unit -1	**Integration:** 1.1. Definition of integration as anti-derivative. Integration of standard function. 1.2. Rules of integration (Integrals of sum, difference, scalar multiplication). 1. 3. Methods of Integration. 1. 4. Integration by substitution 1. 5. Integration of rational functions. 1. 6. Integration by partial fractions. 1. 7. Integration by trigonometric transformation. 1. 8. Integration by parts. 1. 9. Definite Integration. 1.10. Definition of definite integral. 1.11. Pro perties of definite integral with simple problems. **Applications of definite integrals.** 1. Area under the curve. 2. Area between two curves. 3. Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation :** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform :** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series :** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l), (-l, l), (0, 2\pi), (-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**Numerical Methods** 5.1 **Solution of algebraic equations** Bisection method. Regularfalsi method. Newton – Raphson method. 5.2 **Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method.	**05** **05**	**07** **07**
	Total	**48**	**70**

Text /Reference Books:		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

TECHNOLOGY OF INORGANIC CHEMICALS
(CHEMICAL ENGINEERING)

Subject Code 1614302	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

CONTENTS: THEORY

Name of Topics		Hrs/week	Marks
Unit -1	**Manufacturing process of Sulphuric Acid** 1.1 Contact Process	**04**	**06**
Unit -2	**Technology and processes involved in the commercial manufacture of the following chemicals**. 2.1 Ammonia 2.2 Nitric acid 2.3 Urea 2.4 Ammonium Nitrate 2.5 Ammonium Sulphate 2.6 Ammonium Phosphate 2.7 Mixed Fertilizer	**12**	**18**
Unit - 3	**Manufacturing process of phosphorus** 3.1 Phosphorus 3.2 Phosphoric acid (Sulphuric and Hydrochloric acid 3.3 Leaching Super Phosphate 3.4 Single 3.5 Triple Super Phosphate 3.6 Phosphorus Tri Chloride	**12**	**18**
Unit - 4	**Chloro alkali industry.** 4.1 Manufacturing process of Chlorine. 4.2 Manufacturing process of Caustic Soda. 4.3 Manufacturing process of Hydrochloric acid. 4.4 Manufacturing process of Soda ash.	**08**	**10**
Unit - 5	**Fuel and Industrial Gases.** 5.1 Manufacturing process of Oxygen 5.2 Manufacturing process of Nitrogen. 5.3 Manufacturing process of Hydrogen 5.4 Manufacturing process of Water Gas. 5.5 Manufacturing process of Producer Gas. 5.6 Manufacturing process of Carbon di oxide. 5.7 Manufacturing process of Acetelyne.	**08**	**11**
Unit - 6	**Manufacturing process of cement** 6.1 Gypsum 6.2 Plaster of Paris 6.3 Cement	**04**	**07**
	Total	**48**	**70**

Text/ Reference Books:

Titles of the Book	Name of Authors	Name of the Publisher
Dryden's outlines of Chemical Technology	M. Gopalrao and Marshal	Affliated press pvt. Ltd.
Shreve's Chemical Process	Jorge Austin	Tata Mc Graw Hill
Unit process in organic synthesis	P. H. Groggins	Tata Mc Graw Hill

INDUSTRIAL CHEMISTRY

(CHEMICAL ENGINEERING)

Subject Code 1614303	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	04
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

CONTENTS: THEORY

Name of Topics		Hrs/week	Marks
Unit -1	Organic Chemistry Nomenclatures of organic compounds, functional groups.	**05**	**08**
Unit -2	2.1 Classification of organic compounds, aliphatic Compounds, closed chain compounds, unsaturated. **- 2** 2.2 Alkanes, alkenes, alkyans, cycloalkanes. **- 2** 2.3 Halogenations, saturated halogenation Reaction of alkenes, oxidation, halogenation, Nitration, pyrolysis, isomerisation, dehydrogenation, Structures and reactivity of alkanes, cyclo alkanes. **- 8** 2.4 Bayer's strain theory,modification of Bayer's theory. **- 4** 2.5 Alkenes,preparation,properties and reactions, Action of ozone, hydrogenation, halogenation, action Of halogen acids, sulphuric acid, polymerization, uses of alkenes**.** **- 4**	**14**	**18**
Unit - 3	3.1 Aromatic Compounds, alkyl halides, alchohol and phenols. **- 2** 3.2 Concept of aromacity, structure of benzene, properties of benzene, reactions of benzene, halogenation, hydrogenation, pyrolysis, **- 6** 3.3 Classification of alkyl halides, isomerism in alkyl halides, properties of alkyl halides, substitution reaction, elimination reaction, alcohols. **– 6** 3.4 Classification of alcohols, preparation, properties, reaction, phenols Classification, preparation, reaction. **- 6**	**14**	**18**
Unit – 4	**Phase rule:** Phase rule, phase, component, degrees of freedom, One component system.	**05**	**08**
Unit – 5	**Adsorption:** Definition, nature of adsorption, types of adsorption, Langmuir adsorption isotherm, Freundlich adsorption Isotherm, application.	**05**	**10**
Unit - 6	**Solutions and Indicators:** Ideal solution, non ideal solution, Azeotropic Mixture, and theory of indicators.	**05**	**08**
	TOTAL	**48**	**70**

Text / Reference Books:

Titles of the Book	Name of Authors	Name of the Publisher
Organic Chemistry	Morrison and Boyd	Allyn and Bacon,Universal
Organic Chemistry	Bahl and Bahl	S Chand and company
Organic Chemistry	P.L Soni	S Chand and company
Physical Chemistry	Puri Sharma and Pathania	S Nagin and company

MECHANICAL OPERATION
(CHEMICAL ENGINEERING)

Subject Code 1614304	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

CONTENTS: THEORY

Name of Topics		Hrs/week	Marks
Unit -1	1.1 Introduction to unit operations & their meanings Particularly for mechanical operation. 1.2 Specifics principle involved in mechanical Operation as Decantation filtration, Settling & Sedimentation, screening, flotation, mixing Size reduction. 1.3 Electro Mechanical Operation 1.4 Magnetic separation 1.5 Electrostatics separation iii) Electro dialysis iv) Electro osmosis v) Electrophosis	**06**	**04**
Unit -2	**Size reduction of solids:** Theory & Principle involved in crushing & Grinding Classification & Types of crushing & grinding Equipments & principle of their working. Jaw Crusher 1) Black Type 2) Dodge Type and their relative advantages &disadvantages. Roll Crusher, Hammer Mill , Ball Mill Selection of crushing rolls derivation. Derivation for critical speed of a Ball Mill	**08**	**16**
Unit - 3	**Size Separation of solid:** 3.1 Introduction 3.2 Separation of solid by screening 3.3 Screens, Wire screens, screen effectiveness 3.4 Actual screen 3.5 Ideal screen 3.6 Screen Analysis 3.7 Screening Equipments a) Grizzilies b) Trommels c) Gyratory Screen d) Trommel & Trommel Arrangements e) Shaking and Vibrating Screen	**06**	**14**
Unit - 4	**Methods of Separation of solids based on Specifics Properties** 4.1 Size Separation by setting a) Gravity setting tank b) Cone Classification c) Cyclone 4.2 Mechanical Classifier 4.3 Hydraulic Classifier 4.4 Gig 4.5 Magnetic Separation 4.6 Electrostatic Separation 4.7 Flotation	**10**	**08**

Unit – 5	**Filtration** 5.1 Principle of filtration & factors which affect the rate of Filtration. 5.2 Filtration Equipments a) Sand Filter b) Plate & Frame Filter, c) Washing Type & d) Non washing type e) Continuous Rotary Filter 5.3 Derivation of rate equation for filtration & various Parameter involved in the rate equation. 5.4 Constant rate Filtration ,constant pressure filtration 5.5 Centrifuges.	**10**	**12**
Unit - 6	***Sedimentation:*** Definition of sedimentation , difference between sedimentation filtration, settling & Centrifugation Principle involved in sedimentation laboratory Settling test & its use in design of thickeners Industrial methods of sedimentation Thickness.	**04**	**08**
Unit - 7	***Mixing:*** 7.1 Definition 7.2 Mixing equipments , different types their & specific application. 7.3 Flow patterns in an agitated vessel 7.4 Study of mixer used for mixing a) Liquid b) Solids c) Viscous masses d) Pug mill 7.5 Study of power consumption of mixer.	**04**	**08**
	Total	**48**	**70**

Text/ Reference Books:

Titles of the Book	**Name of Authors**	**Name of the Publisher**
Introduction to Chemical Engineering	Walter L. Badger Julius T. Banchero	McGrawHill International 1984
Unit Operation of Chemical Engineering	McCabe, W.L.Smith, Harriott	McGraw Hill Inc 1993
Introduction to Chemical Engineering	S.K. Ghosal, S.K. Sanyal and S. Dutta	Tata McGraw Hill Publication, 1993
Chemical Engineering	J.M. Coulson, J. F. Richardson, J.R. Backhurst and J.H. Harker (Vol.2)	Pergamon Press, 1993

STOICHIOMETRY
(CHEMICAL ENGINEERING)

Subject Code 1614305	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

CONTENTS :THEORY

	Name of Topics	Hrs/week	Marks
Unit -1	**Gases and gas mixture.** 1.1 Ideal gas law, Boyle's law, Charle's law, value of universal gas constant. 1.2 Vander Waal's equation. 1.3 Average molecular weight, density and composition (by weight and by mole) of gas mixture.	**09**	**13**
Unit -2	**Material Balance without Chemical Reaction**. 2.1 Steps for solving material balance problems. 2.2 Solving problems on various unit operations like drying, evaporation, crystallization, distillation, mixing, blending, absorption, extraction.	**15**	**22**
Unit - 3	**Material Balance with Chemical reaction**. 3.1 Limiting component, excess component, percent conversion, percent yield, percent excess	**15**	**22**
Unit - 4	**Energy Balance.** 1.1 Units of heat, sensible heat, latent heat calculations. 1.2 Heat of formation by Hess's law, problems on the same. 1.3 Heat of reaction from specific heat data, heat of combustion, heat of formation data problems. 1.4 Adiabatic reaction and adiabatic reaction temperature.	**09**	**13**
	Total	**48**	**70**

Text/ Reference Books		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Stiochiometry	Bhatt. B. I & Vora. S. M	Mc Graw Hill Publication.
Basic principles & Calculations in Chemical Engineering	Himmelblau & David M	Pentice Hall of Publication.

TECHNOLOGY OF INORGANIC CHEMICALS LAB
(CHEMICAL ENGINEERING)

Subject Code 1614306	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

CONTENTS: PRACTICAL

Practical: Skills to be developed:

Intellectual Skills: 1. Analysis of a given solutions
2. Interpret the Purity of solutions.

Motor Skills :
1. Observe Chemical reactions
2. Measure the purity of solutions
3. Handle the apparatus carefully.

List of Experiments:

1. To find percentage purity of commercial Nitric Acid.
2. To find Nitrogen content in fertilizer (Ammonium Salt)
3. Analysis and testing of Sulphuric Acid.
4. To find Potassium Content in Ammonium Sulphate/ Ammonium Phosphate fertilizer.
5. To find percentage purity of commercial hydrochloric acid
6. To find percentage purity of Caustic Soda.
7. Analysis of cement
8. Analysis of soda ash (Percentage Purity)
9. Analysis of Potassium Permagnet.
10. Analysis of Hydrogen peroxide.
11. To synthesize laboratory grade soap by saponification of fats.

INDUSTRIAL CHEMISTRY LAB

(CHEMICAL ENGINEERING)

Subject Code 1614307	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

CONTENTS : PRACTICAL

PRACTICAL:

Skills to be developed:

Intellectual Skills: 1. Analysis of a given solution
2. To interpret the confirmative test

Motor Skills: 1. Observe chemical reactions
2. Observe readings like boiling point and melting point.
3. Handle the apparatus carefully.

LIST OF EXPERIMENTS:

To identify various organic compounds listed below:

1. Benzoic acid
2. Acidic acid
3. Aniline
4. Benzaldehyde
5. Chloroform
6. Naphthalene
7. Chlorobenzene
8. Alpha or Beta Naphthol
9. Urea
10. Thiourea
11. Nitrobenzene
12. To plot graph of adsorption of oxalic acid from solution on activated charcoal and examine the validity of Freundlich isotherm.
13. To plot a graph of adsorption of acetic acid on activated charcoal and verify Freundlich and Langmuir isotherm.
14. To construct a phase diagram for binary system, naphthalene and benzoic acid and find the melting and eutectic temperature.
15. Preparation of Benzoic acid from Benz amide.
16. Preparation of Nitrobenzene from Benzene.

MECHANICAL OPERATION LAB

(CHEMICAL ENGINEERING)

Subject Code 1614308	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

CONTENTS : PRACTICAL

Skills to be developed:

Intellectual Skills: 1) Interpretation of data.
2) Calculating efficiency.

Motor Skills: 1) Handling size reducing equipments.

LIST OF PRACTICAL:

1. To Determine Screen analysis of mixture obtained from a jaw crusher
2. To find out the Screen analysis from pulverizer.
3. To Determine Variation of size reduction in ball Mill by changing the residence time.
4. To find effectiveness of a screen.
5. To find out efficiency of froth flotation cell.
6. To Study the ofrate of filtration for plate and frame filter.
7. To Study rate of filtration using vacuum filtration.
8. Batch sedimentation test of different concentration for calcium carbonate
9. To determine critical speed of a ball mill.
10. To determine efficiency of cyclone separator.
11. To find out crushing law of constant by using jaw crusher.

STOICHIOMETRY –TW
(CHEMICAL ENGINEERING)

Subject Code 1614309	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	-	-	02	External	:	18	

CONTENTS: TERM WORK

S.No	List of Assignments/Term Work	Hours
1	Problems on Ideal Gas Law application.	03
2	Problems on average molecular weight and density of gas mixture	02
3	Problems material balance on mixing.	04
4	Problems on material balance on Distillation.	02
5	Problems on Material Balance on other operation.	04
6	Problems on % excess, % conversion, % yield in a Chemical Reaction.	02
7	Problems on calculating the % composition of product stream on mole basis and weight basis for a Chemical Reaction.	04
8	Problems on calculating the feed input.	02
9	Problems on calculating the Heat of the Reaction.	02
10	Problems on Heat of Formation.	02
11	Problems based on calculating by different method based Heat of Reaction for Cp values.	05
	Total	32

DEVELOPMENT OF LIFE SKILLS-II- TW

(CHEMICAL ENGINEERING)

Subject Code 1614310	Term Work					Credits
	No. of Periods Per Week			Full Marks	: 50	02
	L	T	P/S	Internal	: 15	
	-	-	04	External	: 35	

CONTENTS :TERM WORK		Hrs/week
Topic No	**Name of Topics**	**HOURS**
Unit-1	**SOCIAL SKILLS** SOCIETY, SOCIAL STRUCTURE, DEVELOP SYMPATHY AND EMPATHY.	**01**
Unit-2	Swot Analysis – Concept , How to make use of SWOT.	**01**
Unit-3	**Inter personal Relation** Sources of conflict, Resolution of conflict , Ways to enhance interpersonal relations.	**02**
Unit-4	**Problem Solving** **I)STEPS IN PROBLEM SOLVING,** 1)IDENTIFY AND CLARIFY THE PROBLEM, 2)INFORMATION GATHERING RELATED TO PROBLEM, 3)EVALUATE THE EVIDENCE, 4)CONSIDER ALTERNATIVE SOLUTIONS AND THEIR IMPLICATIONS, 5)CHOOSE AND IMPLEMENT THE BEST ALTERNATIVE, 6)REVIEW **II)Problem solving technique**.(any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking	**02**
Unit-5	**Presentation Skills** Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. PRESENTATION SKILL – STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board	**03**
Unit-6	**Group discussion and Interview technique** – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making **INTERVIEW TECHNIQUE** NECESSITY, TIPS FOR HANDLING COMMON QUESTIONS.	**03**
Unit-7	**Working in Teams** UNDERSTAND AND WORK WITHIN THE DYNAMICS OF A GROUPS. TIPS TO WORK EFFECTIVELY IN TEAMS, ESTABLISH GOOD RAPPORT, INTEREST WITH OTHERS AND WORK EFFECTIVELY WITH THEM TO MEET COMMON OBJECTIVES, TIPS TO PROVIDE AND ACCEPT FEEDBACK IN A CONSTRUCTIVE AND CONSIDERATE WAY , LEADERSHIP IN TEAMS, HANDLING FRUSTRATIONS IN GROUP.	**02**
Unit-8	**Task Management** INTRODUCTION, TASK IDENTIFICATION, TASK PLANNING ,ORGANIZING AND EXECUTION, CLOSING THE TASK	**02**
	Total	**16**

List of Assignment/ Term Work : (Any Eight Assignment):-

1. SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats.Following points will be useful for doing SWOT.
   a) ---Your past experiences,
   b) --- Achievements
   c) --- Failures,
   d) --- Feedback from others etc.
2. Undergo a test on reading skill/memory skill administered by your teacher.
3. Solve the puzzles.
4. Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)
5. Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.
6. Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme.
7. Conduct an interview of a personality and write a report on it.
8. Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed.
9. Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

Mini Project on Task Management. Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management.

Text/ Reference Books:		
Titles of the Book	Name of Authors	Name of the Publisher
Adams Time management	Marshall Cooks	Viva Books
Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Pretice Hall of India, Pvt Ltd
Body Language	Allen Pease	Sudha Publications Pvt.
Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
Decision making & Problem Solving	by Adair, J	Orient Longman
Develop Your Assertiveness	Bishop , Sue	Kogan Page India
Make Every Minute Count	Marion E Haynes	Kogan page India
Organizational Behavior	Steven L McShane and Mary Ann	Tata McGraw Hill
Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, Pvt Ltd
Presentation Skills	Michael Hatton (Canada – India Project)	ISTE New Delhi
Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
Target setting and Goal Achievement	Richard Hale ,Peter Whilom	Kogan page India
Time management	Chakravarty, Ajanta	Rupa and Company
Working in Teams	Harding ham .A	Orient Longman

INTERNET ASSISTANCE

1. http://www.mindtools.com
2. http://www.stress.org
3. http://www.ethics.com
4. http://www.coopcomm.org/workbook.htm
5. http://www.mapfornonprofits.org/
6. http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7. http://eqi.org/
8. http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9. http://www.mapnp.org/library/ethics/ethxgde.htm
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. http://members.aol.com/nonverbal2/diction1.htm
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. http://snow.utoronto.ca/Learn2/modules.html
14. http://www.quickmba.com/strategy/swot/

PROFESSIONAL PRACTICES III -TW

(CHEMICAL ENGINEERING)

Subject Code 1620311	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	02
	L	T	P/S	Internal	:	07	
	-	-	04	External	:	18	

CONTENTS :TERM WORK

		Hrs/week
Sl. No.	**Name of the Activity**	**Hours**
Unit -1	**Field Visits** Structured field visits (minimum three) be arranged and report of the same should be submitted by the student, as part of the term work. The field visits may be arranged in the following areas / industries : 1.1 Visit to Electric Power Generation Station 2.1 Visit to Wind Mill and/or Hybrid Power Station of Wind and Solar 3.1 Multi Storied Building for Power Distribution Scheme 4.1 Visit to a Multi Plex 5.1 Visit to a Captive Power Plant (Thermal)	**28**
Unit – 2	**Lectures by Professional / Industrial Expert to be organized from of the following areas (any four)** 2.1 Modern Techniques in Power Generation 2.2 Role of Power Factor Improvement a tool in reducing cost of generation 2.3 New trends for built environment 2.4 Software for drafting 2.5 Digital Metering 2.6 Various government schemes such as EGS, 2.7 Industrial hygiene. 2.8 Hydro power generation 2.9 Special purpose wiring in chemical/hazardous industries	**16**
Unit -3	**Seminar :** Any one seminar on the topics suggested below: Students (Group of 4 to 5 students) has to search /collect information about the topic through literature survey, visits and discussions with experts/concerned persons: Students will have to submit a report of about 10 pages and deliver a seminar for 10 minutes. 3.0 Water supply schemes/Problems of drinking water in rural area 3.1 Role of Traffic Signals in smooth flow of vehicles 3.2 Gram Swaraj Yojana 3.3 Schemes of power of generation in coming five years 3.4 Impact of load shading on rural population 3.5 Any other suitable topic	**16**
Unit -4	**Market Survey:** A group of four students is expected to collect information from the market regarding specifications and cost of any four items, used in Electrical wiring for domestic, commercial and industrial use	**10**
	Total	**70**

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN CIVIL ENGINEERING / CIVIL (RURAL) ENGINEERING

(Effective from Session 2016-17 Batch)

THEORY

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME							
			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	Credits
1.	Applied Mathematics-II	1615301	04	03	10	20	70	100	28	40	03
2.	Surveying	1615302	03	03	10	20	70	100	28	40	03
3.	Building Construction	1615303	03	03	10	20	70	100	28	40	03
4.	Building Drawing	1615304	03	04	10	20	70	100	28	40	03
5.	Concrete Technology	1615305	03	03	10	20	70	100	28	40	03
		Total :-	**16**				**350**	**500**			

PRACTICAL

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME					
			Periods per Week	Hours of Exam.	Practical (ESE)		Total Marks (A+B)	Pass Marks in the Subject	Credits
					Internal(A)	External(B)			
6.	Surveying Lab	1615306	04	04	15	35	50	20	01
7.	Building Construction Lab	1615307	03	04	15	35	50	20	01
Total :-			**07**				**100**		

TERM WORK

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME				
			Periods per Week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	Credits
8.	Surveying (TW)	1615308	-	07	18	25	10	01
9.	Building Drawing (TW)	1615309	02	15	35	50	20	01
10.	Development of Life Skills-II (TW)	1625310	03	07	18	25	10	02
11.	Professional Practices-III (TW)	1625311	03	07	18	25	10	02
12.	Concrete Technology (TW)	1615312	02	07	18	25	10	01
Total :-			**10**			**150**		
Total Periods per week Each of duration One Hour			**33**	Total Marks =		**750**		**24**

APPLIED MATHEMATICS -II

(CIV/CIV(RURAL)/MECH./MECH.(AUTO)/AUTO. ENGG)

Subject Code	Theory						Credits
1615301	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents :Theory		Hrs/week	Marks
Unit -1	**INTEGRATION:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems.	10	**20**
	1.5 **Applications of definite integrals.** 1.5.1 Area under the curve. Area bounded by two curves, 1.5.2 Volume of revolution. 1.5.3 Centre of gravity of a rod, plane lamina. 1.5.4 Moment of Inertia of uniform rod, rectangular lamina 1.5.5 Theorems of parallel and perpendicular axes.	08	**10**
Unit -2	**DIFFERENTIAL EQUATION** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 **Applications of Differential equations.** **2.3.1 Rectilinear motion (motion under constant and variable acceleration)** 2.3.2 Simple Harmonic Motion.	10	10 **08**
Unit – 3	**PROBABILITY DISTRIBUTION** 3.1 Binomial distribution. 3.2 Poisson's distribution. 3.3 Normal distribution 3.4 Simple examples corresponding to production process.	08	**10**

Unit – 4	**NUMERICAL METHODS** **4.1 Solution of algebraic equations** Bisection method. Regulafalsi method. Newton – Raphson method. **4.2 Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	06 06	06 06
	Total	48	70

Text / Reference Books :-		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Advanced Mathematics for Engineers and Scientist	Murray R Spiegel	Schaum outline series McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India New Dehli
Numerical methods for Engg. 4th ed.	Chapra	Tata McGraw Hill
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.
Applied Mathematics	Rajendra Pal, S.N. Malik	Foundation Publishing

SURVEYING
(CIVIL ENGINEERING GROUP)

Subject Code	Theory						Credits
1615302	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents : Theory

	Name of the Topic	Hrs/week	Marks
Unit -1	**TYPES OF SURVEY** DEFINITION. OBJECTS OF SURVEYING,. PRINCIPLES OF SURVEYING. USES OF SURVEY, CLASSIFICATION OF SURVEYING. PRIMARY –PLAIN, GEODETIC. SECONDARY – BASED ON INSTRUMENTS, METHOD, OBJECT, NATURE OF FIELD.	**04**	**06**
Unit -2	**Chain & Cross Staff Survey** 2.1 PRINCIPLE OF CHAIN SURVEY .STUDY AND USE OF INSTRUMENTS FOR LINEAR MEASUREMENTS – CHAIN, TAPE, RANGING ROD, ARROWS, PEGS , CROSS STAFF , OPTICAL SQUARE , LINE RANGER. 2.2 RANGING –DIRECT AND INDIRECT RANGING CHAINING – PLAIN AND SLOPING GROUNDS. Chain Triangulation – Survey Station and their Selections, Survey lines, Check lines, Tie lines, base line. Taking offsets .long and short offset, degree of offset. OBSTACLES IN CHAINING. 2.3 CHAIN & CROSS STAFF SURVEY FOR FINDING AREA OF A FIELD (NUMERICAL PROBLEMS) ERRORS IN CHAIN SURVEYING & APPLYING CORRECTIONS FOR CHAIN & TAPE (NUMERICAL PROBLEMS). CONVENTIONAL SIGNS RELATED TO SURVEY.	**08**	**14**
Unit – 3	**COMPASS SURVEY** 3.1 PRINCIPLE OF COMPASS SURVEY. BEARING OF LINES – MERIDIAN –TRUE, MAGNETIC, AND ARBITRARY. BEARING –FORE BEARING, BACK BEARING, WHOLE CIRCLE BEARING, QUADRANTAL BEARING SYSTEM AND REDUCED BEARING, CONVERSION OF BEARINGS, FINDING INCLUDED ANGLES FROM BEARINGS. 3.2 PRISMATIC COMPASS – COMPONENT, CONSTRUCTION AND USE. 3.3 LOCAL ATTRACTION, CAUSES, PRECAUTIONS TO BE TAKEN TO AVOID AND CORRECTION OF BEARINGS AFFECTED DUE TO LOCAL ATTRACTION, CALCULATION OF INCLUDED ANGLES. 3.4 TRAVERSING – OPEN TRAVERSE, CLOSED TRAVERSE, CHECK ON OPEN AND CLOSED TRAVERSE. GRAPHICAL ADJUSTMENT FOR CLOSING ERROR. 3.5 NUMERICAL PROBLEMS ON CALCULATION OF BEARINGS, ANGLES AND LOCAL ATTRACTION.	**12**	**16**

Unit – 4	**Levelling** 4.1 Definitions – Level surface, Level line, horizontal line, Vertical line, Datum surface , Reduced level, Bench mark and its types . 4.2 DUMPY LEVEL –COMPONENTS, CONSTRUCTION, LINE OF SIGHT, LINE OF COLLIMATION, BUBBLE TUBE AXIS, LEVELLING STAFF – TELESCOPIC AND FOLDING TYPE .FORESIGHT, BACK SIGHT, INTERMEDIATE SIGHT, CHANGE POINT, HEIGHT OF COLLIMATION . FUNDAMENTAL AXES AND THEIR RELATIONSHIP 4.3 RECORDING IN LEVEL BOOK. TEMPORARY ADJUSTMENTS OF DUMPY LEVEL. 4.4 METHOD OF REDUCTION OF LEVELS – HEIGHT OF INSTRUMENT METHOD AND RISE AND FALL METHOD. ARITHMETICAL CHECKS, NUMERICAL PROBLEMS, COMPUTATION OF MISSING READINGS. 4.5 CLASSIFICATIONS OF LEVELLING - SIMPLE, DIFFERENTIAL, PROFILE, CROSS SECTIONAL, FLY AND CHECK LEVELLING. 4.6 STUDY AND USE OF TILTING LEVEL & AUTO LEVEL. 4.7 SOURCES AND ERRORS IN LEVELLING, PRECAUTIONS AND DIFFICULTIES FACED IN LEVELLING.	**16**	**20**
Unit – 5	**CONTOURING** 5.1 DEFINITIONS – CONTOUR, CONTOUR INTERVAL, HORIZONTAL EQUIVALENT. 5.2 CHARACTERISTICS OF CONTOURS .METHOD OF LOCATING CONTOURS. INTERPOLATION OF CONTOURS. ESTABLISHING GRADE CONTOURS. 5.3 USES OF CONTOUR MAPS. INTERPRETATION OF TYPICAL CONTOUR SHEETS.	**04**	**08**
Unit – 6	***AREA AND VOLUME MEASUREMENTS*** CONSTRUCTION AND USE OF POLAR PLANIMETER FOR MEASUREMENT OF AREA AND SIMPLE NUMERICAL PROBLEMS.	**04**	**06**
	STUDY AND USE OF DIGITAL PLANIMETER .CONCEPT OF COMPUTATION OF VOLUME BY TRAPEZOIDAL AND PRISMOIDAL FORMULAE.(NO NUMERICAL PROBLEMS)		
	TOTAL	**48**	**70**

Text / Reference Books:-

Titles of the Book	Name of Authors	Name of the Publisher
Surveying and Levelling	N.N.BASAK	Tata Mc Graw-Hill
SURVEYING AND LEVELLING PART I AND II	T .P. Kanetkar & S. V, Kulkarni	PUNE VIDHYARTHI GRIHA Prakashan
SURVEYING AND LEVELLING VOL. I AND II	Dr. B. C. Punmiya	Laxmi Plublication
TEXT BOOK OF SURVEYING	S.K.Husain, M.S. Nagaraj	S. Chand and company
SURVEYING AND LEVELLING VOL. I AND II	S. K. Duggal	TATA MC GRAW-HILL
PLANE SURVEYING	A.M.Chandra	NEW AGE INTERNATIONAL PUBLISHERS
Surveying	Vinod Kumar	Foundation Publishing

BUILDING CONSTRUCTION
(CIVIL ENGINEERING GROUP)

Subject Code	Theory						Credits
1615303	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS : THEORY

	Name of the Topic	Hrs/week	Marks
Unit -1	**BUILDING COMPONENTS AND MATERIALS** **1.1 BUILDING COMPONENTS AND TYPES OF STRUCTURE** BUILDING COMPONENTS & THEIR FUNCTION. SUBSTRUCTURE – FOUNDATION, PLINTH. SUPERSTRUCTURE – WALLS, SILL, LINTEL, DOORS & WINDOWS, FLOOR, ROOF, PARAPET, BEAMS, COLUMNS. TYPES OF STRUCTURES – LOAD BEARING STRUCTURES, FRAMED STRUCTURES, COMPOSITE STRUCTURES. **1.2 MASONRY MATERIALS** A) BUILDING STONES- CLASSIFICATION OF ROCKS, REQUIREMENT OF GOOD BUILDING STONE, DRESSING OF STONES, QUARRYING OF STONES ,ARTIFICIAL OR CAST STONES B) BRICKS– CONVENTIONAL BRICKS , STANDARD BRICKS COMPOSITION OF CLAY BRICK, STRENGTH OF BRICKS, PROPORTIONS OF BURNT CLAY BRICKS , TESTING OF BRICKS , SPECIAL BRICKS ,HOLLOW BLOCKS , FLY ASH BRICKS. C) MORTARS – CLASSIFICATIONS, LIME MORTAR, CEMENT MORTAR, SPECIAL MORTARS. FUNCTIONS OF MORTAR, PROPORTIONS, PROPERTIES OF MORTAR AND TESTS FOR MORTAR. **1.3 TIMBER BASED MATERIAL** USE OF TIMBER, CHARACTERISTICS OF GOOD TIMBER, DEFECTS IN TIMBER, PLYWOOD, PARTICLE BOARD ,VENEER, SUN MICA , FORE MICA, NUWOOD, ARTIFICIAL TIMBER, RUBBER WOOD. **1.4 MISCELLANEOUS MATERIALS** GLASS, PLASTIC, FIBERS, ALUMINIUM, STEEL , GALVANIZED IRON, ASPHALT BITUMEN ETC .MICRO SILICA, PVC, CPVC, PPF. WATERPROOFING AND TERMITE PROOFING MATERIALS, ADMIXTURES IN CONCRETE, BONDING AGENTS, EPOXY RESINS, POLISHING MATERIALS ETC	06	10
Unit -2	**CONSTRUCTION OF SUBSTRUCTURE** **2.1 JOB LAYOUT** SITE CLEARANCE, PREPARING JOB LAYOUT, LAYOUT FOR LOAD BEARING STRUCTURE AND FRAMED STRUCTURE BY CENTER LINE AND FACE LINE METHOD, PRECAUTIONS WHILE MARKING LAYOUT ON GROUND . **2.2 EARTHWORK** EXCAVATION FOR FOUNDATION, TIMBERING AND STRUTTING EARTHWORK FOR EMBANKMENT MATERIAL FOR PLINTH FILLING. TOOLS AND PLANTS USED FOR EXCAVATION AND EARTHWORK. **2.3 FOUNDATION** TYPES OF FOUNDATION – OPEN FOUNDATIONS, SHALLOW FOUNDATION, STEPPED FOUNDATION, ISOLATED AND COMBINED COLUMN FOOTING, RAFT FOUNDATION, DEEP FOUNDATION AND PILE FOUNDATION. PUMPING METHOD OF DEWATERING, COFFERDAMS. BEARING CAPACITY OF FOUNDATION SOIL, UNDER REAMED PILE FOUNDATION.	06	12

Unit -3	**CONSTRUCTION OF SUPERSTRUCTURE** 3.1 **STONE MASONRY** TERMS USED IN STONE MASONRY – FACING, BACKING, HEARTING, THROUGH STONE, CORNER STONE. UNCOURSED RUBBLE MASONRY, COURSED RUBBLE MASONRY, POINT TO BE OBSERVED IN CONSTRUCTION OF STONE MASONRY, MORTARS FOR STONE MASONRY, TOOLS AND PLANTS USED FOR STONE MASONRY, COL-GROUT MASONRY. 3.2 **BRICK MASONRY** COMMON TERMS USED IN BRICK MASONRY, REQUIREMENTS OF GOOD BRICKWORK, BONDS IN BRICK MASONRY, ENGLISH, FLEMISH, STRETCHER AND HEADER BONDS ONLY. BRICK LAYING ,LINE LEVEL AND PLUMB OF BRICKWORK, STRIKING AND RAKING OF JOINTS, LEAD AND LIFT, PRECAUTIONS IN BRICK MASONRY, TOOLS AND PLANTS USED IN BRICK MASONRY . COMPARISON BETWEEN BRICK AND STONE MASONRY. HOLLOW CONCRETE BLOCK MASONRY, COMPOSITE MASONRY , CAVITY WALL- PURPOSE AND CONSTRUCTION. 3.3 **DOORS AND WINDOWS** Doors -Components and construction of panelled doors, battened doors, flush doors, collapsible doors, rolling shutters, Revolving doors, Glazed doors. Sizes of door. Windows -Component and construction of fully panelled, partly panelled and glazed, glazed wooden, steel, Aluminum windows, sliding windows, louvered window, ventilators, cement grills. Protective treatment for doors and windows, fixtures and fastenings for doors and window. SILL, LINTEL AND WEATHER SHED - FUNCTIONS, TYPES AND CONSTRUCTION . 3.4 **VERTICAL COMMUNICATION** MEANS OF VERTICAL COMMUNICATION – STAIR CASE, ELEVATOR OR OF GOOD STAIRCASE, TYPES OF STAIRCASE, FABRICATED STAIR. 3.5 **SCAFFOLDING AND SHORING** PURPOSE, TYPES OF SCAFFOLDING, PROCESS OF ERECTION AND DISMANTLING. PURPOSE AND TYPES OF SHORING, UNDERPINNING, SAFETY PRECAUTIONS.	**20**	**24**
Unit -4	***4. Building Finishes*** 4.1 **FLOORS AND ROOF**S FLOOR FINISHES- SHAHABAD , KOTA, MARBLE, GRANITE ,KADAPPA, CERAMIC TILES ,VITRIFIED , MOSAIC TILES ,CHEQUERRED TILES, GLAZED TILES ,PAVEMENT BLOCKS , CONCRETE FLOORS, TREMIX FLOOR, SKIRTING AND DADO. PROCESS OF LAYING- PROCESS OF LAYING AND CONSTRUCTION, FINISHING AND POLISHING OF FLOORS. ROOFING MATERIALS – AC SHEETS ,G.I. SHEETS, PLASTIC SHEETS, FIBRE SHEETS, MANGALORE TILES ETC. STEEL TRUSSES. R.C.C. SLAB 4.2 **WALL FINISHES** PLASTERING – NECESSITY OF PLASTERING, SINGLE COAT PLASTER DOUBLE COAT PLASTER , NEERU FINISHING AND POP, SPECIAL PLASTERS STUCCO PLASTER , PLASTER BOARD AND WALL CLADDINGS. PRECAUTION TO BE TAKEN WHILE PLASTERING. DEFECTS IN PLASTER. POINTING – NECESSITY AND PROCEDURE OF POINTING. PAINTING – NECESSITY, SURFACE PREPARATION, METHOD OF APPLICATION, SELECTING SUITABLE PAINTING MATERIAL, WHITE WASH AND COLOUR WASH.	16	24
Unit -5	**5. BUILDING MAINTENANCE** 5.1 **CRACKS** CAUSES AND TYPES OF CRACKS, IDENTIFICATION AND REPAIR OF CRACKS. GUNITING AND GROUTING, USE OF EPOXY AND CRACK FILLS.		

	5.2 **SETTLEMENT** SETTLEMENT --CAUSES AND REMEDIAL MEASURES PLINTH PROTECTION – NECESSITY AND MATERIALS USED. 5.3 **DEMOLITION** NECESSITY, METHOD OF DEMOLITION-HAND DEMOLITION, MACHINE DEMOLITION, CONTROLLED BLASTING DEMOLITION, PRECAUTIONS DURING DEMOLITION. 5.4 **REBARING TECHNIQUES** NECESSITY AND EQUIPMENT FOR REBARING TECHNIQUES		
	TOTAL	**48**	**70**

Text /Hand Books:-		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Construction Materials	D.N. Ghose	Tata McGraw-Hill
Building materials	Amarjit Agrawal	New India Publication
Building materials	S. K. Duggal	New Age International
Engineering materials	Sharma	PHI Publication
Building Construction	S. P. Arora and Bindra	Dhanpat Rai Publication
Building Construction	S. C. Rangawala	Charotar Publication
Building Construction	Sushil Kumar	Standard Publication
Building Construction	B. C. Punmia	Laxmi Publication
Building Construction	S.K. Sharma	Tata McGraw-Hill
Civil Engineering materials	TTTI ,Madras	TTTI ,Madras
Building Construction	Dr.Janardan Zha	Khanna Publication
A to Z of Building Construction	Mantri Construction	Mantri Publication
Building Construction Vol. I to IV	W. B. Mackay	Longman(ELBS)
PWD Handbooks for -Materials - Masonry -Building -Plastering and Pointing - Foundation	All India Council for Technical Education	All India Council for Technical Education
Practical Civil Engineering Handbook	Khanna	Khanna Publication
Building Construction	S.N. Srivastava, VS Dubey	Foundation Publishing

BUILDING DRAWING

(CIVIL ENGINEERING GROUP)

Subject Code 1615304	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS : THEORY

	Name of the Topic	Hrs/week	Marks
Unit -1	**1 Conventions** 1.1 Conventions as per IS:962-1967 and other practices 2 Types of Lines – Visible line, Centerline, Hidden line, Section line, Dimension line, Extension line, Pointers, Arrow heads or dots. 2.1 Symbols – Materials used in construction, building components **3** Reading of available ammonia prints of residential buildings.	**04**	**03**
Unit -2	**Planning Of Building** 2.1 Principles of planning of Residential and Public building. 2.2 Space requirements and norms for various units of Residential and Public building. Rules and byelaws of local governing authorities for construction. 2.3 Drawing of line plans for Residential and Public building.	**06**	**14**
Unit – 3	**Types Of Drawing** 3.1 Development of line plan 3.2 Elevation 3.3 Section 3.4 Site plan 3.5 Location Plan 3.6 Foundation plan 3.7 Area statement and other details. 3.8 Measured Drawing and its significance 3.9 Submission Drawing and Working Drawing	**26**	**45**
Unit – 4	**Perspective Drawing** 4.1 Definition, Necessity, Principles of Perspective Drawing, Terms used in perspective drawing 4.2 Two point perspective view of a small object like pedestal, step block, small single storied building with flat roof etc.	**12**	**08**
	Total	**48**	**70**

Text /Reference Books:-

Titles of the Book	Name of Authors	Name of the Publisher
Text Book of Building Drawing	Shah, Kale, Patki	-
Elements of Building Drawing	D. M. Mahajan	Pune Vidyarthi Griha Prakashan
Planning and Design of Building.	Y. S. Sane	
Civil Engineering Drawing	Malik & Mayo	New Asian Publishers New Delhi
Civil Engg. Drawing & House Planning	B.P. Verma	Khanna Publishers, Delhi
Bulding Planning & Drawing	S.S Bharikatti M.V. Chitawadegi	I.K International Publishing House.
Building Drawing	Nagrajan	Foundation Publishing

CONCRETE TECHNOLOGY
(CIVIL ENGINEERING GROUP)

Subject Code 1615305	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS : THEORY

	Name Of The Topic	Hrs/week	Marks
Unit -1	**Properties of Cement:** 1.1 Physical properties of Ordinary Portland cement (OPC), determination and test on OPC ,Hydration of cement, physical properties of cement – fineness, standard consistency, initial & final setting times, compressive strength & soundness, different grades of opc 33, 43 , 53 & their specification of physical properties as per relevant I. S. codes. Adulteration of cement (field test), storing cement at site, effect of storage of cement on properties of cement / concrete. 1.2 Types of Cement Physical properties, specifications as per relevant IS codes & field application of the following types of cement i) Rapid hardening cement Ii) Low heat cement Iii) Pozzolana Portland cement Iv) Sulphate resisting cement Vi) Blast furnace slag cement Vii) White cement	**06**	**10**
Unit -2	**Properties of Aggregates :** 2.1 Properties of fine aggregates : Concept of size, shape, surface texture, strength, specific gravity, bulk density , water absorption, surface moisture, soundness, bulking impurities 2.2 Determination of fineness modulus & grading zone of sand by sieve analysis, determination of silt content in sand & their specification as per IS 383 2.3 Bulking of sand, phenomenon of bulking, its effect on concrete mix proportion. 2.4 Properties of coarse aggregates : Concept of size, shape, surface texture, water absorption, soundness, specific gravity & bulk density 2.5 Determination of fineness modulus of coarse aggregate by sieve analysis, grading of Coarse Aggregates 2.6 Determination of crushing value, impact value & abrasion value of coarse aggregate, flakiness index & elongation index of coarse aggregate and their specification.	**08**	**15**

Unit – 3	**Properties of Concrete:** 3.1 **Introduction to concrete -** Definition of concrete, necessity of supervision for concreting operation, different grades of concrete (ordinary concrete, standard concrete & high strength concrete as per provisions of IS 456- 2000), minimum grade of concrete for different exposure conditions, minimum grade of concrete for R.C.C., water retaining structure & in sea water construction, durability of concrete. 3.2 **Water cement ratio** Definition of w/c ratio, Duff Abraham w/c law, significance of w/c ratio, selection of w/c ratio for different grades of concrete prepared from different grades of OPC as per graphs specified in IS 10262 -1982, maximum w/c ratio for different grades of concrete for different exposure conditions. 3.3 **Properties of fresh concrete** Definition of workability, factors affecting workability of concrete. Determination of workability of concrete by slump cone test, compaction factor test, vee bee consistometer & flow table tests. Range values of workability requirement for different types of concrete works, cohesiveness, segregation, harshness, bleeding. 3.4 **Properties of hardened concrete** Definition of compressive strength, durability, impermeability, elastic properties of concrete, modulus of elasticity of concrete. Creep, factors affecting creep, shrinkage, factors affecting shrinkage ***3.5 CONCRETE MIX DESIGN*** Objectives of mix design, list of different method of mix design ,study of mix design procedure by I.S. method as per I.S. 10262-1982 ,determination of design mix proportion by mass for M 20 grade of concrete using I.S. Method for given data (such as grading zone of sand, proportion of 20 mm & 10 mm metals, specific gravities of cement, sand & aggregate , water absorption of sand & aggregate, compacting factor and exposure condition). 3.6 **Testing of concrete** Significance of testing, determination of compressive strength of concrete cubes at different ages, interpretation & co-relation of test results 3.7 **Non- destructive testing of concrete** Importance of NDT, methods of NDT - rebound hammer test & ultrasonic pulse velocity test, working principle of rebound hammer and factor affecting the rebound index, specification for deciding the quality of concrete by ultrasonic pulse velocity as per I.S. 13311 (part 1 & 2). Determination of rebound index & compressive strength of concrete by rebound hammer test as per I.S. 13311, determination of quality of concrete by ultrasonic pulse velocity test	**12**	**15**

Unit – 4	**Quality Control of Concrete:** 4.1 Batching, Different Types of Mixers & Vibrators Volume & weight batching, volume batching for nominal mixes & weight batching for design mix concrete, types of mixers (tilting & non-tilting type) Different types of vibrators - needle vibrator, surface vibrator, table vibrator, principle & application of each type of vibrator 4.2 Formwork : formwork for concreting, different types of formworks for different works such as beams, slabs, columns, well foundation, materials used for formwork, requirement of good formwork, stripping time for the removal of formwork as per I.S. 456- 2000 provisions for different structural members. 4.3 Transportation, placing, compaction & finishing of concrete: Modes of transportation of concrete , precautions to be taken during transportation and placing of concrete in formwork compaction of concrete, methods of compaction, care to be taken during compaction, purpose of finishing, types of finishing & methods of application (surface treatment, expose aggregate finish, applied finish, coloured finish), requirement of good finish. 4.4 Curing of concrete : definition of curing, necessity of curing, different methods of curing and their application (spraying water, membrane curing, steam curing, curing by infra red radiations, curing by wet gunny bags, ponding methods). 4.5 Waterproofing of concrete & joints in concrete construction: Importance & need of waterproofing, methods of waterproofing & materials used for waterproofing, types of joints, joining old & new concrete, methods of joining, materials used for filling joints.	**12**	**16**
Unit – 5	**Extreme weather concreting & chemical Admixture in concrete :** 5.1 Extreme weather concreting Effect of cold weather on concrete, effect of hot weather on concrete, precautions to be taken while concreting in hot & cold weather condition. 5.2 Chemical admixture in concrete Properties & application for different types of admixture such as accelerating admixtures, retarding admixtures, water reducing admixture, air entraining admixture & super plasticizers.	**05**	**07**
Unit – 6	**Properties of Special Concrete:** Properties, Advantages & Limitation of the following types of Special concrete i) Ready mix Concrete ii) Reinforced Concrete iii) Prestressed Concrete iv) Fiber Reinforced Concrete v) Precast Concrete vi) High performance Concrete	**05**	**07**
	Total	**48**	**70**

Text /Reference Books:-		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Concrete Technology	M. L. Gambhir	Tata Mc Graw . Hill Publishing Co. Ltd. New Delhi
Concrete technology	A. M. Neyille & J J Brooks	Pearson Education (Singapore) Pyt. Ltd. New Delhi
Concrete technology	M. S. Shetty	S. Chand Publication
Text book of Concrete technology	P. D. Kulkarni	M. H. Ghosh and Phull publication
Chemical Admixtures for concrete	H.R. Rixom	Powells' Books
Concrete Technology	Gopalkrishnan	Foundation Publishing

SURVEYING LAB
(CIVIL ENGG. GROUP)

Subject Code 1615306	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS : PRACTICAL

SKILLS TO BE DEVELOPED:

INTELLECTUAL SKILLS:

1) IDENTIFY THE DIFFERENT INSTRUMENTS FOR LINEAR MEASUREMENT AND LEVELLING
2) RECORD AND OBSERVING NECESSARY OBSERVATION WITH THE SURVEY INSTRUMENTS
3) CLASSIFY AND DISCRIMINATING VARIOUS TYPES OF SURVEY INSTRUMENTS.
4) IDENTIFY THE ERRORS OF THE SURVEY INSTRUMENTS.

MOTOR SKILLS:

1. MEASURE DISTANCES, BEARINGS AND FINDING REDUCED LEVELS WITH SURVEY INSTRUMENTS.
2. PREPARE DRAWING USING SURVEY DATA.
3. PREPARE CONTOUR MAP OF A GIVEN TERRAIN/TOPOGRAPHY.
4. MEASURE AREA OF AN IRREGULAR SHAPE FIGURE WITH PLANIMETER.

INSTRUCTIONS:

1) GROUP SIZE FOR SURVEY PRACTICAL WORK SHOULD BE MAXIMUM 6 STUDENTS.
2) EACH STUDENT FROM A GROUP SHOULD HANDLE THE INSTRUMENT INDEPENDENTLY TO UNDERSTAND THE FUNCTION OF DIFFERENT COMPONENTS AND USE OF THE INSTRUMENT.
3) DRAWING, PLOTTING SHOULD BE CONSIDERED AS PART OF PRACTICAL.
4) ONE FULL DAY PER PROJECT IS REQUIRED FOR CARRYING OUT PROJECT WORK.

- **Practical SHALL CONSIST OF RECORD OF ALL PRACTICAL AND PROJECTS IN FIELD BOOK AND DRAWING OF PROJECT WORK ON FULL IMPERIAL SIZE DRAWING SHEETS.**
  1) MEASUREMENT OF DISTANCES WITH CHAIN & TAPE ON GROUND WITH DIRECT OR INDIRECT RANGING.
  2) CONSTRUCTION AND USE OF OPTICAL SQUARE AND OPEN CROSS STAFF FOR SETTING OUT PERPENDICULAR AND RUNNING A SURVEY LINE FOR LOCATING DETAILS .
  3) MEASUREMENT OF AREA BY CHAIN AND CROSS STAFF SURVEY.
  4) USE OF PRISMATIC COMPASS AND OBSERVING FORE BEARING AND BACK BEARING.
  5) MEASURING FORE BEARING AND BACK BEARING OF 5-6 SIDE CLOSED POLYGON. IDENTIFYING STATIONS AFFECTED BY LOCAL ATTRACTION AND CALCULATION OF CORRECTED F.B. & B.B.
  6) MEASURING FORE BEARING AND BACK BEARING FOR AN OPEN TRAVERSE (5 TO 6 SIDED). CALCULATE DIRECT ANGLES BETWEEN SUCCESSIVE LINES.
  7) USE OF DUMPY LEVEL, TEMPORARY ADJUSTMENTS AND TAKING READING ON LEVELLING STAFF. RECORDING READINGS IN FIELD BOOK.
  8) DIFFERENTIAL LEVELLING PRACTICE, REDUCTION OF LEVEL BY H.I. METHOD.
  9) DIFFERENTIAL LEVELLING PRACTICE, REDUCTION OF LEVEL BY RISE & FALL METHOD.
  10) CARRYING BENCH MARK FROM ONE POINT TO ANOTHER POINT ABOUT 200 M BY FLY LEVELLING WITH TILTING LEVEL.
  11) USE OF AUTO LEVEL AND TAKING OBSERVATION.
  12) MEASUREMENT OF AREA OF IRREGULAR FIGURE BY POLAR PLANIMETER
  13) MEASURING AREA ENCLOSED BY CLOSED CONTOURS ON CONTOUR MAP PREPARED EARLIER, BY SIMPLE DIGITAL PLANIMETER

BUILDING CONSTRUCTION LAB
(CIVIL ENGG. GROUP)

Subject Code	Practical						Credits
1615307	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	03	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS: PRACTICAL

SKILLS TO BE DEVELOPED:-

1. **INTELLECTUAL SKILLS:-** STUDENTS WILL BE ABLE TO
   - A) IDENTIFY COMPONENTS OF A BUILDING.
   - B) DIFFERENTIATE AND IDENTIFY TYPES OF BUILDING MATERIALS.
   - C) SELECT APPROPRIATE MATERIAL FOR BUILDING CONSTRUCTION.
   - D) SUPERVISE THE BUILDING CONSTRUCTION ACTIVITIES.

2. **MOTOR SKILLS :-** STUDENTS WILL BE ABLE TO.
   - a) MARK LAYOUT OF BUILDING ON THE GROUND.
   - b) CHECK AND MARK VARIOUS LEVELS IN BUILDING.

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LIST OF PRACTICALS:

1. PREPARING FOUNDATION PLAN AND MARKING ON GROUND LAYOUT OF LOAD BEARING STRUCTURE BY FACE LINE METHOD FROM THE GIVEN PLAN OF THE BUILDING.
2. PREPARING FOUNDATIONS PLAN AND MARKING ON GROUND LAYOUT OF FRAMED STRUCTURE BY FACE LINE METHOD FROM THE GIVEN PLAN OF THE BUILDING.
3. CHECKING AND TRANSFERRING LINE AND LEVEL OF PLINTH, SILL, LINTEL, FLOORING, SLAB LEVEL OF A BUILDING AND WRITING REPORT OF THE PROCESS.
4. CHECKING VERTICALITY (PLUMB LINE) OF FORMWORK FOR COLUMN, BEAM AND WALL AT CONSTRUCTION SITE AND WRITING REPORT OF THE PROCESS.
5. LAYING AND CONSTRUCTING THE PROCESS OF CONSTRUCTION OF BRICKWORK AND REPORT WRITING OF THE PROCESS.
6. OBSERVING THE PROCESS OF PAINTING IN RESIDENTIAL / PUBLIC BUILDING AND WRITING A REPORT WITH REFERENCE TO PROCESS AND TYPE OF PAINT SELECTED.
7. OBSERVING AND WRITING REPORT OF THE PROCESS OF PLASTERING.
8. OBSERVING AND WRITING REPORT OF THE PROCESS OF WATER PROOFING OF TERRACE OR BASEMENT.
9. OBSERVING THE MODELS, SPECIMEN OF BUILDING MATERIALS KEPT IN THE MODEL ROOM FOR FEW BUILDING ITEMS AND WRITING A REPORT FOR ANY FIVE MODELS/MATERIALS.

SURVEYING -TW
(CIVIL ENGG. GROUP)

Subject Code 1615308	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	—	External	:	18	

CONTENTS :TERM WORK

SURVEYING PROJECTS:-

1) **CHAIN & COMPASS TRAVERSE SURVEY** – A SIMPLE CLOSED TRAVERSE OF 5-6 SIDES ENCLOSING A BUILDING. CALCULATION OF INCLUDED ANGLES, LOCATING DETAILS AND PLOTTING THEM ON A 1 SIZE IMPERIAL DRAWING SHEET.
2) **BLOCK CONTOURING** – A BLOCK OF 100 X 150M WITH SPOT LEVELS AT 10X10M PLOTTING THE CONTOURS ON A-1 SIZE IMPERIAL DRAWING SHEET WITH A CONTOUR INTERVAL 0F 1M.
3) **PROFILE LEVELLING SURVEY** – RUNNING A LONGITUDINAL SECTION FOR A LENGTH OF 500 M FOR A ROAD /CANAL /RAILWAY ALIGNMENT. CROSS SECTION SHALL BE TAKEN SUITABLY. PLOTTING PLAN, L- SECTION AND CROSS SECTION ON A1 SIZE IMPERIAL DRAWING SHEET.

BIS/ International Codes of Practice:-

Sr. No.	Title
01	National Building Code
02	BIS 962-1973 Code of Architectural and Building Drawing
03	BIS 1256-1967 Code for Building Byelaws
04	BIS 1038- 1983 Steel Doors, Windows and Ventilators

SOFTWARE:

	01	Super Civil CD

BUILDING DRAWING -TW
(CIVIL ENGG. GROPU)

Subject Code 1615309	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	Internal	:	15	01
	—	—	02	External	:	35	

Contents : Term Work

Skills to be developed:

Intellectual Skills:

1. Read and interpret the building drawings
2. Plan residential and public buildings
3. Apply the building rules, regulations and byelaws.

Motor Skills:

1. Prepare line plans of Residential and Public Buildings
2. Prepare Detailed Plans, Elevations, Sections and other working drawings for the buildings.

S.No	**Term Work / Assignments :** Following exercises should be drawn on full imperial size drawing sheets.
1	• Drawing various types of lines, lettering and symbols of materials, doors and windows etc. used in construction on Full Imperial size drawing sheet.
2	• Drawing the lines plans of following buildings on Full Imperial size **graph paper.** • Residential Building (Min. three rooms) • Public Building – School building, Primary health center / Hospital building, Bank, Post Office, Hostel building etc.(At least four)
3	• Measured Drawing of an existing residential Building (Load bearing/ Framed structure Type) , showing Plan , Elevation, Sections, Construction notes, Schedule of openings, Site Plan, Area statement etc .
4	• Submission Drawing of two storied residential building (Framed structure type) showing Plans , Elevation, Sections, Foundation Plan ,construction notes, Schedule of openings, Site Plan ,Area statement etc.
5	• Working drawing of above drawing sheet preferably one plan, section through stair case to scale 1:50
6	• Two point perspective view of a building drawn in submission drawing.
7	• Tracing of a submission drawing prepared at Sr. No.4 above.
8	• Ammonia print of submission drawing prepared at Sr. No.4 above.

DEVELOPMENT OF LIFE SKILLS II - TW
(MECH. +CIVIL ENGINEERING GROUP)

Subject Code	Term Work						Credits
1625310	No. of Periods Per Week			Full Marks	:	25	02
	L	T	P/S	Internal	:	07	
	—	—	03	External	:	18	

CONTENTS: TERM WORK

	Name Of The Topic	Hrs/week
Unit -1	**SOCIAL SKILLS** SOCIETY, SOCIAL STRUCTURE, DEVELOP SYMPATHY AND EMPATHY.	**01**
Unit -2	Swot Analysis – Concept , How to make use of SWOT.	**01**
Unit – 3	**Inter personal Relation** Sources of conflict, Resolution of conflict , Ways to enhance interpersonal relations.	**02**
Unit – 4	**Problem Solving** **I)STEPS IN PROBLEM SOLVING,** 1)IDENTIFY AND CLARIFY THE PROBLEM, 2)INFORMATION GATHERING RELATED TO PROBLEM, 3)EVALUATE THE EVIDENCE, 4)CONSIDER ALTERNATIVE SOLUTIONS AND THEIR IMPLICATIONS, 5)CHOOSE AND IMPLEMENT THE BEST ALTERNATIVE, 6)REVIEW **II)Problem solving technique**.(any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking	**02**
Unit – 5	**Presentation Skills** Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. PRESENTATION SKILL – STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board	**03**
Unit – 6	**Group discussion and Interview technique** – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making **INTERVIEW TECHNIQUE** NECESSITY, TIPS FOR HANDLING COMMON QUESTIONS.	**03**

Unit – 7	**Working in Teams** UNDERSTAND AND WORK WITHIN THE DYNAMICS OF A GROUPS. TIPS TO WORK EFFECTIVELY IN TEAMS, ESTABLISH GOOD RAPPORT, INTEREST WITH OTHERS AND WORK EFFECTIVELY WITH THEM TO MEET COMMON OBJECTIVES, TIPS TO PROVIDE AND ACCEPT FEEDBACK IN A CONSTRUCTIVE AND CONSIDERATE WAY , LEADERSHIP IN TEAMS, HANDLING FRUSTRATIONS IN GROUP.	**02**
Unit – 8	**Task Management** INTRODUCTION, TASK IDENTIFICATION, TASK PLANNING ,ORGANIZING AND EXECUTION, CLOSING THE TASK	**02**
	TOTAL	**16**

List of Term Work / Assignment: (Any Eight):-

1) SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats.Following points will be useful for doing SWOT.
   a) Your past experiences,
   b) Achievements,
   c) Failures,
   d) Feedback from others etc.
2) Undergo a test on reading skill/memory skill administered by your teacher.
3) Solve the puzzles.
4) Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)
5) Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.
6) Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme. ####
7) Conduct an interview of a personality and write a report on it.
8) Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed
9) Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

MINI PROJECT ON TASK MANAGEMENT. DECIDE ANY TASK TO BE COMPLETED IN A STIPULATED TIME WITH THE HELP OF TEACHER. WRITE A REPORT CONSIDERING VARIOUS STEPS IN TASK MANAGEMENT.

Text /Reference Books:-		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Adams Time management	Marshall Cooks	Viva Books
Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Pretice Hall of India, Pvt Ltd
Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
Decision making & Problem Solving	by Adair, J	Orient Longman
Develop Your	Bishop , Sue	Kogan Page India
Assertiveness		
Make Every Minute Count	Marion E Haynes	Kogan page India
Organizational Behavior	Steven L McShane and Mary Ann Glinow	Tata McGraw Hill
Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, Pvt Ltd
Presentation Skills	Michael Hatton (Canada – India Project)	ISTE New Delhi
Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
Target setting and Goal Achievement	Richard Hale ,Peter Whilom	Kogan page India
Time management	Chakravarty, Ajanta	Rupa and Company
Working in Teams	Harding ham .A	Orient Longman
Development of Life Skills-II	Sudha Ranjan	Foundation Publishing

PROFESSIONAL PRACTICES III -TW

(MECH. + CIVIL ENGINEERING GROUP)

Subject Code 1625311	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	02
	L	T	P/S	Internal	:	07	
	—	—	03	External	:	18	

CONTENTS :TERM WORK

	Name Of The Topic	Hrs/week
Unit -1	**Industrial Visits** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. **TWO** industrial visits may be arranged in the following areas / industries : i) Manufacturing organizations for observing various manufacturing processes including heat treatment ii) Material testing laboratories in industries or reputed organizations iii) Auto workshop / Garage iv) Plastic material processing unit v) ST workshop / City transport workshop	**08**
Unit -2	Lectures by Professional / Industrial Expert be organized from **ANY THREE** of the following areas : i) Use of a plastics in automobiles. ii) Nonferrous Metals and alloys for engineering applications iii) Surface Treatment Processes like electroplating, powder coating etc. iv) Selection of electric motors. v) Computer aided drafting. vi) Industrial hygiene. vii) Composite Materials. viii) Heat treatment processes. ix) Ceramics x) Safety Engineering and Waste elimination	**08**
Unit – 3	**Individual Assignments :** **Any two** from the list suggested a) Process sequence of any two machine components. b) Write material specifications for any two composite jobs. c) Collection of samples of different plastic material or cutting tools with properties , specifications and applications. d) Preparing models using development of surfaces. e) Assignments on bending moment , sheer forces , deflection of beams and torsion chapters of strength of material. f) Select different materials with specifications for at least 10 different machine components and list the important material properties desirable. g) Select 5 different carbon steels and alloy steels used in mechanical engineering applications and specify heat treatment processes employed for improving the properties. Also give brief description of the heat treatment processes. h) List the various properties and applications of following materials – a. Ceramics b. fiber reinforcement plastics c. thermo plastics d. thermo setting plastics e. rubbers.	**08**

	OR Conduct **ANY ONE** of the following activities through active participation of students and write report i) Rally for energy conservation / tree plantation. ii) Survey for local social problems such as mal nutrition, unemployment, cleanliness, illiteracy etc. iii) Conduct aptitude , general knowledge test , IQ test iv) Arrange **any one** training in the following areas : a) Yoga. B) Use of fire fighting equipment and First aid Maintenance of Domestic appliances.	
Unit – 4	**Modular courses (Optional) :** A course module should be designed in the following areas for max. 12 hrs. Batch size – min. 15 students.	
Unit – 5	j) 3-D Design using software k) Computer screen, coordinate system and planes, definition of l) HP,VP, reference planes How to create them in 2nd/3rd m) environment. Selection of drawing site & scale. Commands of n) creation of Line, coordinate points, Axis, Poly lines, square, o) rectangle, polygon, spline, circles, ellipse, text, move, copy, p) offset, Mirror, Rotate, Trison, Extend, Break, Chamfer, Fillet, q) Curves, Constraints fit tangency, perpendicularity, dimensioning r) Line convention, material conventions and lettering. s) t) The Student should draw – different orthographic Views (including sections), Auxiliary views according to first/ Third angle method of projection. (Minimum two sheets, each containing two problems) after learning the contents as above.	**16**
	Total	**48**

CONCRETE TECHNOLOGY -TW

(CIVIL ENGG. GROUP)

Subject Code 1615312	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	02	External	:	18	

Contents : Term Work

Skill to be developed:

Intellectual Skills:

1. Analyze the given data
2. Select proper method for analysis
3. Interpret the results

Motor Skills:

1. Measure the quantities accurately
2. Handle instruments properly

Term work shall consist of eight experiments in part A & mini project work in Part B

Part A: PART A consists of GROUP I & GROUP II.

Group I– Physical tests on ordinary Portland cement (any four)

1) Determination of fineness of cement preferably by Blaine's air permeability apparatus or by sieving.
2) Determination of standard consistency of OPC
3) Determination of initial & final setting times of OPC.
4) Determination of compressive strength of ordinary portland cement
5) Determination of soundness of OPC.

Group II – Tests on fine & coarse aggregates (any four)

1) Determination of silt content in sand by volume / weight
2) Determination of maximum % of bulking of sand
3) Determination of aggregate impact value.
4) Determination of aggregate abrasion value.
5) Determination of aggregate crushing value.
6) Determination of bulk density & water absorption, fine & coarse aggregated.

Part B:

Mini Project :

Comparative study of compressive strength of concrete for different Water cement ratio With and without curing.

Note: video cassettes or cd's of above experiments developed by NITTTR (if available) shall be shown to the students on T. V. / L.C.D. projector prior to the conductance of above experiments.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN COMPUTER SCIENCE & ENGINEERING

(Effective from Session 2016-17 Batch)

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.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	1600302	03	03	10	20	70	100	28	40	03
3.	Introduction to Software Package	1618303	03	03	10	20	70	100	28	40	03
4.	Computer Organization & Architecture	1618304	03	03	10	20	70	100	28	40	03
5.	Operating System	1618305	03	03	10	20	70	100	28	40	03
		Total:-	**16**				**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.	Computer Programming Through 'C' Lab.	1600306	06	03	15	35	50	20	03
7.	Introduction to Software Package Lab.	1618307	04	03	15	35	50	20	02
8.	Computer Organization & Architecture Lab.	1618308	02	03	15	35	50	20	01
		Total:-	**12**				**150**		

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.	Operating System (T W)	1618309	05	30	70	100	40	03
		Total:-	**05**			**100**		
Total Periods per week Each of duration One Hours			**=** 33			**Total Marks = 750**		**24**

APPLIED MATHEMATICS-I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code 1600301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents :Theory		Hrs/week	Marks
Unit -1	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems. 1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area between two curves. 1.5.3 Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l), (-l, l), (0, 2\pi), (-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**Numerical Methods** 5.1 Solution of algebraic equations Bisection method. Regularfalsi method. Newton – Raphson method. 5.2 **Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	**05** **05**	**07** **07**
	Total	**48**	**70**

Text /Reference Books:		
Name of Authors	**Titles of the Book**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

Contents : Theory			Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		[03]	
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		[08]	
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		[08]	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		[07]	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Operator.		
	04.03	If statement, if-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		[07]	

Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.	**[07]**	
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	**[04]**	
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	**[06]**	
	Total	**[50]**	

Text / Reference Books -

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India. - R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill. - E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education. - A. Kamthane
5. Programming with C. First Edition, 1997, Tara McGraw hill. - Venugopla and Prasad
6. The C Programming Language, Second Edition, 2001, Prentice Hall of India. - B. W. Kernighan & D.M. Ritchie
7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - R. Subburaj
8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami
9. Elements of C, Khanna Publishers, Delhi. - M. H. Lewin
10. Programming in C. - Stephen G. Kochan
11. Programming in C, khanna Publishers, Delhi. - B. P. Mahapatra
12. Let us C, BPB Publication, New Delhi. - Yashwant kanetkar
13. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa
14. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
15. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth
16. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
17. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
18. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

INTRODUCTION TO SOFTWARE PACKAGES

Subject Code 1618303	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale & Objective:-

This course will enable the students to familiarize with the features and use of application packages such as Word Processing Package (MS-Word), Spreadsheet Package (MS-Excel), Presentation Packages (MS-Power Point), Data Base Management Package (Visual Fox Pro) and Anti-virus Packages.

Contents : Theory		Hrs/week	Marks
Unit -1	**WORD PROCESSING PACKAGE (MS-WORD):** 01.01 Features of Word Processing Package MS-Word, Menu Options-File, Edit, View, Insert, Format, Tools-spelling and grammar, language, mail-merge, options; table. 01.02 Creating, editing and saving a document, Opening a document, password protection for file. 01.03 Setting page margins, tab setting, ruler and indenting. 01.04 Formatting a document- using different fonts; changing font size and colour; changing the appearance through bold/italic/underline; highlighting text; change case; use of sub script and superscript. 01.05 Alignment of text in a document and justification, use of bullets and numbering. 01.06 Paragraph formatting, inserting page breaks and column breaks. 01.07 Use of headers, footers, footnote and end note. Use of Comments, inserting date, time, and special symbols, importing graphical images and use of drawing tools 01.08 Creating table, formatting cells, using different border styles, shading in tables, merging of cells, and partition of cells, inserting and deleting a row/column in a table. 01.09 Print preview, zoom, page setup, print options. 01.10 Use of tools such as spell checker, help, mail-merge, and use of macros.	[16]	
Unit -2	**SPREADSHEET PACKAGE (MS-EXCEL):** 02.01 Features of Spreadsheet package such as MS Excel, Menu Options- File; edit; view; insert; format; tools- spelling, auto correct, protection, options; data. 02.02 Concepts of cell and cell-addressing. 02.03 Creating, operating and saving worksheet. 02.04 Entering text, numeric information and formula 02.05 Formatting numbers and text, protection cells, printing worksheet. 02.06 Using data management functions-mathematical, statistical and financial functions. 02.07 Creating different types of charts, graphs and balance worksheet and displaying 3-D Charts, printing and resizing charts. Importing files and graphics.	[16]	

Unit -3	**PRESENTATION PACKAGE (MS-POWER POINT):** 03.01 Features of Presentation Package MS-Power Point, Menu options-File; edit, view; insert; format; tools-spelling, language, auto clipart, slide show 03.02 Status bar, tool bar, customized tool bar, slide view, outline view, slide sorter view, notes page view, slide show view 03.03 Creating and saving slides, opening and editing slides, changing layout of a slide, deleting of slide, changing layouts of a slide, deleting of slide, changing the order of slides, animation. 03.04 Working with objects: selecting, grouping, ungrouping and regrouping of objects, moving, aligning, cutting, copying, pasting, and duplicating objects. 03.05 Putting text on slides: selecting and editing text, finding and replacing text. 03.06 Creating graphs and importing files. 03.07 Creating tables. 03.08 Use of data sheet view and design view.	[13]	
Unit -4	**ANTI VIRUS PACKAGES:** 05.01 Introduction to Virus. 05.02 Virus Protection, Deletion & Removal Utilities Anti Virus Packages to prevent, detect & delete Viruses.	[02]	
	Total	**50**	

Books Recommended:-

1.	MS office 2000 for Everyone, Vikash Publications, New Delhi	-	Sanjay Saxena
2.	MS office 2000, Addison Wesley(Singapore) Pvt. Ltd., New Delhi	-	Sagman
3.	MS office 2000 8-in-1, Prentice Hall of India, New Delhi	-	Habraken
4.	MS office, BPB Publications, New Delhi	-	Ron Mansfield
5.	MS Word 2000 in a Nutshell, Vikash Publishing House, New Delhi.	-	Sanjay Saxena
6.	MS Excel 2000 in a Nutshell, Vikash Publishing House, New Delhi.	-	Sanjay Saxena
7.	A Quick Course in Power Point and A Quick Course for Windows, Galgotia Publications Pvt. Ltd., Daryaganj New Delhi.	-	Cox
8.	Building Visual FoxPro 5 Application, First Edition, 1997, IDG Books	-	B. Sosinsky
9.	FoxPro 2.6 code Book, BPB Publication, 1994	-	Griver
10.	Mastering FoxPro 2.5, BPB Publication, 1994	-	Siegel
11.	FoxPro 2.6 for Dummies, Pustak Mahal	-	Dan Gookin
12.	Understanding Norton Utilities	-	Peter Dysen

COMPUTER ORGANISATION & ARCHITECTURE

Subject Code 1618304	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:
This course will enable the students to grasp the working of basic components of computer system. Further the course will help them to learn as to how the basic components interact with each other to form a working system.

Objective:
Objective of the course is to familiarize students about hardware and software design including logic design, and basic structure and behavior of the various functional modules of the computers and how they interact to provide the processing needs of the user.
This subject mainly focuses on the hardware and system software. It aims to describe the following aspects:

- Building blocks of the computer
- Computer Design
- Assembly Language Programming

S.No.	Units	Periods
01	Introduction and Background	(04)
02	Register Transfer Language and Micro-operations	(05)
03	Architecture of a Simple Processor	(06)
04	CPU Organization	(06)
05	Assembly Language Programming	(07)
06	Micro programmed Control Unit	(07)
07	Arithmetic Algorithms	(04)
08	I/O Organization	(05)
09	Memory Organization	(06)
	Total :	**(50)**

	CONTENTS : Theory	Hrs/week	Marks
Unit-1	**INTRODUCTION AND BACKGROUND** 01.01 Evolution of Computers 01.02 Stored Program concept and Von Neumann Architecture 01.03 Information Representation and Codes 01.04 Building blocks of Computers(Combinational blocks: gates, multiplexers, decoders, encoders etc., Sequential Building Blocks: Flip flops, registers, counters, random access memory etc.	**(04)**	
Unit-2	**REGISTER TRANSFER LANGUAGE AND MICRO-OPERATIONS** 02.01 Concept of bus, Data movement among registers. 02.02 A language to represent conditional data transfer 02.03 Data movement from/to memory	**(05)**	
Unit-3	**ARCHITECTURE OF SIMPLE PROCESSOR** 03.01 A simple computer organization and Instruction set. 03.02 Instruction execution in terms of microinstructions 03.03 Concept of Interrupt and simple I/O organisation 03.04 Implementation of the processor using building blocks	**(06)**	
Unit-4	**CPU ORGANISATION** 04.01 Address modes Instruction formats. 04.02 Instruction formats 04.03 CPU organisation with large registers 04.04 Stacks and handling of interrupts and subroutines 04.05 Instruction pipelining : stages, hazards and methods to remove hazards	**(06)**	

Unit-5	**ASSEMBLY LANGUAGE PROGRAMMING** 05.01 Machine and Assembly language. 05.02 Pseudo-Operations 05.03 Subroutines in assembly language 05.04 Interrupt and I/O Programming 05.05 Examples	**[07]**	
Unit-6	**MICROPROGRAMMED CONTROL UNIT** 06.01 Basic organization of micro programmed controller. 06.02 Horizontal and vertical formats 06.03 Address sequencer	**[07]**	
Unit-7	**ARITHMETIC ALGORITHMS** 07.01 Addition and Subtraction for sign magnitude and 2's complement numbers. 07.02 Integer multiplication using shift and add 07.03 Booth's algorithm 07.04 Integer Division 07.05 Floating point representations and arithmetic algorithms	**[04]**	
Unit-8	**I/O ORGANISATION** 08.01 Strobe based and handshake based communication. 08.02 Vector and priority interrupts 08.03 DMA based data transfer	**[05]**	
Unit-9	**MEMORY ORGANISATION** 09.01 Basic cell of static & dynamic RAM. 09.02 Building large memories using chips 09.03 Associative memory 09.04 Cache memory organisation 09.05 Virtual memory organisation	**[06]**	
	Total	**50**	

Books Recommended:

Text/Reference Books-

1 Computer System Architecture, Third Edition, 2000, Pearson Education - M.M. Mano
2 Computer System and Architecture, Prentice Hall of India Pvt. Ltd., New Delhi - M. Mano
3 Computer Architecture and Organization, McGraw Hill Company, New Delhi - J.P. Hayes
4 Computer Organization and Architecture, Prentice Hall of India Ltd., New Delhi - W. Stallings
5 Computer System Architecture, Third Edition, 1998, Prentice Hall of India - M. Morris Mano
6 Microprocessor Architecture, Programming and Application, Wiley Eastern Limited - Gaonkar

Reference Books:

1 Computer Architecture & Organization, Third Edition, 1988, McGraw-Hill. New York - J.P. Hayes
2 Computer Design and Architecture, Second Edition, 1991, Harper Collins Publishers - S.G. Siva
3 Computer Organization and Design, Prentice Hill of India Ltd., 1994 - P. Pal Choudhary

OPERATING SYSTEM

Subject Code	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	03
1618305	03	—	—	TA	:	10	
				CT	:	20	

Rationale:
The course provides the students with an understanding of human computer interface existing in computer system and the basic concepts of operating system and its working. Further, good working knowledge to work in Windows and Unix environments is provided by this course.

Objective:
The objectives of this course are to make the students able to

- To teach the requirement of Operating System in Computers.
- To teach Windows Operating System and to make familiar with special features of Windows Operating System.
- To teach multi-user Operating System Unix Operating System and Unix File Structure.

S.No.	Units	Periods
01	Introduction	(02)
02	Process	(08)
03	Inter-process Communication and Synchronization	(07)
04	Memory Management	(07)
05	File Management	(07)
06	Security and Protection	(04)
07	Multi Processor System	(06)
08	Case Studies	(09)
	Total:	**(50)**

CONTENTS : Theory		Hrs/week	Marks
Unit-1	**INTRODUCTION** Evaluation of Operating Systems, Types of Operating Systems, Different views of the Operating Systems,	**(2)**	
Unit-2	**PROCESSES** The Process Concept, Systems Programmer's view of Processes, The Operating System view of Processes, Operating System Services for Process Management, Scheduling algorithms, Performance Evaluation.	**(8)**	
Unit-3	**INTERPROCESS COMMUNICATION AND SYNCHRONIZATION** The need for inter process synchronization, mutual exclusion, semaphores, Hardware support for mutual exclusion, Classical Problems in concurrent programming, Critical region and conditional critical region, monitors, messages, deadlocks.	**(3)**	
Unit-4	**MEMORY MANAGEMENT** 4.1 **Contiguous Allocation** Single Process Monitor, Partitioned memory allocation static, Partitioned memory allocation-Dynamic, segmentation 4.2 **Noncontiguous Allocation** Paging, Virtual Memory(allocation policies and replacement policies)	**(7)**	
Unit-5	**FILE MANAGEMENT** A generalization of file services. Directory structure, command Language uses view of the file System	**(7)**	
Unit-6	**SECURITY AND PROTECTION** Security threats and goals, penetration, attempts, security policies and mechanisms, authentication, protection and access control, worms and viruses.	**(4)**	

Unit-7	**MULTI PROCESSOR SYSTEMS** Motivation and classification, multi processor interconnection, types of multi processor operating system, multi processor OS functions and requirements, introduction of parallel computing (distributed operating system) Introduction to multiprocessor synchronization.	**(6)**	
Unit-8	**CASE STUDY** 8.01 **LINUX OPERATING SYSTEM** Introduction to Linux Operating System. Linux features & Benefits :- **Introduction to Linux**:- Systems characteristics and requirements with Linux. **Getting Started**:-System manger, Password, Log in, Log out, running the system.	**[03]**	
	8.02 **UNIX OPERATING SYSTEM** Introduction to Unix Operating System. Unix features &Benefits :- **Introduction to Linux**:- Systems characteristics and requirements with Linux. **Getting Started**:-System manger, Password, Log in, Log out, running the system. **File in the Unix System**:- File structure in Unix, Working with file structures, removable file volumes. **Unix Command Shells**:- Issuing commands, Input handling by the shells, The shell programming language, Running the Unix shells, Pipes, Version of Unix Systems. **The System Kernel**:- Nature of the Kernel, Process Co-ordinations and Management, Input and Output Operations. and Output Operations.	**[6]**	
	Total	**50**	

Books /Reference Books-

1 Operating Systems-Concept and Design, McGraw-Hill international Edition-Computer Science Series, 1992 - Milan Milenkovic

2 An introduction to Operating Systems, Addition-Wesley Publishing Company, 1984. - Harvey M. Deitel

3 Operating System Concepts, Addition-Wesley Publishing Company, 1989. - James L. Paterson, Abraham Silberschatz

4 Modern Operating Systems, Prentice-Hall of India Private Ltd., 1995. - Andrew S. Tanenbaum

5 Microsoft Windows Manual -

6 First Course in Computers, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - Sanjay Saxena

7 WWW.msn.com and linked sites -

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	
1600306	L	T	P/S	ESE	:	50	03
	—	—	06	Internal	:	15	
				External	:	35	

Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Eight experiments to be performed in the laboratory:

Contents : Practical		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	12	
Unit-2	Programming exercise on case Control Statement.	12	
Unit-3	Programming exercise on Decision Control Statement.	12	
Unit-4	Programming exercise on looping.	12	
Unit-5	Programming exercise on recursion technique.	12	
Unit-6	Programming exercise on Structure.	12	
Unit-7	Programs on array implementation.	12	

Text / Reference Books -

1. How to solve it by Computer, Prentice Hall of India, 1992. - R.G. Dromey.
2. The C Programming Language, Prentice Hall of India, 1989. - B.W. Kernighan & D.M. Ritchie.
3. The C Programming Language, Prentice Hall of India, 1989. - Cooper, Mullish
4. Application Programming in C. Macmillain International editions, 1990. - Richa'd Johnson- Baugh & Martin Kalin
5. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
6. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth.
7. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
8. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi - R. Subburaj
10. Programming with C language, Tata McGraw Hill, New Delhi. - C. Balaguruswami
11. Elements of C, Khanna Publishers. Delhi - M. H. Lewin
12. Programming in C - Stephan G. Kochan.
13. Programming in C, Khanna Publishers. New Delhi - B.P. Mahapatra
14. Let us C, BPB Publication. New Delhi - Yashwant Kanetkar
15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

INTRODUCTION TO SOFTWARE PACKAGE LAB

Subject Code 1618307	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Contents : Practical		Hrs/week	Marks
Unit -1	Using mail merge of MS-Word prepare send New Year greetings to the all Principal, staffs and students of your institution.	[ ]	
Unit -2	Demonstrate the different tools of the MS-Word.	[ ]	
Unit -3	Using MS-Excel prepare monthly salary payment of your institution. For calculating use mathematical, statistical and financial functions of MS-Excel.	[ ]	
Unit -4	Using MS-Excel Prepare Pie and bar chart to show current branch wise and batch wise status of students, pass outs, fails for last five years.	[ ]	
Unit -5	Using MS-PowerPoint Prepare a power point presentation of last year annual activities of your polytechnic.	[ ]	
Unit -6	Using MS-PowerPoint Prepare a power point presentation on current scientific research based on direction of your teacher.	[ ]	
Unit -7	Prepare a Project Report on definition, types, and history of viruses and antivirus virus packages to fight with viruses.	[ ]	
	Total		

Books Recommended:-

1	MS office 2000 for Everyone, Vikash Publications, New Delhi	-	Sanjay Saxena
2	MS office 2000, Addison Wesley(Singapore) Pvt. Ltd., New Delhi	-	Sagman
3	MS office 2000 8-in-1, Prentice Hall of India, New Delhi	-	Habraken
4	MS office, BPB Publications, New Delhi	-	Ron Mansfield
5	MS Word 2000 in a Nutshell, Vikash Publishing House, New Delhi.	-	Sanjay Saxena
6	MS Excel 2000 in a Nutshell, Vikash Publishing House, New Delhi.	-	Sanjay Saxena
7	A Quick Course in Power Point and A Quick Course for Windows, Galgotia Publications Pvt. Ltd., Daryaganj New Delhi.	-	Cox
8	Building Visual FoxPro 5 Application, First Edition, 1997, IDG Books	-	B. Sosinsky
9	FoxPro 2.6 code Book, BPB Publication, 1994	-	Griver
10	Mastering FoxPro 2.5, BPB Publication, 1994	-	Siegel
11	FoxPro 2.6 for Dummies, Pustak Mahal	-	Dan Gookin
12	Understanding Norton Utilities	-	Peter Dysen

COMPUTER ORGANISATION & ARCHITECTURE LAB

Subject Code 1618308	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	01
	—	—	02	Internal	:	15	
				External	:	35	

Contents : Practical		Hrs/week	Marks
Unit -1	Write a program in C-language to implement the digital gates. The program should give the truth table of the gate, which is selected by the user from the menu displayed by the program.		
Unit -2	Write a program in C-language to implement division algorithm.		
Unit -3	Write a program in C-language to generate the r's and (r-1)'s complement for a number given in any number system .		
Unit -4	Give the presentation on 74xx series IC for gates.		
Unit -5	Give the presentation on combinational circuits such as multiplexer, decoder, encoder etc.		
Unit -6	Give the presentation on sequential circuits such as registers, counters etc.		
Unit -7	Give the presentation on the flip-flops i.e. RS-flip-flop, D-flip-flop, JK-flip-flop, T-flip-flop, Master-Slave JK-flip-flop etc.		
Unit -8	Give the presentation on Von Neumann Architecture of a computer system.		
Unit -9	Give the presentation on money management i.e. virtual memory, cache memory, paging etc.		
Unit -10	Write an assembly language program to find the largest integer from maximum of 15 numbers stored at NUM, defined as consecutive words. The end of the sequence of number is denoted by-9999.		
Unit -11	Write an assembly language program to covert the binary number into hexadecimal number.		
Unit -12	Write an assembly language program to convert binary number to decimal number.		
Unit -13	Write an assembly language program to add two 8-bits numbers in the memory location called NUM1 and NUM2. The result is stored in the memory location called RESULT. If there was a carry from the addition it will be stored as 0000001 in location called CARRY.		
Unit -14	Write an assembly language program to exchange the data between two variables.		
Unit -15	Write an assembly language program, which count the frequency of each decimal digit 0 to 9 of the segment of digits available at DIGIT. The sequence is terminated by character #. Put the frequency of 0 to 9 at FREE in ten consecutive words.		
Unit -16	Write an assembly language program to convert the lower alphabet character after full stop to capital letter if it is a small letter in the string available at MSG.		
Unit -17	Write an assembly language program to multiply the two unsigned binary numbers.		
Unit -18	Write an assembly language program to find the smallest integer from maximum of 15 numbers stored at NUM, defined as consecutive words. The end of the sequence of number is denoted by -9999.		
Unit -19	Write an assembly language program to count the number of spaces character and words in the string available at MSG.		
	Total		

OPERATING SYSTEM -T W

Subject Code	Term Work					Credits
	No. of Periods Per Week			Full Marks	100	
1618309	L	T	P/S	Internal	30	03
	—	—	05	External	70	

LIST OF SESSIONALS:

Contents : Term Work		Hrs/week	Marks
Unit -1	Demonstrate giving brief history of Operating System, types of Operating Systems inuse these days, how it is necessary for a computer functioning.		
Unit -2	Prepare a report on different views of the Operating System, the journey of a command execution, Design and implementation of Operating System.		
Unit -3	Prepare a report on memory management of Operating System.		
Unit -4	Prepare a report on file management of Operating System.		
Unit -5	Demonstrate the Security and Protection features of an Operating System.		
Unit -6	Demonstrate the functions of Multi Processor Systems.		
Unit -7	Demonstrate and produce report on computer network algorithms for distributed processing.		
Unit -8	Prepare a brief history of Windows Operating System.		
Unit -9	Demonstrate features, tools and accessories of Windows 98.		
Unit -10	Prepare a brief report on features and benefits of Unix Operating System.		
	Total		

Books Recommended:

1 Operating Systems-Concept and Design, McGraw-Hill international Edition-Computer Science Series, 1992 - Milan Milenkovic
2 An introduction to Operating Systems, Addition-Wesley Publishing Company, 1984. - Harvey M. Deitel
3 Operating System Concepts, Addition-Wesley Publishing Company, 1989. - James L. Paterson, Abraham Silberschatz
4 Modern Operating Systems, Prentice-Hall of India Private Ltd., 1995. - Andrew S. Tanenbaum
5 Microsoft Windows Manual -
6 First Course in Computers, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - Sanjay Saxena
7 WWW.msn.com and linked sites -
8 Unix Programming - Bach

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN ELECTRONICS & COMMUNICATION ENGINEERING

(Effective from Session 2016-17 Batch)

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.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	1600302	03	03	10	20	70	100	28	40	03
3.	Analog Electronics Circuit	1638303	03	03	10	20	70	100	28	40	03
4.	Basic Electronic Engineering	1638304	03	03	10	20	70	100	28	40	03
5.	Electronics Measurement-I	1621305	03	03	10	20	70	100	28	40	03
		Total:- 16					**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.	Computer Programming Through 'C' Lab.	1600306	06	03	15	35	50	20	03
7.	Analog Electronics Circuit Lab.	1638307	04	03	15	35	50	20	02
8.	Electronic Measurement and Instrumentation Lab.	1621308	04	03	15	35	50	20	02
	Total:- 14						**150**		

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.	Basic Electronic Engineering (TW)	1638309	03	30	70	100	40	02
	Total:- 03					**100**		
Total Periods per week Each of duration one Hours **= 33**						**Total Marks = 750**		**24**

APPLIED MATHEMATICS -I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code 1600301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents :Theory		Hrs/week	Marks
Unit -1	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems. 1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area between two curves. 1.5.3 Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l), (-l, l), (0, 2\pi), (-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**Numerical Methods** 5.1 Solution of algebraic equations Bisection method. Regularfalsi method. Newton – Raphson method. 5.2 **Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	**05** **05**	**07** **07**
	Total	**48**	**70**

Text /Reference Books:		
Name of Authors	**Titles of the Book**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

Contents : Theory			Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		**[03]**	
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		**[08]**	
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		**[08]**	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		**[07]**	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Perator.		
	04.03	If statement, it-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		**[07]**	
Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.		**[07]**	

Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	**[04]**	
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	**[06]**	
	Total		

Text / Reference Books -

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India. - R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill. - E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education. - A. Kamthane
5. Programming with C. First Edition, 1997, Tara McGraw hill. - Venugopla and Prasad
6. The C Programming Language, Second Edition, 2001, Prentice Hall of India. - B. W. Kernighan & D.M. Ritchie
7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - R. Subburaj
8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami
9. Elements of C, Khanna Publishers, Delhi. - M. H. Lewin
10. Programming in C. - Stephen G. Kochan
11. Programming in C, khanna Publishers, Delhi. - B. P. Mahapatra
12. Let us C, BPB Publication, New Delhi. - Yashwant kanetkar
13. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa
14. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
15. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth
16. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
17. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
18. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

ANALOG ELECTRONIC CIRCUIT

Subject Code 1638303	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Contents : Theory		Hrs/week	Marks
Unit -1	**NOISE AND NOISE FIGURE IN AMPLIFIERS:** Thermal noise, short noise, flicker noise Fiss formula.	[05]	
Unit -2	**POWER AMPLIFIERS:** Classification of amplifiers and class-c, conversion efficiency complimentary symmetry amplifiers.	[07]	
Unit -3	**IDEAL AMPLIFIERS:** Ideal voltage amplifier, ideal current amplifiers, ideal transresistance amplifier, ideal trans conductance amplifier, distortions, amplitude distortions, harmonic distortions, frequency distortions and phone distortion.	[07]	
Unit -4	**TRANSISTOR AMPLIFIERS:** Multistage transistor amplifier, gain, frequency response, decibel gain, band with of a multistage amplifiers. Small signal amplifier and large signal amplifier, difference between voltage amplifier and power amplifier. Classification of power amplifier. Push-pull amplifier.	[12]	
Unit -5	**FEEDBACK AMPLIFIER AND OSCILLATORS:** Feedback, concept of negative and positive feedback, considerations of gain. bandwidth, distortions etc with negative feedback Berkhausian criterion for oscillations, colpitts oscillator, wein bridge oscillator.	[06]	
Unit -6	**H-PARAMETERS:** Determination of h-parameters, h-parameters equivalent circuit, h-parameter of a transistor, Approximate hybrid formulae for Zi, Ai, Av and Zo.	[08]	
Unit -7	Bootstrapping in emitter follower, Darlington pair cascade amplifier.	[05]	
	Total	**50**	

Text / Reference Books -

Electronics	-	Miliman and Halkias
Principle of electronics	-	V.K.Mehta & S.Chand. (MCGRAW HILL)

BASIC ELECTRONICS ENGINEERING

Subject Code 1638304	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Electronics is a major part of our day to day life. In each and every field electronic systems are used. Basic electronics is one of the subjects which are the base of all advance electronics. It starts with PN junction which makes the student to follow the functioning of all semiconductor based electronics. This is a core group subject and it develops cognitive and psychomotor skills.

Objectives: Student will be able to:

1) Describe the formation of PN junction.
2) Draw the characteristics of basic components like diode, transistor etc.
3) Draw and describe the basic circuits of rectifier, filter, regulator and amplifiers.
4) Know voltage amplifiers.
5) Test diode and transistors.
6) Read the data sheets of diode and transistors.

Contents : Theory		Hrs/week	Marks
Unit -1	**Semiconductor Physics** Semiconductor Bonds in Semiconductor and their application. Energy Band Description of Semiconductor Effects of Temperature on Semiconductors Intrinsic and Extrinsic Semiconductor n- type and p- type Semiconductor PN Junction, V – I Characteristics of p n junction and its properties	[08]	
Unit -2	**Semiconductor Diode** Semiconductor diode Crystal diode as a rectifier Crystal diode rectifier and its kinds Efficiency of full wave rectifier Ripple factor Filter circuits and its types Zener diode	[08]	
Unit -3	**Special Purpose diodes** LED and its advantage Photo diode, characteristics and its applications Tunnel diode, Varactor diode and its applications Shockley diode	[06]	
Unit -4	**Transistors** Transistor Transistor as an amplifier Transistor connection (CB, CE, CC) Transistor load line analysis Operating point Cut off and Saturation points Semiconductor devices numbering system	[08]	
Unit -5	**Transistor Biasing** Transistor biasing Stabilisation Stability factor Method of transistor biasing	[08]	
Unit -6	**Single Stage Transistor Amplifiers** Single stage transistor amplifiers Phase reversal D.C. and A.C. equivalent circuits Voltage gain of CE Amplifier Classification of Amplifier	[08]	
Unit -7	Feed back, -ve feed back, +ve feed back, oscillations, multistage amplifier (Fundamental idea only).	[04]	
	Total	**50**	

ELECTRONIC MEASUREMENT - I

Subject Code 1621305	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale

Measurements are essential in every sphere. The subjects of Electronics and Tele-Communication Engineering are inseparably linked. Studies of Electrical and Electronic measuring instruments are incorporated in two papers, Paper-I and Paper-II.

Objectives

This paper mainly deals with the measurement of Current, Voltage, Power, Frequency and Phase beside the measurement of passive elements. The students are expected to be familiar with the principle, construction and uses of instruments utilized for these purposes.

SL	Topics	Periods
1.	Characteristics of Instruments and possible errors.	02
2.	Galvanometers	04
3.	Ammeters, Voltmeters and Ohm Meters	13
4.	Instruments Transformers	04
5.	Power Measurement	04
6.	Phase and Frequency Measurement	05
7.	Resistance Measurement	05
8.	Potentiometers	04
9.	DC and AC Bridges	04
10.	Cathode Ray Oscilloscope	05
	Total	**50**

Contents : Theory		Hrs/week	Marks
Unit -1	Characteristics of Instruments and possible errors: Introduction to value, accuracy, precision, sensitivity, resolution, noise, repeatability, instrument efficiency, scale range, linearity, dynamic systems, dynamic response, and loading. Types of errors.	[02]	
Unit -2	Galvanometers: D'Arranvol galvanometer, Torque equation, Dynamic behaviour, under damped, over damped and critically damped motion of galvanometer. sensitivity, choice of galvanometer, Flux meter.	[04]	
Unit -3	Ammeters, Voltmeters and Ohm meters: Types of instruments. 03.01 Permanent Magnet Moving coil Instruments: Torque equation, Multi-range Ammeter, Voltmeters, Sensitivity, Loading effects, Advantages and Disadvantages. 03.02 Ohm Meters: Series and Shunt type Multimeter, Megger, 03.04 Moving Iron Instruments: Operating Principle, Torque equation, Electro-dynamometer, ammeter and voltmeters. Errors. Use in AC and DC. Use of these at high frequency. 03.04 Introduction to Electrostatics. Induction type and Rectifier type Instruments.	[13]	
Unit -4	Instrument Transformer: Introduction to Instrument Transformer, Current Transformer and Potential Transformer in light of instrumentation.	[04]	
Unit -5	Power Measurement: Power Measurement using instrument transformer. Wattmeters of different types. 3-phase Wattmeters. Energy meters for DC and AC circuits.	[04]	
Unit -6	Phase and Frequency Measurement: Moving iron, Rotating field, Alternating field, Power Factor Meters. Types of Frequency Meters.	[05]	
Unit -7	Resistance Measurement: Classification of Resistance, Measurement of medium resistance using ammeter, voltmeter, substitution and bridges. Construction for low resistance, Methods for measurement of low resistance using ammeter and voltmeter, Kelvin double bridge Measurement of high resistances: Difficulties and measurement, guard circuits, Direct deflection, loss of charge and mega ohm bridges methods of measurement.	[05]	
Unit -8	Potentiometers: Classification, basic potentiometer, multi-range potentiometer, , Application of potentiometers.	[04]	

Unit -9	DC and AC Bridges: Basic principle of bridges. Wheatstone Kelvin Bridge, Maxwell bridges, Hay's bridges, Anderson's bridge. Measurement of inductance and capacitance using bridges. Wien's bridge, Universal bridge, Bridge circuits for measurement of mutual inductance.	[04]	
Unit -10	Cathode Ray Oscilloscope: CRT, Deflection Systems, Synchronization, Time base circuits, Measurement of voltage, current, phase angle, frequency Lissajeous pattern etc.	[05]	
	Total	**50**	

Recommended Books

SL	**Title/Publisher**	**Author**
1.	Electronic Instrument and Measurement Techniques	Cooper
2.	Course in Electrical and Electronic Measurement and Instrumentation	A. K. Sawhny
3.	Electric and Electronics Measurement	Golding

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	
1600306	L	T	P/S	ESE	:	50	03
	—	—	06	Internal	:	15	
				External	:	35	

Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Eight experiments to be performed in the laboratory:

Contents : Practical		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	12	
Unit-2	Programming exercise on case Control Statement.	12	
Unit-3	Programming exercise on Decision Control Statement.	12	
Unit-4	Programming exercise on looping.	12	
Unit-5	Programming exercise on recursion technique.	12	
Unit-6	Programming exercise on Structure.	12	
Unit-7	Programs on array implementation.	12	

Text / Reference Books -

1. How to solve it by Computer, Prentice Hall of India, 1992. - R.G. Dromey.
2. The C Programming Language, Prentice Hall of India, 1989. - B.W. Kernighan & D.M. Ritchie.
3. The C Programming Language, Prentice Hall of India, 1989. - Cooper, Mullish
4. Application Programming in C. Macmillain International editions, 1990. - Richa'd Johnson- Baugh & Martin Kalin
5. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
6. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth.
7. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
8. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi - R. Subburaj
10. Programming with C language, Tata McGraw Hill, New Delhi. - C. Balaguruswami
11. Elements of C, Khanna Publishers. Delhi - M. H. Lewin
12. Programming in C - Stephan G. Kochan.
13. Programming in C, Khanna Publishers. New Delhi - B.P. Mahapatra
14. Let us C, BPB Publication. New Delhi - Yashwant Kanetkar
15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

ANALOG ELECTRONICS CIRCUIT LAB.

Subject Code 1638307	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Contents : Practical		Hrs/week	Marks
Unit -1	Wiring of RC coupled single stage FET amplifier and determination of the gain-frequency response, input and output impedances.		
Unit -2	Wiring of RC coupled single stage BJT amplifier and determination of the gain-frequency response, input and output impedances.		
Unit -3	Wiring of BJT Darlington Emitter follower with and without bootstrapping and determination of the gain, input and output impedances (single circuit) (one experiment)		
Unit -4	Wiring and testing for the performance of BJT-RC phase shift oscillator for fo $\geq$ 10 KHz.		
Unit -5	Testing for the performance of BJT-Hatley and colpitts oscillators for RF range fo $\geq$ 100KHz.		
Unit -6	Testing for the performance of BJT-crystal oscillators for fo $\geq$ 100KHz.		
Unit -7	Testing of diode clipping (single/Double ended) circuits for peak clipping, peak detection.		
Unit -8	Testing of clamping circuits: positive clamping/negative clamping.		
Unit -9	Testing of a transformer less class-B push pull power amplifier and determination of its conversion efficiency.		
Unit-10	Testing of half wave, full wave and bridge rectifier circuits with and without capacitor filter. Determination of ripple factor, regulation and efficiency.		
Unit-11	Verification of Thevinin's Theorem and maximum power transfer therem for DC circuit.		
Unit-12	Characteristics of Series and Parallel Resonant Circuits.		
Unit-13	Verification of Norton's theorem		
Unit-14	Verification of leads transistors.		

ELECTRONIC MEASUREMENT AND INSTRUMENTATION LAB

Subject Code 1621308	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Rationale

The study of this subject will help a student to gain the knowledge of working principles and operation of different electronic instruments (analog and digital). The practical work done in this subject will help to acquire skills in operation and testing of instruments as per their specifications.

Contents : Practical

LIST OF PRACTICALS:-		Hrs/week	Marks
Unit -1	Conversion of Galvanometer into Ammeter and Voltmeter.		
Unit -2	Calibration of Ammeter, Voltmeter and Wattmeter.		
Unit -3	Determination of Inductance, Capacitance using AC bridges.		
Unit -4	Use of AC potentiometer, chokes, resistance model.		
Unit -5	To observe the loading effect of a multi-meter while measuring voltage across a low resistance and high resistance.		
Unit -6	Measurement of voltage, frequency, time period and phase angle using Cathode Ray Oscilloscope (CRO).		
Unit -7	Measurement of time period, frequency,		
Unit -8	Measurement of rise, fall and delay times using a Cathode Ray Oscilloscope.		
Unit -9	Measurement of R, L and C using a LCR bridge/Universal bridge.		
	Total		

BASIC ELECTRONICS ENGINEERING - TW

Subject Code 1638309	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	Internal	:	10	
	—	—	03	External	:	20	

Contents : Term Work		Hrs/week	Marks
Unit -1	Forward & Reverse characteristics of diode		
Unit -2	Forward & Reverse characteristics of Zener diode		
Unit -3	Study of Rectifiers a] Half wave b] Full wave		
Unit -4	Study of filter circuits. a] Capacitor Filter b] Inductor filter.		
Unit -5	Input & output characteristics of transistor in CE mode		
Unit -6	Input & output characteristics of transistor in CB mode		
Unit -7	Characteristics of FET		
Unit -8	Characteristics of UJT		
Unit -9	Zener diode Regulator		
Unit -10	Transistor series and shunt regulator		
	Total		

Books:

Sl.No.	Author	Title	Publisher
01	N.N.Bhargava, D.C. Kulashreshtha, S.C. Gupta -TTTI Chandigharh	Basic Electronics & Linear Circuits	Tata McGraw Hill
02	Alberrt Malvino David J.Bates	Electronic Principles	Tata McGraw Hill
03	Allen. Mottershead	Electronic Devices & Components'	Prentice Hall of India
04	NIIT	Basic Electronics & Devices	Prentice Hall of India
05	Grob Bernard	Basic Electronics	Tata McGraw Hill
06	David J. Bell	Electronics Devices & Circuits	Prentice Hall of India
07	V.K.Mehta & Rohit Mehta	Principles of Electronics	S.Chand

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN ELECTRICAL ENGINEERING/ ELECTRICAL & ELECTRONICS ENGINEERING.

(Effective from Session 2016-17 Batch)

THEORY

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME							
			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	Credits
1.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Electrical Circuits and Network	1620302	03	03	10	20	70	100	28	40	03
3.	Electrical Measurements	1620303	03	03	10	20	70	100	28	40	03
4.	Electrical Power Generation	1620304	03	03	10	20	70	100	28	40	03
5.	Basic Electronics	1620305	03	03	10	20	70	100	28	40	03
		Total :-	**16**				**350**	**500**			

PRACTICAL

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME					
			Periods per Week	Hours of Exam.	Practical (ESE)		Total Marks (A+B)	Pass Marks in the Subject	Credits
					Internal(A)	External(B)			
6.	Electrical Circuits and Network Lab	1620306	02	03	15	35	50	20	01
7.	Electrical Measurements Lab	1620307	02	03	15	35	50	20	01
8.	Basic Electronics Lab	1620308	02	03	15	35	50	20	01
9.	Electrical Workshop Practice	1620309	03	03	15	35	50	20	02
		Total :-	**09**				**200**		

TERM WORK

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME				
			Periods per Week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	Credits
10.	Elements of Mechanical & Civil Engineering (TW)	1620310	04	07	18	25	10	02
11.	Professional Practices-III (TW)	1620311	04	07	18	25	10	02
		Total :-	**08**			**50**		
Total Periods per week Each of duration One Hour 33					Total Marks = **750**			**24**

APPLIED MATHEMATICS-I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code	Theory						Credits
1600301	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS :THEORY

	Name of Topics	Hrs/week	Marks
Unit -1	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems. 1.5 **Applications of definite integrals.** 1.5.1 Area under the curve. 1.5.2 Area between two curves. 1.5.3 Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l), (-l, l), (0, 2\pi), (-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**Numerical Methods** 5.1 **Solution of algebraic equations** Bisection method. Regularfalsi method. Newton – Raphson method. 5.2 **Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	**05** **05**	**07** **07**
	Total	**48**	**70**

Titles of the Book	**Name of Authors**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.
Rajendra Pal, S.N. Malik	Applied Mathematics	Foundation Publishing

ELECTRICAL CIRCUITS & NETWORK

(ELECTRICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
1620302	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS:THEORY

Name of the Topic		Hrs/week	Marks
Unit -1	**Review of Basic concepts of electrical Circuit** 1.1 Electric Circuit Elements R,L,C 1.2 Energy Sources 1.3 A.C. waveform and definition of various terms associated with it 1.4 Response of pure R, L, and C to AC supplies. Vector Representation of alternating quantity.	**06**	**04**
Unit -2	**Single phase AC Circuits** 2.1 Series AC circuits R-L, R-C and R-L-C circuits. Impedance, reactance, phasor diagram, impedance triangle, power factor, Average power, Apparent power, Reactive power, Power triangle (Numerical) 2.2 Series Resonance, quality factor (Numerical) 2.3 Parallel AC circuits R-L, R-C and R-L-C circuits. Admittance, Susceptance, Solution by admittance method, phasor diagram and complex Algebra method. (Numerical) Parallel resonance, quality factor. 2.4 Comparison of series and Parallel circuits.	**12**	**22**
Unit - 3	**Poly phase AC Circuits** 3.1 Generation of three phase e. m. f. 3.2 Phase sequence, polarity marking 3.3 Types of three-phase connections. 3.4 Concept of unbalanced load and balanced load. 3.5 Line, phase quantities and power in three phase system with balanced star and Delta connected load & their interrelationship 3.6 Advantages of polyphase circuits over single phase circuits	**10**	**16**
Unit - 4	**Principles of circuit Analysis (AC and DC circuits)** 1.1 Mesh analysis.(Numerical) 1.2 Node analysis with voltage current source .(Numericals) Star/delta & Delta/star transformations.(Simple Numericals)	**08**	**10**
Unit - 5	**Network Theorems (Statement, procedure, applications and areas of applications, Simple Numerical)** 5.1 Superposition Theorem 5.2 Thevenin's Theorem 5.3 Norton's Theorem 5.4 Source conversion /ideal voltage and current source 5.5 Maximum power transfer Theorem	**10**	**18**
	Total	**48**	**70**

Text /Reference Books:

Titles of the Book	Name of Authors	Name of the Publisher
Introductory circuit Analysis.	Boylested R.L.	Wheeler, New Delhi
Schaum online series Theory and problems of Electric circuits	Edminister	T. M. G. H. , Newyork
Circuit and network	A. Sudhakar	Tata McGraw Hill
Basic Electrical Engineering.	V.N. Mittle	Tata McGraw Hill
Electrical Technology Volume-I	B. L. Theraja	S. Chand & Co.
Electrical Circuits and Network	Umesh Kumar	Foundation Publishing

ELECTRICAL MEASUREMENTS
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
1620303	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS :THEORY

	Name of the Topic	Hours	Marks
Unit -1	**Fundamentals of Measurement** 1.1 Purpose of measurement and significance of measurement 1.2 Various effects of electricity employed in measuring instruments. 1.3 Desirable qualities of measuring instruments. 1.4 Classification of Instruments. 1.5 Types of errors 1.6 Different types of torque in Analog Instruments.	**05**	**08**
Unit – 2	**Measurement of Current and Voltage** 2.1 Construction and principle of PMMC, MI & Dynamometer type Instrument. 2.2 Production of torque :methods. 2.3 Principles of Voltage and Current measurement. 2.4 Range Extension of Ammeter and Voltmeter 2.5 Different Methods of range extension of Ammeter and Voltmeter. 2.6 Calibration of Ammeter and Voltmeter. 2.7 Instrument transformers (CT & PT)	**10**	**14**
Unit -3	**Measurement of Power** 3.1 Concept of power in A.C. Circuit 3.2 Principle and Construction of dynamometer type wattmeter. 3.3 Errors and their compensation. 3.4 Polyphase wattmeter. 3.5 Multiplying factor of wattmeter. 3.6 Measurements of power in 3 phase circuit for balanced and unbalanced load by one wattmeter method, two wattmeter method. 3.7 Effect of power factor variation on wattmeter readings in two wattmeter method. 3.8 Measurement of reactive power in three phase balance load by one wattmeter method and two wattmeter method. 3.9 Digital Wattmeter.	**10**	**14**
Unit -4	**Measurement of Electrical Energy** **4.1.** Concept of electrical energy. 4.2 Constructional feature & principle of working of single phase and three-phase induction type energy meter. 4.3 Different types of errors and their compensation. 4.4 Calibration of energy meter. 4.5 Electronic energy meter.	**07**	**10**
Unit -5	**Constructional features and working principles of other Meters** 5.1 Single phase and three phase Power Factor Meter(only dynamometer type). 5.2 Frequency meter (Weston and Ferro dynamic type). 5.3 Sychronoscope. 5.4 Phase sequence Indicator.(Rotating type only) 5.5 Clip-on-mmeter. 5.6 Q-meter.	**08**	**10**

Unit -6	**Measurement of Circuit Parameters** 6.1 Classification of Resistance, Low, Medium and High. 6.2 Methods of Measurements of Low, Medium and High. Resistance (Kelvin Double bridge, wheatstone bridge and Megger) 6.3 Measurement of Earth resistance- Earth tester (Analog & Digital) 6.4 Digital Multimeter. 6.5 Introduction to A.C. Bridges. 6.6 L.C.R. Meter.	**08**	**14**
	Total	**64**	**70**

Text/Reference Books:		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Electric & Electronic Measurement and Instrumentation	A.K. Sawhney	Dhanpatrai & Sons
Electronic Instrumentation & measurement Techniques	Copper & Heltrick	Prentice Hall of India
Instrumentation Devices and System	Rangan Mani & Sarma	Tata McGraw Hill
Electronic Instrumentation	Kalsi	Tata McGraw Hill
Industrial Instrumentation & control	S.K.Singh	Tata McGraw Hill
Electrical Measurement & measuring Instrument	Golding	Wheeler
Electrical Measurement & measuring Instrument, Delhi.	N.V.Suryanaryan	S. Chand & Co.
Fundamental of Electrical Easurement	C.T. Baldwin	--
Electrical Measurements	S.N. Bhargava	Foundation Publishing

ELECTRICAL POWER GENERATION

(ELECTRICAL ENGINEERING GROUP)

Subject Code 1620304	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS: THEORY

	Name of the topic	Hours	Marks
Unit -1	**Basics of Power Generation** 1.1 Importance of electrical power in day today life 1.2 Various sources of energy 1.3 Overview of method of electrical power generation 1.4 Comparison of Sources of power.	**02**	**06**
Unit – 2	**Thermal Power Stations** 2.1 List of thermal power stations in the state with their capacities 2.2 Selection of site for thermal power stations. 2.3 Main parts , block diagram of thermal power stations. 2.4 Quality of fuel and its effect on quality of power generation 2.5 Operation of following components: 2.5.1 Boiler 2.5.2 Economizer. 2.5.3 Air pre heater 2.5.4 Super-heaters & re-heaters. 2.5.5 Steam prime movers. 2.5.6 Condensers. 2.5.7 Spray ponds & cooling towers. (Block diagrams & description in brief)	**07**	**10**
Unit -3	**Nuclear Power Stations** 3.1 Block diagram and working of Nuclear Power Station 3.2 Construction and working of Nuclear Reactor 3. 3 Fuels used in Nuclear Power Station 3. 4 Economics of Nuclear Power Station 3. 5 List of Nuclear power stations in state & county with their capacities.	**05**	**06**
Unit -4	**Hydro Power Stations** 4.1 List of Hydro Power stations with their capacities & number of units in the state. 4.2 Selection of site and Classification 4.3 Layout of hydro Power stations 4.4 Types of Turbines & generators used 4.5 Selection of turbine and alternator according to water head and capacity	**05**	**08**
Unit -5	**Diesel Power Stations** 5.1 Applications of diesel power stations 5.2 Diesel electric plant- Main components (Block Diagram) 5.3 Different types of engines & their working. Operation, maintenance & trouble shooting chart of diesel plant.	**05**	**07**

Unit -6	**Non-Conventional Energy Sources** 6.1 Types of non-conventional energy sources. 6.2 Solar Energy 6.2.1 Potential of solar energy. 6.2.2 Photovoltaic effect – for solar energy. 6.2.3 Construction & materials used in solar photo-voltaic cells. 6.2.4 Working & applications of solar energy. 6.3 Wind Energy. 6.3.1 Selection of site for wind mills 6.3.2 Principle of electricity generation with the help of wind energy 6.3.3 Block diagram and working of Wind energy plant and its applications 6.3.4 List of major wind farms in the state with their approximate capacities 6.4 Bio-mass & Bio-gas energy. 6.4.1 Composition of Bio-gas & its calorific value. 6.4.2 Traditional; non-traditional Biogas plants 6.4.3 Bio-mass based power generation plants & their capacities. 6.5 Geo-thermal Energy and its Applications. 6.6 Ocean energy. 6.6.1 Ocean thermal Electric conversion. 6.6.2 Energy from tides 6.6.3 Site requirements 6.6.4 Advantages and Limitations of Tidal power generation. 6.7 Fuel Cells: Construction, working and applications	**09**	**14**
Unit -7	**Economics Of Power Generation** 7.1 Terms commonly used in system operation: connected load, firm power, cold reserve, hot reserve, spinning reserve. 7.2 Terms used in system operation such as Load-curve, load duration curve, integrated duration curve. (Simple numerical based on plotting above curves.) 7.3 Factors affecting the cost of Generation: Average demand, Maximum demand, plant capacity factor& plant use factor, Diversity factor& load factor. (Simple numerical based on above) 7.4 Choice of Size & number of Generator Units, difficulties involved in it.	**09**	**10**
Unit -8	**Interconnected Power Systems** 8.1 Combined operation of power stations. 8.2 Comparison of various types of power stations 8.3 Advantages of Interconnection. 8.4 Base load & peak loads, load allocation among various types of power stations 8.5 Economic loading of interconnected stations. 8.6 Load sharing and transfer of load between power stations. 8.7 Inter connection of power stations at state and national level	**06**	**09**
	Total	**48**	**70**

Text /Reference Books:-

Titles of the Book	**Name of Authors**	**Name of the Publisher**
Electrical Power	Dr. S. L. Uppal	Khanna Publishers.
A course in Electrical Power	Soni – Gupta - Bhatnagar	Dhanpatrai & Sons
Non conventional Energy sources	Prof. G. D. Rai	Khanna, New Delhi
A course in Power Plant Engineering	Prof. Arrora and Dr. V. M. Domkundwar	Dhanpatrai & Sons
Electrical Power Generation	P.K. Banarjee	Foundation Publishing

BASIC ELECTRONICS
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
1620305	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS: THEORY

	Name of the topic	Hrs/week	Marks
Unit -1	**1.1 Semiconductor diode** 1.1.1 Rectifying diode Review of P-type and N-type semiconductor Junction of P-type & N-type i.e. PN junction Barrier voltage, depletion region, Junction Capacitance. 1.1.2 Forward biased & reversed biased junction Diode symbol , circuit diagram for characteristics (forward & reversed) Characteristics of PN junction diode 1.1.3 Specifications:- Forward voltage drop , Reversed saturation current, maximum forward current , power dissipation Package view of diodes of different power ratings (to be shown during practical hours) **1.2 Zener Diode:** Construction (reference to doping level) 1.2.1 Symbol , circuit diagram for characteristics (forward & reversed) 1.2.1 Avalanche & zener breakdown 1.2.3 Specifications:- Zener voltage, power dissipation, break over current, dynamic resistance & maximum reverse current. **1.3 Special Diodes:** Point contact diode , Schottky diode **1.4 Optical Diodes:** LED, IRLED, photo diode, laser diode. Symbol, operating principle & applications of each.	**12**	**14**
Unit -2	**2.1 Rectifiers & Filters** Need of rectifier, definition 2.1.1 Types of rectifier – Half wave rectifier, Full wave rectifier (Bridge & centre tapped) 2.1.2 Circuit operation: Input/output waveforms for voltage & Current, Average (dc) value of current & voltage (no derivation), Ripple , ripple factor , ripple frequency , PIV of diode used , transformer utilization factor , efficiency of rectifier. 2.1.3 Comparison of three types of rectifier 2.1.4 Need of filters Types of filters A] shunt capacitor B] Series inductor C] LC filter D] π filter 2.1.5 Circuit operation, dc output voltage , ripple factor (formula) , ripple frequency , Dependence of ripple factor on load . Input/output waveforms , limitations & advantages	**10**	**10**

Unit - 3	**Transistors** **3.1 Bipolar Junction Transistor(BJT)** Introduction , Basic concept 3.1.1 Types of transistors , structure & symbols Transistor operation Conventional current flow , relation between different currents in transistor 3.1.2 Transistor amplifying action Transistor configurations:- CB , CE & CC Circuit diagram to find the characteristics Input / output characteristics 3.1.3 Transistor parameters- input resistance, output resistance, α, β & relation between them. Comparison between three configurations 3.1.4 Transistor specifications: $V_{CE\ Sat}$, $I_{C\ Max}$, V_{CEO} , I_{CEO}, α , β $V_{CE\ Breakdown}$, Power dissipation (to be explained during practical using data sheets) 3.1.5 Testing of transistor using multimeter (To be shown during practical) 3.1.6 Construction, working principle, characteristics of Photo Transistor Introduction to opto-coupler **3.2 Unipolar Transistor (JFET)** Construction, working principle & characteristics. **3.3 Unijunction Transistor(UJT**) Construction, working principle& characteristics.	**12**	**14**
Unit - 4	**Biasing of BJT** 4.1Introduction , need of biasing , concept of dc load line, selection of operating point (Q point) , need of stabilization of Q point, (thermal run away concept) 4.2 Types of biasing circuits A] Fixed biased circuit B] Base biased with emitter feed back C] Base biased with collector feed back D] Voltage divider E] Emitter biased 4.3 Circuit operation of each circuit. 4.4 Introduction to two port n/w Hybrid model for CE	**10**	**10**
Unit - 5	**Regulated Power Supply** **5.1 What is a regulator?** 5.1.1 Need of regulators , voltage regulation factor 5.1.2 Concept of load regulation & line regulation 5.1.3 Basic zener diode voltage regulator **5.2 Linear Regulators** 5.2.1 Basic block diagram of dc power supply 5.2.2 Transistorised series & shunt regulator – circuit diagram	**08**	**08**

Unit - 6	**Small Signal Amplifiers** 6.1 Concept of amplification 6.1.1 Small signal amplifier using BJT 6.1.2 Graphical analysis 6.1.3 Determination of current , voltage & power gain , Input & output resistance , phase shift between input & output. 6.1.4 AC Load Line 6.1.5 Function of input & output coupling capacitors & criteria for the value selection. 6.1.6 Function of emitter bypass capacitor & its value selection. 6.2 AC equivalent circuit of transistor CE amplifier. 6.3 Single stage CE amplifier with voltage divider bias. Its explanation. 6.4 Frequency response of single stage CE Amplifier, Bel, Decibel unit. Bandwidth & its significance. Effect of coupling & emitter bypass capacitor on bandwidth. 6.5 Introduction to CB & CC amplifier & List of applications. 6.6 Cascade Amplifiers (Multistage Amplifier) 6.6.1 Need of Multistage Amplifiers, Gain of amplifier. 6.6.2 Types of amplifier coupling – RC, transformer & Direct coupling. 6.6.3 Two stage amplifier circuit diagram, working, frequency Response, merits & demerits & applications of each.	**12**	**14**
	Total	**64**	**70**

Titles of the Book	**Name of Authors**	**Name of the Publisher**
Basic Electronics & Linear Circuits	N.N.Bhargava, D.C. Kulashreshtha, S.C. Gupta – TTTI Chandigharh	Tata McGraw Hill
Electronic Principles	Alberrt Malvino David J.Bates	Tata McGraw Hill
Electronic Devices & Components'	Allen. Mottershead	Prentice Hall of India
Basic Electronics &Devices	NIIT	Prentice Hall of India
Basic Electronics	Grob Bernard	Tata McGraw Hill
Electronics Devices & Circuits	David J. Bell	Prentice Hall of India
Basic Electronics	Amit Kumar, D.P. Verma	Foundation Publishing

ELECTRICAL CIRCUITS AND NETWORK LAB

(ELECTRICAL ENGINEERING GROUP)

Subject Code 1620306	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS: PRACTICAL

Skills to be developed:

Intellectual Skills:

1. Interpret results
2. Calculate values of various components for given circuits
3. Select instruments

Motor Skills:

1. Connect the instruments properly.
2. Take accurate readings.
3. Draw phasor diagrams and graphs.

List of Practical:

1) To observe A.C. waveform on C.R.O.and calculates average & R.M.S. Values, frequency, Time Periods.
2) To determine impedance & Plot the phasor diagram of R-L series circuit.
3) To determine the current and P.F. of R.C. series circuit.
4) To determine the current and P.F. of R.L.C. series circuit.
5) To determine the current and P.F. in R.L. Parallel circuit.
6) To determine the current and P.F. in R.C. Parallel circuit.
7) To determine the current and P.F. in R.L.C. Parallel circuit.
8) To verify the line and phase values of voltage & current in star connected balanced load & Compare with practical situation.
9) To verify the line and phase values of voltage & Current in delta connected balanced load & Compare with practical situation.
10) To verify the superposition theorem applicable to D.C.& A.C. circuit.
11) To verify Thevenins theorem applicable to D.C.& A.C. circuit
12) To verify Norton's theorem applicable to D.C.& A.C. circuit
13) To verify the maximum power transfer Theorem applicable to D.C. & A.C. circuit.
14) To verify conditions for Series and Parallel Resonance

LIST OF PRACTICE ORIENTED PROJECTS:

1) To observe Response of R; L; and C to A.C. supply. Observe the current and voltage wave forms on C. R. O. and determine magnitude and phase angle of voltage and current.
2) To obtain Resonance in R-L-C series circuit and study the quality factor and bandwidth. Give applications
   of series resonance circuit and Draw the curve showing variation of R,XL,XC,I with F.

To verify KCL, KVL, Superposition theorem, Thevenin's theorem and maximum power transfer theorem applicable to A.C. circuits.

ELECTRICAL MEASUREMENTS LAB
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Practical						Credits
1620307	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS: PRACTICAL

Skills to be developed:

Intellectual Skills:

1. Identification of instruments
2. Selection of instruments and equipment for measurement

Motor Skills:

1. Accuracy in measurement
2. Making proper connections

List of Practicals:

1. Measurement of Current and Voltages by Low range ammeter and voltmeter respectively with shunt and multiplier.
2. Measurement of Current and Voltages by Low range ammeter and voltmeter respectively by Using Current Transformer and potential Transformer.
3. Measurement of active and reactive power in three phase balanced load by single wattmeter method.
4. Measurement of active and reactive power in three phase balanced load by two wattmeter method and observe the effect of Power Factor variation on Wattmeter reading.
5. Calibration of Energy meter at various power factor by standard energy meter.
6. Measurement of energy in single phase & three phase balanced load using Electronic Energy Meter.
7. Measurement of Low resistance by Kelvin's Double Bridge.
8. Measurement of Medium resistance by Wheatstone bridge.
9. Measurement of Insulation Resistance by Megger.
10. a) Measurement of Resistance, Voltage, Current, Voltage, Current in A.C & D. C. Circuit by using digital multimeter.
    b) Measurement of A.C. Current by Clip-on ammeter
11. Measurement of Earth Resistance by Earth Tester.
12. Measurement of Circuit Parameters by LCR meter.
13. Measurement of power factor of single phase and three phase load by PF meter and verifying through I, V and P measurement.
14. Observe the phase sequence of three phase circuit Using Rotating type phase sequence Indicator.
15. Measurement of Frequency of A.C. Supply Using Weston or Ferro dynamic type Frequency meter.

BASIC ELECTRONICS LAB
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Practical						Credits
1620308	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS: PRACTICAL

Skills to be developed:

Intellectual Skills:

1. Identification and selection of components.
2. Interpretation of circuits.
3. Understand working of Regulated dc power supply.

Motor skills:

1. Ability to draw the circuits.
2. Ability to measure various parameters.
3. Ability to test the components using multimeter.
4. Follow standard test procedures.

List of Practical:

1] To plot Forward & Reverse biased characteristics of diode.

2] To plot Forward & Reverse biased characteristics of Zener diode.

3] To Study the Rectifiers a] Half wave b] Full wave & draw i/p & o/p wave forms.

4] To Study the filter circuits. a] Capacitor Filter b] Inductor filter & draw wave forms.

5] To Plot Input & output characteristics of transistor in CE mode.

6] To Plot Input & output characteristics of transistor in CB mode.

7] To Plot Characteristics of FET.

8] To Plot Characteristics of UJT.

9] To study the Zener Diode as Regulator& calculate load regulation.

10] To study Transistor series and shunt regulator.

11] To study Single stage common emitter amplifier & plot its frequency response.

12] To study Two stage RC coupled amplifier & plot its Frequency response.

ELECTRICAL WORKSHOP PRACTICE

(ELECTRICAL ENGINEERING GROUP)

Subject Code 1620309	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	03	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS: PRACTICAL

Note: All the experiments will be performed by using casing capping or conduit wiring, prepare schedule of material for each wiring work.

1. Identify, dismantle, sketch & assemble different Electrical accessories — 10 Hrs.
2. Wire up one lamp controlled by one SPT switch — 06 Hrs.
3. Wire up two lamps controlled by two independent SPT switches — 06 Hrs.
4. Wire up a call bell/ buzzer — 06 Hrs.
5. Wire up four power sockets controlled independently — 06 Hrs.
6. Wire up a test board — 06 Hrs.
7. Wire lighting circuit for a go down wiring — 08 Hrs.
8. Prepare & mount the energy meter board — 08 Hrs.
9. Wire up consumer's main board with ICDP & distribution fuse box & 08 Hrs. With LCB / MCB

ELEMENTS OF MECHANICAL & CIVIL ENGINEERING -TW

(ELECTRICAL ENGINEERING GROUP)

Subject Code 1620310	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	02
	L	T	P/S	Internal	:	07	
	—	—	04	External	:	18	

Contents :Term Work		Hrs/week
	Name of the Topic	**Hours**
Unit -1	**Boilers, Steam Turbines, Steam Engines:** 1.1 Construction & working of Cochran &Babcock & Wilcox Boilers. 1.2 Construction & working of impulse & reaction turbines. 1.3 Construction & working of steam engine 1.4 Reasons for Malfunctioning, and remedial measures for boilers and steam turbines	**04**
Unit – 2	**I.C. Engines:** 2.1 Construction & working of two stroke & our stroke petrol & diesel engines 2.2 Reasons for Malfunctioning, and remedial measures for I. C. Engines	**04**
Unit -3	**Air Compressors:** 3.1 Uses of compressed air. 3.2 Construction & working of single stage & two stage reciprocating compressor. 3.3 Screw compressor & centrifugal compressor- construction, working & applications. 3.4 Reasons for Malfunctioning and remedial measures	**03**
Unit -4	**Pumps:** 4,1 Types of Pumps and their working 4.2 Reasons for malfunctioning and remedial measures	**03**
Unit -5	**Foundation for Machines:** 5.1 Need for foundation 5.2 Material required for foundation 5.3 Foundation Bolts: Types and Sizes 5.4 Criteria for Design of foundation	**02**
	Total	**16**

List of Term Work:-

1. Trace the flue gas path and water – steam circuit with help of boiler model.
2. Identify the possible location of fault/malfunctioning and decide how to repair them
3. Dismantling & assembly of Petrol/Diesel Engine.
4. Trial on single / multi cylinder petrol/ diesel engine.
5. Observe operation of Air Compressor and identify locations of fault and decide how to repair
6. Observe operation of a Centrifugal Pump and locations of fault and decide how to repair
7. Visit a thermal power station and observe functioning of Steam Turbine
8. Using Maintenance manuals prepare a maintenance schedule for a centrifugal Pump or Compressor

Text /Reference Books:

Titles of the Book	Name of Authors	Name of the Publisher
A Course in Thermal Engineering	P.L. Ballaney	Khanna Publishers
A test book of Thermal Engineering	R. S. Khurmi	S. Chand & Co. Ltd.
Thermal Engineering	R. K. Rajput	Laxmi Publication, New Delhi
Heat Engine Vol. I & II	Patel, Karmchandani	Achrya publication
Engineering Thermodynamics	P.K. Nag	Tata McGraw Hill
Elements of Mechanical & Civil Engineering	Deepak Singh	Foundation Publishing

PROFESSIONAL PRACTICES III - TW
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Term Work						Credits
1620311	No. of Periods Per Week			Full Marks	:	25	02
	L	T	P/S	Internal	:	07	
	—	—	04	External	:	18	

Contents :Term Work		Hrs/week
	Name of the Activity	**Hours**
Unit -1	**Field Visits** Structured field visits (minimum three) be arranged and report of the same should be submitted by the student, as part of the term work. The field visits may be arranged in the following areas / industries : i) Visit to Electric Power Generation Station ii) Visit to Wind Mill and/or Hybrid Power Station of Wind and Solar iii) Multi Storied Building for Power Distribution Scheme iv) Visit to a Multi Plex v) Visit to a Captive Power Plant (Thermal)	**28**
Unit – 2	**Lectures by Professional / Industrial Expert to be organized from of the following areas (any four)** i) Modern Techniques in Power Generation ii) Role of Power Factor Improvement a tool in reducing cost of generation iii) New trends for built environment iv) Software for drafting v) Digital Metering vi) Various government schemes such as EGS, vii) Industrial hygiene. viii) Hydro power generation ix) Special purpose wiring in chemical/hazardous industries	**16**
Unit -3	**Seminar :** Any one seminar on the topics suggested below: Students (Group of 4 to 5 students) has to search /collect information about the topic through literature survey, visits and discussions with experts/concerned persons: Students will have to submit a report of about 10 pages and deliver a seminar for 10 minutes. 1. Water supply schemes/Problems of drinking water in rural area 2. Role of Traffic Signals in smooth flow of vehicles 3. Gram Swaraj Yojana 4. Schemes of power of generation in coming five years 5. Impact of load shading on rural population 6. Any other suitable topic	**16**
Unit -4	**Market Survey:** A group of four students is expected to collect information from the market regarding specifications and cost of any four items, used in Electrical wiring for domestic, commercial and industrial use	**10**
	Total	**70**

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN **ELECTRONICS ENGINEERING**

(Effective from Session 2016-17 Batch)

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.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C '	1600302	03	03	10	20	70	100	28	40	03
3.	Analog Electronics	1621303	03	03	10	20	70	100	28	40	03
4.	Electronics Drawing & Drafting	1621304	03	04	10	20	70	100	28	40	03
5.	Electronics Measurement-I	1621305	03	03	10	20	70	100	28	40	03
		Total:-	**16**				**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.	Computer Programming Through 'C' Lab.	1600306	06	03	15	35	50	20	03
7.	Analog Electronics Lab.	1621307	04	03	15	35	50	20	02
8.	Electronic Measurement and Instrumentation Lab.	1621308	04	03	15	35	50	20	02
	Total:-		**14**				**150**		

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.	Electronics Drawing & Drafting (TW)	1621309	03	30	70	100	40	02
	Total:-		**03**			**100**		**24**
Total Periods per week Each of duration one Hours = 33						**Total Marks = 750**		

APPLIED MATHEMATICS -I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code 1600301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents :Theory		Hrs/week	Marks
Unit -1	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems. 1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area between two curves. 1.5.3 Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l), (-l, l), (0, 2\pi), (-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**Numerical Methods** 5.1 Solution of algebraic equations Bisection method. Regularfalsi method. Newton – Raphson method. 5.2 **Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	**05** **05**	**07** **07**
	Total	**48**	**70**

Text /Reference Books:		
Name of Authors	**Titles of the Book**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

Contents : Theory			Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		[03]	
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		[08]	
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		[08]	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		[07]	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Perator.		
	04.03	If statement, it-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		[07]	

Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.	[07]	
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	[04]	
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	[06]	
	Total	**[50]**	

Text / Reference Books -

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India. - R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill. - E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education. - A. Kamthane
5. Programming with C. First Edition, 1997, Tara McGraw hill. - Venugopla and Prasad
6. The C Programming Language, Second Edition, 2001, Prentice Hall of India. - B. W. Kernighan & D.M. Ritchie
7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - R. Subburaj
8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami
9. Elements of C, Khanna Publishers, Delhi. - M. H. Lewin
10. Programming in C. - Stephen G. Kochan
11. Programming in C, khanna Publishers, Delhi. - B. P. Mahapatra
12. Let us C, BPB Publication, New Delhi. - Yashwant kanetkar
13. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa
14. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
15. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth
16. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
17. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
18. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

ANALOG ELECTRONICS

Subject Code 1621303	Theory			No of Period in one session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Contents : Theory		Hrs/week	Mark
Unit -1	**IDEAL AMPLIFIERS:** Ideal voltage amplifier, ideal current amplifier, ideal trans resistance amplifiers and ideal trans conductance amplifier. Distortions, amplitude distortion, harmonic distortion, frequency distortions and phase distortions.	[06]	
Unit -2	**TRANSISTOR AMPLIFIERS:** Multistage transistor amplifier, its gain, frequency response, decibel gain, bandwidth. Small signal amplifiers, large signal amplifiers, difference between voltage amplifier and power amplifier, classification of power amplifier, class A power amplifier, Push-Pull amplifier, multistage frequency response.	[14]	
Unit -3	**FEED BACK AMPLIFIERS AND OSCILLATORS:** Feed back concept negative and positive feedback, voltage/current, series/shunt feedback. Berkhausian criterion colpitts. Hartley's, phase shift, wein bridge and crystal oscillator.	[08]	
Unit -4	**HYBRID PARAMETERS:** Determaination of h-parameters, h-parameter equivalent circuit, performance of a linear circuit in h-parameters. The h-parameters of a transistor, Nomenclature for transistor h-parameters. Approximate hybrid formulae for transistor amplifier. Limitations of h-parameters.	[14]	
Unit -5	**POWER AMPLIFIERS:** Class-A, class-AB, class-B and Class-C, conversions efficiency Tuned amplifiers	[08]	
	Total	**50**	

Text / Reference Books -

1.	Electronics	-	Miliman and Halkias, Mc GRAW HILL
2.	Principle of electronics	-	V.K.Mehta & S.Chand.

ELECTRONICS DRAWING AND DRAFTING

Subject Code 1621304	Theory			No of Period in one session : 120			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale

The drawing part is important in all fields of Engineering and Electronics and Communications Engineering is not an exception.

Objectives

Learn and practice to distinguish and draw the various types of components, their symbols, block diagrams, circuit diagrams, Line diagrams, Logic diagrams, sketch and pictorial views, PCBs drawing and drafting neatly and properly.

The broad main topics to be covered are:

SL	Units	Periods
1.	Symbols	07
2.	Construction views of commonly used component and devices	12
3.	Block Diagrams	16
4.	Circuit Diagrams	20
5.	Logic Diagrams	15
6.	Outline Drawing	10
7.	Sketch and Pictorial views	05
8.	Exploded views	06
9.	Wiring Diagram	12
10.	PCB Drawing	12
11.	Nomography	05
	Total	**120**

Contents : Theory		Hrs/week	Marks
Unit -1	**Symbols** 01.01 Symbols and references of Common types of active and passive devices. (min. 2 sheets)	[07]	
Unit -2	**Construction view of commonly used components and devices - showing all mechanical and electrical parts with labeling.** 02.01 Relays. 02.02 Microphones (min. 3 sheets). 02.03 Speakers. 02.04 Microphone. 02.05 Trimmers. 02.06 Condenser.	[13]	
Unit -3	**Block Diagrams** 03.01 Block Diagrams. 03.02 System Diagrams (min. 3 sheets). 03.03 Sub system diagram. 03.04 General layout (A. M. Transmitter , A. M. Receiver, F. M. Transmitter, F. M. Receiver, T. V. Transmitter, Computer, Calculator etc.)	[16]	
Unit -4	**Circuit Diagrams** 04.01 Simple circuits showing interconnections. 04.02 Amplifiers. 04.03 Coupled Amplifiers. 04.04 Large Signal Amplifier. (3 sheets) 04.05 Multivibrators (3 sheets) 04.06 Multimeters 04.07 Radio Receiver. 04.08 TV Receiver.	[20]	

Unit -5	**Logic Diagrams** 05.01 Elements of Logic Diagram. 05.02 Symbols. 05.03 General Layout (2 Sheets) 05.04 Truth Tables. 05.05 Line Work and Labeling (Gates, Shift Registers, Counters, Calculators, A/D and D/A Convertor, Multiplexer, de-Multiplexer, Adder, Substractor).	[16]	
Unit -6	**Outline Drawing** 06.01 Outlining and Pin Configuration of ICs. 06.02 Semiconductor Devices. 06.03 Electron Toys. 06.04 Speakers (1 Sheet). 06.05 Parts of Electric Machine and winding of Stator and Rotor.	[10]	
Unit -7	**Sketch and Pictorial Views** 07.01 Sketches and pictorial views of common devices and mechanical parts. (1 sheet)	[06]	
Unit -8	**Wiring Diagram** 09.01 Wiring Diagram. 09.02 Preparation of Layouts. 09.03 Wire Folds. 09.04 Representation of Joints in different ways. - (1 Sheet)	[13]	
Unit -9	**PCB Drawing** 10.01 Drawing documents for PCB. 10.02 Schematic Diagram. 10.03 Art Work. 10.04 Stencil Drawing.	[13]	
Unit -11	**Nomography** 11.01 Introduction. 11.02 Nomography of different electrical variations in realistic circuits. - (1 Sheet)	[06]	
	Total	**120**	

ELECTRONIC MEASUREMENT - I

Subject Code 1621305	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale

Measurements are essential in every sphere. The subjects of Electronics and Tele-Communication Engineering are inseparably linked. Studies of Electrical and Electronic measuring instruments are incorporated in two papers, Paper-I and Paper-II.

Objectives

This paper mainly deals with the measurement of Current, Voltage, Power, Frequency and Phase beside the measurement of passive elements. The students are expected to be familiar with the principle, construction and uses of instruments utilized for these purposes.

SL	Topics	Periods
1.	Characteristics of Instruments and possible errors.	02
2.	Galvanometers	04
3.	Ammeters, Voltmeters and Ohm Meters	13
4.	Instruments Transformers	04
5.	Power Measurement	04
6.	Phase and Frequency Measurement	05
7.	Resistance Measurement	05
8.	Potentiometers	04
9.	DC and AC Bridges	04
10.	Cathode Ray Oscilloscope	05
	Total	**50**

Contents : Theory		Hrs/week	Marks
Unit -1	Characteristics of Instruments and possible errors: Introduction to value, accuracy, precision, sensitivity, resolution, noise, repeatability, instrument efficiency, scale range, linearity, dynamic systems, dynamic response, and loading. Types of errors.	02	
Unit -2	Galvanometers: D'Arranvol galvanometer, Torque equation, Dynamic behaviour, under damped, over damped and critically damped motion of galvanometer. sensitivity, choice of galvanometer, Flux meter.	04	
Unit -3	03 Ammeters, Voltmeters and Ohm meters: Types of instruments. 03.01 Permanent Magnet Moving coil Instruments: Torque equation, Multi-range Ammeter, Voltmeters, Sensitivity, Loading effects, Advantages and Disadvantages. 03.02 Ohm Meters: Series and Shunt type Multimeter, Megger, 03.03 Moving Iron Instruments: Operating Principle, Torque equation, Electro-dynamometer, ammeter and voltmeters. Errors. Use in AC and DC. Use of these at high frequency. 03.04 Introduction to Electrostatics. Induction type and Rectifier type Instruments.	13	
Unit -4	04 Instrument Transformer: Introduction to Instrument Transformer, Current Transformer and Potential Transformer in light of instrumentation.	04	
Unit -5	Power Measurement: Power Measurement using instrument transformer. Wattmeters of different types. 3-phase Wattmeters. Energy meters for DC and AC circuits.	04	
Unit -6	Phase and Frequency Measurement: Moving iron, Rotating field, Alternating field, Power Factor Meters. Types of Frequency Meters.	05	
Unit -7	Resistance Measurement: Classification of Resistance, Measurement of medium resistance using ammeter, voltmeter, substitution and bridges. Construction for low resistance, Methods for measurement of low resistance using ammeter and voltmeter, Kelvin double bridge Measurement of high resistances: Difficulties in measurement, guard circuits, Direct deflection, loss of charge and mega ohm bridges methods of measurement.	05	
Unit -8	Potentiometers: Classification, basic potentiometer, multi-range potentiometer, Application of potentiometers.	04	

Unit -9	DC and AC Bridges: Basic principle of bridges. Wheatstone Kelvin Bridge, Maxwell bridges, Hay's bridges, Anderson's bridge. Measurement of inductance and capacitance using bridges. Wien's bridge, Universal bridge, Bridge circuits for measurement of mutual inductance.	04	
Unit -10	Cathode Ray Oscilloscope: CRT, Deflection Systems, Synchronization, Time base circuits, Measurement of voltage, current, phase angle, frequency Lissajeous pattern etc.	05	
	Total	**50**	

Recommended Books

SL	**Title/Publisher**	**Author**
1.	Electronic Instrument and Measurement Techniques	Cooper
2.	Course in Electrical and Electronic Measurement and Instrumentation	A. K. Sawhny
3.	Electric and Electronics Measurement	Golding

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code 1600306	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
				External	:	35	

Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Eight experiments to be performed in the laboratory:

Contents : Practical		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	12	
Unit-2	Programming exercise on case Control Statement.	12	
Unit-3	Programming exercise on Decision Control Statement.	12	
Unit-4	Programming exercise on looping.	12	
Unit-5	Programming exercise on recursion technique.	12	
Unit-6	Programming exercise on Structure.	12	
Unit-7	Programs on array implementation.	12	

Text / Reference Books -

1.	How to solve it by Computer, Prentice Hall of India, 1992.	-	R.G. Dromey.
2.	The C Programming Language, Prentice Hall of India, 1989.	-	B.W. Kernighan & D.M. Ritchie.
3.	The C Programming Language, Prentice Hall of India, 1989.	-	Cooper, Mullish
4.	Application Programming in C. Macmillain International editions, 1990.	-	Richa'd Johnson- Baugh & Martin Kalin
5.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
6.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth.
7.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
8.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
9.	Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi	-	R. Subburaj
10.	Programming with C language, Tata McGraw Hill, New Delhi.	-	C. Balaguruswami
11.	Elements of C, Khanna Publishers. Delhi	-	M. H. Lewin
12.	Programming in C	-	Stephan G. Kochan.
13.	Programming in C, Khanna Publishers. New Delhi	-	B.P. Mahapatra
14.	Let us C, BPB Publication. New Delhi	-	Yashwant Kanetkar
15.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa

ANALOG ELECTRONICS LAB.

Subject Code 1621307	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Contents : Practical			
Unit -1	Wiring of RC coupled single stage FET amplifier and determination of the gain-firequency response, input and output impedances.	**Hrs/week**	**Marks**
Unit -2	Wiring of RC coupled single stage BJT amplifier and determination of the gain-frequency response, input and output impedances.		
Unit -3	Wiring of BJT Darlington Emitter follower with and without bootstrapping and determination of the gain, input and output impedances (single circuit) (one experiment)		
Unit -4	Wiring and testing for the performance of BJT-RC phase shift oscillator for fo $\geq$ 10 KHz.		
Unit -5	Testing for the performance of BJT-Hatley and colpitts oscillators for RF range fo $\geq$ 100KHz.		
Unit -6	Testing for the performance of BJT-crystal oscillators for fo $\geq$ 100KHz.		
Unit -7	Testing of diode clipping (single/Double ended) circuits for peak clipping, peak detection.		
Unit -8	Testing of clamping circuits: positive clamping/negative clamping.		
Unit -9	Testing of a transformer less class-B push pull power amplifier and determination of its conversion efficiency.		
Unit-10	Testing of half wave, full wave and bridge rectifier circuits with and without capacitor filter. Determination of ripple factor, regulation and efficiency.		
Unit-11	Verification of Thevinin's Theorem and maximum power transfer therem for DC circuit.		
Unit-12	Characteristics of Series and Parallel Resonant Circuits.		

ELECTRONIC MEASUREMENT AND INSTRUMENTATION LAB

Subject Code 1621308	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Rationale

The study of this subject will help a student to gain the knowledge of working principles and operation of different electronic instruments (analog and digital). The practical work done in this subject will help to acquire skills in operation and testing of instruments as per their specifications.

Contents : Practical			
Unit -1	Conversion of Galvanometer into Ammeter and Voltmeter.	**Hrs/week**	**Marks**
Unit -2	Calibration of Ammeter, Voltmeter and Wattmeter.		
Unit -3	Determination of Inductance, Capacitance using AC bridges.		
Unit -4	Use of AC potentiometer, chokes, resistance model.		
Unit -5	To observe the loading effect of a multi-meter while measuring voltage across a low resistance and high resistance.		
Unit -6	Measurement of voltage, frequency, time period and phase angle using Cathode Ray Oscilloscope (CRO).		
Unit -7	Measurement of time period, frequency,		
Unit -8	Measurement of rise, fall and delay times using a Cathode Ray Oscilloscope.		
Unit -9	Measurement of R, L and C using a LCR bridge/Universal bridge.		

ELECTRONICS DRAWING & DRAFTING -TW

Subject Code 1621309	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	Internal	:	30	02
	—	—	03	External	:	70	

Rationale

The drawing part is important in all fields of Engineering and Electronics and Communications Engineering is not an exception.

Objectives

Learn and practice to distinguish and draw the various types of components, their symbols, block diagrams, circuit diagrams, Line diagrams, Logic diagrams, sketch and pictorial views, PCBs drawing and drafting neatly and properly.

The broad main topics to be covered are:

SL	Topics	Periods
1.	Symbols	07
2.	Construction views of commonly used component and devices	12
3.	Block Diagrams	16
4.	Circuit Diagrams	20
5.	Logic Diagrams	15
6.	Outline Drawing	10
7.	Sketch and Pictorial views	05
8.	Exploded views	06
9.	Wiring Diagram	12
10.	PCB Drawing	12
11.	Nomography	05
	Total	**120**

CONTENTS : Term Work		Hrs/week	Marks
Unit -1	**Symbols.** 01.01 Symbols and references of Common types of active and passive devices. (min. 2 sheets)	[10]	
Unit -2	**Construction view of commonly used components and devices - showing all mechanical and electrical parts with labeling.** 02.01 Relays. 02.02 Microphones (min. 3 sheets). 02.03 Speakers. 02.04 Microphone. 02.05 Trimmers. 02.06 Condenser.	[14]	
Unit -3	**Block Diagrams** 03.01 Block Diagrams. 03.02 System Diagrams (min. 3 sheets). 03.03 Sub system diagram. 03.04 General layout (A. M. Transmitter, A. M. Receiver, F. M. Transmitter, F. M. Receiver, T. V. Transmitter, Computer, Calculator etc.)	[20]	
Unit -4	**Circuit Diagrams** 04.01 Simple circuits showing interconnections. 04.02 Amplifiers. 04.03 Coupled Amplifiers. 04.04 Large Signal Amplifier. (3 sheets) 04.05 Multivibrators (3 sheets) 04.06 Multimeters 04.07 Radio Receiver. 04.08 TV Receiver.	[20]	
Unit -5	05 Logic Diagrams 05.01 Elements of Logic Diagram. 05.02 Symbols. 05.03 Truth Tables. 05.04 Gates, Shift Registers, Counters, Calculators, A/D and D/A Convertor, Multiplexer, de-Multiplexer, Adder, Substractor.	[15]	
Unit -6	06 Outline Drawing 06.01 Outlining and Pin Configuration of ICs. 06.02 Semiconductor Devices. 06.03 Speakers (1 Sheet).	[10]	

Unit -7	07 07.01	Sketch and Pictorial Views Sketches and pictorial views of common devices and mechanical parts. (1 sheet)	[07]	
Unit -8	08 08.01 08.02 08.03 08.04	Wiring Diagram Wiring Diagram. Preparation of Layouts. Wire Folds. Representation of Joints in different ways. - (1 Sheet)	[12]	
Unit -9	9 9.01 9.02 9.03 9.04 9.05	PCB Drawing Drawing documents for PCB. Schematic Diagram. Art Work. Stencil Drawing. Marking Assembly Drawing (Pictorial and Part List).	[12]	
		Total	**120**	

Total Sheets: 20

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for
III SEMESTER DIPLOMA IN INSTRUMENTATION AND CONTROL ENGG.

(Effective from Session 2016-17 Batch)

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.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	1600302	03	03	10	20	70	100	28	40	03
3.	Instrumentation and Process Control	1640303	03	03	10	20	70	100	28	40	03
4.	Basic Electronics Engineering	1640304	03	03	10	20	70	100	28	40	03
5.	Digital Circuits	1640305	03	03	10	20	70	100	28	40	03
		Total:-	**16**				**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.	Computer Programming Through 'C' Lab.	1600306	06	03	15	35	50	20	03
7.	Electrical Measurements Lab.	1640307	04	03	15	35	50	20	02
8.	Electrical & Electronics Workshop Practice	1640308	04	03	15	35	50	20	02
		Total:-	**14**				**150**		

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.	Electrical & Electronics Workshop Practice (TW)	1640309	03	30	70	100	40	02
		Total:-	**03**			**100**		
Total Periods per week Each of duration One Hours			**= 33**			**Total Marks = 750**		**24**

APPLIED MATHEMATICS -I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code 1600301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents :Theory		Hrs/week	Marks
Unit -1	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems. 1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area between two curves. 1.5.3 Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l), (-l, l), (0, 2\pi), (-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**Numerical Methods** 5.1 Solution of algebraic equations Bisection method. Regularfalsi method. Newton – Raphson method. 5.2 **Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	**05** **05**	**07** **07**
	Total	**48**	**70**

Text /Reference Books:

Name of Authors	**Titles of the Book**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

Contents : Theory			Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		[03]	
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		[08]	
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		[08]	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		[07]	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Perator.		
	04.03	If statement, it-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		[07]	

Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.	**[07]**	
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	**[04]**	
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	**[06]**	
	Total		

Text / Reference Books -

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India. - R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill. - E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education. - A. Kamthane
5. Programming with C. First Edition, 1997, Tara McGraw hill. - Venugopla and Prasad
6. The C Programming Language, Second Edition, 2001, Prentice Hall of India. - B. W. Kernighan & D.M. Ritchie
7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - R. Subburaj
8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami
9. Elements of C, Khanna Publishers, Delhi. - M. H. Lewin
10. Programming in C. - Stephen G. Kochan
11. Programming in C, khanna Publishers, Delhi. - B. P. Mahapatra
12. Let us C, BPB Publication, New Delhi. - Yashwant kanetkar
13. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa
14. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
15. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth
16. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
17. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
18. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

INSTRUMENTATION AND PROCESS CONTROL

Subject Code 1640303	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale and objectives :-

The instrument part deals with the principles and functioning of measuring instruments. Instrumentation is the use of measuring instruments to monitor and control of process variables within a laboratory, production or manufacturing area. While sensors and values are important in all aspects of engineering they assume greatest importance in the study of automatic control which is termed process control when applied in process industries.

Contents : Theory		Hrs/week	Marks
Unit-1	**Measurement and Measuring systems :-** 1.1 Introduction 1.2 Measurement systems 1.3 Methods of measurement 1.4 Classification of Instruments 1.5 Functions of Instrument and measuring system 1.6 Instrument Automation 1.7 Applications of measurement Instrumentation	**[04]**	
Unit-2	**Characteristics of Instruments and measuring systems :-** 2.1 Introduction 2.2 Static characteristics 2.3 Loading effects	**[04]**	
Unit-3	**Errors in Measurement :-** 3.1 Absolute error 3.2 Relative error and percentage error 3.3 Resolution and sensitivity 3.4 Accuracy and Precision 3.5 Types of errors	**[03]**	
Unit-4	**Analog Ammeters and Voltmeters :-** 4.1 Introduction 4.2 Moving Iron and moving Coil instruments 4.3 Dynamometer Type Instruments 4.4 Induction Type instruments	**[06]**	
Unit-5	**Extension of Instrument Range :-** 5.1 Ammeter shunts 5.2 Multipliers for Electrostatic Voltmeters 5.3 Current Transformers 5.4 Potential Transformers	**[04]**	
Unit-6	**Measurement of Power and Energy:-** 6.1 Introduction 6.2 Dynamometer type wattmeter 6.3 Induction type wattmeter 6.4 Measurement of energy	**[06]**	

Unit-7	**Measurement of Resistance, Inductance and capacitance:-** 7.1 Introduction 7.2 Measurement of low, medium and high resistance 7.3 Measurement of Inductance : Maxwell, Anderson, Hay and Owen bridges 7.4 Measurement of Capacitance by scherring bridge	**[08]**	
Unit-8	**Basics of Process control:-** 8.1 Basic concepts of Process control 8.2 Open look and closed look control 8.3 Process Variables 8.4 Types of control and their applications. 8.5 Process leg, measurement lag, dead time 8.6 Concept of on-off, Proportonal, Integral and derivatic control.	**[05]**	
Unit-9	**Pneumatic Control elements:-** 9.1 Pneumatic pressure supply 9.2 Pneumatic actuators, relays, pressure switches contractors, etcs.	**[05]**	
Unit-10	**Hydraulic control element:-** 10.1 Introduction 10.2 Hydraulic actuators 10.3 Hydraulic valves	**[05]**	
	Total	**50**	

BOOKS :-

1.	Electrical & Electronics Measurements	- A.K.Stwney- Dhanpat rai & Co.
2.	A course in Electronic and Electrical Measurements and instrumentation	- J.B.Gupta- S.K.Kataria & sons.
3.	Advance instrumentation & control	M.F.Kureshi.
4.	Process control by Harrist	P – Mc Graw Hill.
5.	Automatic process control	- Eckman D.P, Willey Eastern.
6.	Automatic process control systems Concepts and Hardware	- Ronald P Hunta P.E., P.H.I, New Delhi.

BASIC ELECTRONICS ENGINEERING.

Subject Code 1640304	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale

Contents : Theory		Hrs/week	Marks
Unit -1	**REVIEW OF THE BASIC CONCEPTS** 1.1 Voltage source. 1.2 Current source. 1.3 Conversion of voltage source into current source and vice-versa. 1.4 Parallel division of current and series division of voltage. 1.5 KCL and KVL . 1.6 Thevnin's and Norton's theorem. 1.7 Star delta connection. 1.8 Simple Problem.	[2]	
Unit -2	**SEMICONDUCTOR PHYSICS AND DEVICES** 2.1 Semiconductor. 2.2 Energy band description of semiconductor, effect of temperature on semiconductor. 2.3 Intrinsic and Extrinsic semiconductor 2.4 N-type and P-type semiconductor 2.5 P-N junction diode 2.6 V-I characteristics of p-n junction diode. 2.7 Simphified model of diode. 2.8 Applications of diode. 2.9 Diode as a rectifier 2.10 Full wave bridge rectifier 2.11 Clipper 2.12 Clamper 2.13 Simple problems related to diodes.	[10]	
Unit -3	**SPECIAL PURPOSE DIODE** 3.1 LED 3.2 Photo diode 3.3 Characteristics and Application 3.4 Tunnel diode and Varactor diode and their applications. 3.5 Avalanche and Zener effect 3.6 Zener diode and its application as a voltage regulator 3.7 Simple problems related to these devices.	[6]	

Unit -4	**TRANSISTOR AND TRANSISTOR BIASING** 4.1 Basic concepts of transistor. 4.2 Transistor as an amplifier. 4.3 Transistor connection in CE, CB, CC 4.4 Input/output mode 4.5 Transistor load line analysis 4.6 Operating point, cut off and saturation region, transistor biasing 4.7 Stabilisation 4.8 Satability factor 4.9 Thermal runaway 4.10 Different methods of transistor biasing 4.11 Concepts of h-parameters 4.12 H-parameter of a transistor nomenclature etc. 4.13 (Simple problems related to dc load line) 4.14 Operating point 4.15 Biasing and h-parameters.	**[12]**	
Unit -5	**TRANSISTOR AMPLIFIERS** 5.1 Single stage transistor amplifier 5.2 Phase reversal 5.3 DC and AC equivalent circuits 5.4 Voltage gain of CE amplifier 5.5 Classification of amplifier 5.6 Cas cading and its effects	**[6]**	
Unit -6	**JUNCTION FIELD EFFECT TRANSISTOR**	**[6]**	
Unit -7	**NEGETIVE FEEDBACK AMPLIFIERS / OSCILLATOR / MULTIVIBRATORS :-** 7.1 Basic concept of feedback 7.2 Advantage in disadvantage of –ve feedback 7.3 Classification of –ve feedback (inbrief) 7.4 Barkhamsen's criteria 7.5 Oscillaters (RC phase oscillator) Multivibrators	**[8]**	
	Total	**50**	

Books Recommended:

1. Fundamentals of Electrical and Electronics Engg. - Dr. Sri Bhagwan Singh and Prof. S. Tarlok Singh (Foundation Publishing house, Patna)
2. Principles of Electronics - Prof. V.K. Mehta (S. Chand)
3. Integrated Electronics - Millimon & Kalkijas
4. Basic Electronics - J. B. Gupta
5. Electronics - Malvino & Leach
6. Basic Electronics - Mittal
7. Basic Electronics - B. K. Mehta

DIGITAL CIRCUITS

Subject Code 1640305	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale

The subject will help the students to learn concepts, facts, principle and working of digital circuits. These ideas can be used for designing sequential and combinational circuits. Which forms the basic of any electronics system.

Objective

The objective of this subject is to enable the students to know basic concepts of digital electronics. After undergoing this course the students will have the concepts and awareness of various arithmetic circuits, registers, counter design, multiplexers, demultiplexers, encoders and decoder etc.

Contents : Theory		Hrs/week	Marks
Unit -1	**INTRODUCTION :-** Digital and Analog systems. Number system : Binary, octal and hexadecimal. Conversion Binary codes : BCD, Gray and ASCII code Binary Addition and subtraction.	[4]	
Unit -2	**LOGIC GATES** :- AND, OR, NOT, NAND, EX-OR and EX-NOR gates. Truth table, symbol, logical expression and realization Universal gates.	[4]	
Unit -3	**ARITHMETIC OPERATION** :- Multiplication and division of two binary numbers. Complementary numbers, Addition and subtraction by one's Complement and Two's complement method.	[4]	
Unit -4	**BOOLEAN ALZEBRA :-** Logic operation Axioms and Laws of Boolean Alzebra De-Morgan's Theorem. Duality Reducing Boolean Expressions.	[4]	
Unit -5	**KARNAUGH MAP :-** Introduction The standard sum of Products The standard Product of sums. Minterm and Maxterm specifications of Logical Functions. Karnaugh map representation of Logical Functions. Karnaugh map representation of Two, three and Four variables. Simplification of Logical functions with karnaugh .map.	[8]	

Unit -6	**COMBINATIONAL CIRCUITS :-** Introduction Half Adder, Half Subtractor, Full Adder Decoder. Encoder. Multiplexer. Demultiplexer.	**[6]**	
Unit -7	**SEQUENTIAL CIRCUITS :-** S-R Latch NOR gate and NAND gates. Flip Flops – S-R, D,T,J- kand master slave. Conversion of FFS (S-R to J-K, S-R to D and J-K Ff to T & D FF) MOS FF'S Application of FF'S, Data Storage	**[8]**	
Unit -8	**REGISTERS :-** The shift Register, clocking. Serial-Parallel Data Transfer. Shift-Right- Shift. Left Registers.	**[8]**	
Unit -9	**COUNTERS :-** Introducetion. Asynchronous counters. Synehronous counters.	**[8]**	
Unit -10	**OP-AMP AND COMPARATOR :-** The operational Amplifier. Characteristies of an OP-AMP. CMRR The comparator. The Schmitt Trigger circuit.	**[6]**	
	Total	**60**	

BOOKS RECOMMENDED :-

1.	Digital integrated electronics	T.M.H	Taub/schilling
2.	Digital principles and Applications	T.M.H	Leach/Malvino/Saha
3.	Modern Digital electronics	T.M.H	JAIN
4.	Fundamentals of Digital electronics	P.H.I	A-Anand kumar
5.	Microelectronics	T.M.H.(1987)	J. Millman & A. Galel
6.	Digital logic & Computer design	P.H.I, New Delhi	A. Morries Merrow

Reference Books :-

1.	Modern digital electronics	T.M.H	JAW
2.	Fundamental of Digital electronics	P.H.I	A-Anand Kumar
3.	Electronic circuits and systems	T.M.H	Y.N. Bapat
4.	Digital electronic	T.M.H	V.K.Puri
5.	Liner integrated circuits	wiley estern 1991	D. Roy chowdhary& S.B.Jain
6.	Digital Electronics & Circuit		Malvino

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	
1600306	L	T	P/S	ESE	:	50	03
	—	—	06	Internal	:	15	
				External	:	35	

Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Eight experiments to be performed in the laboratory:

Contents : Practical		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	12	
Unit-2	Programming exercise on case Control Statement.	12	
Unit-3	Programming exercise on Decision Control Statement.	12	
Unit-4	Programming exercise on looping.	12	
Unit-5	Programming exercise on recursion technique.	12	
Unit-6	Programming exercise on Structure.	12	
Unit-7	Programs on array implementation.	12	

Text / Reference Books -

1. How to solve it by Computer, Prentice Hall of India, 1992. - R.G. Dromey.
2. The C Programming Language, Prentice Hall of India, 1989. - B.W. Kernighan & D.M. Ritchie.
3. The C Programming Language, Prentice Hall of India, 1989. - Cooper, Mullish
4. Application Programming in C. Macmillain International editions, 1990. - Richa'd Johnson- Baugh & Martin Kalin
5. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
6. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth.
7. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
8. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi - R. Subburaj
10. Programming with C language, Tata McGraw Hill, New Delhi. - C. Balaguruswami
11. Elements of C, Khanna Publishers. Delhi - M. H. Lewin
12. Programming in C - Stephan G. Kochan.
13. Programming in C, Khanna Publishers. New Delhi - B.P. Mahapatra
14. Let us C, BPB Publication. New Delhi - Yashwant Kanetkar
15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

ELECTRICAL MEASUREMENTS LAB

Subject Code 1640307	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	02
	—	—	04	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS : PRACTICAL

Skills to be developed:

Intellectual Skills:

1. Identification of instruments
2. Selection of instruments and equipment for measurement **Motor**

Skills:

1. Accuracy in measurement
2. Making proper connections

List of Practicals:

1. Measurement of Current and Voltages by Low range ammeter and voltmeter respectively with shunt and multiplier.
2. Measurement of Current and Voltages by Low range ammeter and voltmeter respectively by Using
   Current Transformer and potential Transformer.
3. Measurement of active and reactive power in three phase balanced load by single wattmeter method.
4. Measurement of active and reactive power in three phase balanced load by two wattmeter method and observe the effect of Power Factor variation on Wattmeter reading.
5. Calibration of Energy meter at various power factor by standard energy meter.
6. Measurement of energy in single phase & three phase balanced load using Electronic Energy Meter.
7. Measurement of Low resistance by Kelvin's Double Bridge.
8. Measurement of Medium resistance by Wheatstone bridge.
9. Measurement of Insulation Resistance by Megger.
10. a) Measurement of Resistance, Voltage, Current, Voltage, Current in A.C & D. C. Circuit by using digital multimeter.
    b) Measurement of A.C. Current by Clip-on ammeter
11. Measurement of Earth Resistance by Earth Tester.
12. Measurement of Circuit Parameters by LCR meter.
13. Measurement of power factor of single phase and three phase load by PF meter and verifying through I, V and P measurement.
14. Observe the phase sequence of three phase circuit Using Rotating type phase sequence Indicator.
15. Measurement of Frequency of A.C. Supply Using Weston or Ferro dynamic type Frequency meter.

ELECTRICAL & ELECTRONICS WORKSHOP PRACTICE

Subject Code 1640308	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	02
	—	—	04	Internal	:	15	
				External	:	35	

RATIONALE :- As a supervisor, electrical and electronic diploma holder has to inspect test and modify the work done by skilled workers. Sometimes he has to demonstrate the correct method and Procedure of doing certain operations. So an electrical & electronic diploma holder must have conceptual understanding of the method of procedure and posses manual skills in addition to supervisory capability**.**

OBJECTIVES :- To develop special skills required for repairing small electrical and electronic domestic appliances, making connections and carrying out work and detecting faults etc. in electrical & electronic equipments and circuits.

LIST OF PRACTICALS :-

Contents : Practical			Hrs/week	Marks
Unit -1	1.	Acquaintance with required tools and equipments used for electrical & electronics workshop.		
	2.	Soldering the different joint straight or married joint T-joint; also the other electrical and electronic spares in the circuit.		
	3.	To make straight or married joint and T-joint from 7/20 copper wire.		
	4.	Batton, cleat and conduit wiring on a board, giving complete circuit to some lamp points and other load points.		
	5.	To complete the wiring of a fluorescent tube light and to check the deffects in choke, starter and tube if any.		
	6.	To connect a table and ceiling fan with regulator and also test their running on power supply.		
	7.	To make an earthing to a motor by earthing wire and measure the earth resistance.		
	8.	To make an extension board, containing two 5A, 2-pin socket, one 5A, 3-pin socket, one 5A switch, one indicator and fuse.		
	9.	To make a series test lamp board, containing one 5A switch, one 2-pin, 5A socket, one bulb holder, one indicator and fuse.		
	10.	Wiring and connection of an electric bell, testing of no-volt coil and also to test the electric bell on power supply.		
	11.	Dismantling, testing, repairing and assembling of domestic appliances like electric iron, room heater, water heater, electric kettle, ceiling fan, table fan and regulators.		
	12.	To make coil for winding of small transformer used in alarm bell.		
	13.	To make start and running winding of a ceiling fan.		
	14.	To test electronic component with multimeter.		
	15.	To measure resistance, voltage and current of an electronic component in a circuit.		
	16.	To prepare a battery Eliminator.		
	17.	To prepare an Emergency lamp.		
	18.	To test transistor in absence of their datas indicated by manufacturer, the base, emitter and collector leads whether it is NPN or PNP transistor.		
	19.	To test the diode and also verify that which one is anode and cathode leads.		
	20.	To make an automatic voltage stabilizer.		
	21.	To make a Battery charger for charging the torch battery.		

ELECTRICAL & ELECTRONICS WORKSHOP PRACTICE -TW

Subject Code 1640309	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	Internal	:	30	
	—	—	03	External	:	70	

RATIONALE :- As a supervisor, electrical and electronic diploma holder has to inspect test and modify the work done by skilled workers. Sometimes he has to demonstrate the correct method and Procedure of doing certain operations. So an electrical & electronic diploma holder must have conceptual understanding of the method of procedure and posses manual skills in addition to supervisory capability**.**

OBJECTIVES :- To develop special skills required for repairing small electrical and electronic domestic appliances, making connections and carrying out work and detecting faults etc. in electrical & electronic equipments and circuits.

LIST OF PRACTICALS :-

Contents :Term Work			Hrs/week	Marks
Unit -1	22.	Acquaintance with required tools and equipments used for electrical & electronics workshop.		
	23.	Soldering the different joint straight or married joint T-joint; also the other electrical and electronic spares in the circuit.		
	24.	To make straight or married joint and T-joint from 7/20 copper wire.		
	25.	Batton, cleat and conduit wiring on a board, giving complete circuit to some lamp points and other load points.		
	26.	To complete the wiring of a fluorescent tube light and to check the deffects in choke, starter and tube if any.		
	27.	To connect a table and ceiling fan with regulator and also test their running on power supply.		
	28.	To make an earthing to a motor by earthing wire and measure the earth resistance.		
	29.	To make an extension board, containing two 5A, 2-pin socket, one 5A, 3-pin socket, one 5A switch, one indicator and fuse.		
	30.	To make a series test lamp board, containing one 5A switch, one 2-pin, 5A socket, one bulb holder, one indicator and fuse.		
	31.	Wiring and connection of an electric bell, testing of no-volt coil and also to test the electric bell on power supply.		
	32.	Dismantling, testing, repairing and assembling of domestic appliances like electric iron, room heater, water heater, electric kettle, ceiling fan, table fan and regulators.		
	33.	To make coil for winding of small transformer used in alarm bell.		
	34.	To make start and running winding of a ceiling fan.		
	35.	To test electronic component with multimeter.		
	36.	To measure resistance, voltage and current of an electronic component in a circuit.		
	37.	To prepare a battery Eliminator.		
	38.	To prepare an Emergency lamp.		
	39.	To test transistor in absence of their datas indicated by manufacturer, the base, emitter and collector leads whether it is NPN or PNP transistor.		
	40.	To test the diode and also verify that which one is anode and cathode leads.		
	41.	To make an automatic voltage stabilizer.		
	42.	To make a Battery charger for charging the torch battery.		

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN LIBRARY & INFORMATION SCIENCE

(Effective from Session 2016-17 Batch)

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.	Foundation of Library and Information Science	1641301	03	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C '	1600302	03	03	10	20	70	100	28	40	03
3.	Knowledge Organization of Library Classification & Cataloguing	1641303	03	03	10	20	70	100	28	40	03
4.	Management Information System in Libraries	1641304	03	03	10	20	70	100	28	40	03
5.	Library House Keeping Operation	1641305	03	03	10	20	70	100	28	40	03
		Total:-	**15**				**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.	Computer Programming Through 'C ' Lab.	1600306	06	03	15	35	50	20	03
7.	Knowledge Organization Classification Lab.	1641307	04	03	15	35	50	20	02
8.	Knowledge Organization Cataloguing Lab.	1641308	04	03	15	35	50	20	02
Total:- 14							**150**		

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.	Knowledge Organization Classification (TW)	1641309	02	15	35	50	20	01
10.	Knowledge Organization Cataloguing (TW)	1641310	02	15	35	50	20	01
Total:- 04						**100**		
Total Periods per week Each of duration one Hours **= 33**						**Total Marks = 750**		**24**

FOUNDATION OF LIBRARY AND INFORMATION SCIENCE

Subject Code 1641301	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course Objective:

- To make students appreciate the basic philosophy and ethics of Librarianship.
- To understand the role and evolution of Library as a social Institution.
- To Know about Various Type of Libraries, their nature. Objective and service.
- To Create awareness about the role of professional Library Associations.
- To understand the concept of Resource sharing and extension activation in libraries.
- To generate awareness about legal, political and ethical aspects of information and its use.
- **Course Contents:**
  1. Introduction of Library and Information science
  2. Five laws of Library Science: Implications
  3. Type of Libraries.
  4. Library Associations and Organisation
  5. Library organization
  6. Resource sharing
  7. Library Rules and Regulations

Contents : Theory		Hrs/week	Marks
Units-1	**Introduction of Library & Information science:** • Social and Historical Foundations of Library. • Philosophy and ethics of Librarianship • Library as a social institution: objective and function of the Library. • Role of Library in formal and Informal educdin		
Units-2	**Five laws of Library Science: Implication** • Implication of five laws in Library and Inf. Activities. • Relevance of Five laws in present Technology oriented environment.		
Units-3	**Types of Libraries:** • National Library: Features, objective, function, role and service. • Public Library: Feature, objective, function, role and service. • Academic Libraries: Feature, objective, function role and service. • Special Libraries: Feature, objective, function role and services. • UNESCO PUBLIC LIBRARY Manifesto.		
Units-4	**Library Association and Organisation:** • Professional organization: objectives, function and professional Activities. • Library Association of India: ILA, IASLIC, IATLIS, UPLA. • International Association: IFLA, ALA • NAPLIS		
Units-5	**Library Organization:** • Library building and design. • Cost and benefits. • Collective protection • Fire protection • Furniture and Equipments.		
Units-6	**Resource sharing:** • Concept, Need, Purpose, Area of Resource sharing. • Resource sharing Programmes: Impact of IT on Resource sharing. • Intellectual property Rights. • Copy Right- copy right Act in India, censorship. • Library Rule and Regulation • Concept • Types.		
Units-7	**Library Rule and Regulation** • Concept • Types.		
	Total		

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	03
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

Contents : Theory			Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		[03]	
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		[08]	
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		[08]	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		[07]	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Perator.		
	04.03	If statement, it-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		[07]	

Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.	**[07]**	
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	**[04]**	
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	**[06]**	
	Total	**50**	

Text / Reference Books -

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India. - R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill. - E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education. - A. Kamthane
5. Programming with C. First Edition, 1997, Tara McGraw hill. - Venugopla and Prasad
6. The C Programming Language, Second Edition, 2001, Prentice Hall of India. - B. W. Kernighan & D.M. Ritchie
7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - R. Subburaj
8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami
9. Elements of C, Khanna Publishers, Delhi. - M. H. Lewin
10. Programming in C. - Stephen G. Kochan
11. Programming in C, khanna Publishers, Delhi. - B. P. Mahapatra
12. Let us C, BPB Publication, New Delhi. - Yashwant kanetkar
13. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa
14. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
15. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth
16. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
17. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
18. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

KNOWLEDGE ORGANISATION OF LIBRARY CLASSIFICATION & CATALOGUING

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1641303	L	T	P/S	ESE	:	70	03
	03	—	—	TA	:	10	
				CT	:	20	

Course Objective/Rationale and Objectives

To identify a book or a bit of information from a huge store of knowledge, a professional needs to find out and make available the right book (information) of the right reader (seeker) at the right moment.

For this purpose a student is trained to search out the common subjects are put under one heading. The process of classification is important and three such internationally accepted classification schemes have been discussed with special stress of Dewey Decimal Classification 19th edition.

Training to project the holdings of a library/information centre according to accepted universal codes of cataloguing with special stress on **AACR-II** has been discussed.

SL Topics

1. Basic of classification
2. Theoretical of Foundation
3. Basic of Cataloguing
4. Normative Principles and Subject Cataloguing
5. Bibliographical Formats and other Aspects.

Contents : Theory			Hrs/week	Marks
Unit -1	**Basic of Classification**			
	01.01	Definition, Need and purpose of classification.		
	01.02	Concept of call Number, class Number and Basic number.		
	01.03	Species of classification scheme.		
	01.04	Salient features of DDC, CC and UDC.		
	01.05	Notation: Definition, Kinds, Function.		
Unit -2	02	**Theoretical Foundation of Classification**		
	02.01	Canons of classification		
	02.02	Phase relation, Common isolates and other Auxiliary Table of DDC, CC and UDC.		
	02.03	Postulational Approach to classification and Five fundamental categories and Facet sequence.		
	02.04	Devices, Indicator digits.		
	02.05	Recent developments in classification.		
Unit -3	03	**Basic of Cataloguing**		
	03.01	Library Catalogue: Definition, Function, type and Physical Forms.		
	03.02	Kinds of entries and their function.		
	03.03	History of Catalogue Cod.		
	03.04	Salient Feature of AACR-II and CCC		
Unit -4	04	**Normative Principle and subject cataloguing**		
	04.01	Normative principle and canons of Cataloguing		
	04.02	Subject cataloguing: Chain Procedure, Subject Heading lists.		
	04.03	Filling of Catalogue entire and Alphabetisation.		
Unit -5	05	**Bibliographical Formals and other aspects**		
	05.01	Standards of bibliographic description and Record Formats: ISBD, MARC, CCF, ISO-2709/Z39.2, Dublin core.		
	05.02	Centralised and Co-operative cataloguing, Simplified Cataloguing.		
	05.03	Cataloguing of Non-Book Material: Cartographic Materials, Electrons Documents, Audio-Visual Materials and Continuing documents.		
		Total		

Recommended Books

SL	Title/Publisher	Author
5.	पुस्तकालय वर्गीकरण के सिद्धांत	
6.	सूचीकरण के सिद्धांत	S. S. Agarwal

MANAGEMENT INFORMATION SYSTEM IN LIBRARIES

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	03
1641304	03	—	—	TA	:	10	
				CT	:	20	

Rationale and Objectives

This subject gives a unified picture of what Management is? And low it is applicable to various forms of Library and information centre in our Country. It gives a basic knowledge about information officers function is the most useful and organised way.
A Student must be sensitive to the Environment of the place where may be operating. So he may to make decision and plan, organize and control activity in the environment prospective of his own service.

Objective.

- To Familiar with Management is formation System.
- History of MIS.
- To able to make appropriate decision.
- To Familiar with its Techniques
- Evaluate its utility.

Topics

- Management: Definition, Types and functions.
- Principles of Management.
- Concept and control in Library and information Centre.
- Management information system: Concept, Level, Planning in Libraries.
- Reporting System.
- Budgeting system
- Establishing Role of MIS in any types of Library.

Contents : Theory		Hrs/week	Marks
Unit-1	**Management:** Concept, Definition, types and function (POSDCORB).	[ ]	
Unit-2	**Principles of Management** • Division of work, Authority and Responsibility. Discipline, unity of command, unity at Direction, Remuneration, Devotation, Centralization, Order, Equality, Stability in tenure of personnel's, Initiative, Espriritede Corpe • Software package: General and Special.	[14]	
Unit-3	• Concept of Control in library and Information science.	[ ]	
Unit-4	**Management Information System** • Management Planning: Librarian control, Librarian as leader, qualification, training and role. • Management Information system: Concept, Level, planning in libraries.		
Unit-5	• Reporting System: Concept types and utility.	[ ]	
Unit-6	• Budgeting system: Concept types and utility.	[ ]	
Unit-7	• Establishing role of MIS in any types of Library: Public Library academic Library and special Library. (Manual and digital).	[ ]	
	Total		

Recommended Books

SL	Title/Publisher	Author
1.	Library administration	R L Mitlal
2.	Modernization in Libraries.	C P Vasisth.
3.	पुस्तकालय सूचना विज्ञान एवं सूचना प्रौद्यौगकीय	डा० बी० के० शर्मा
4.	Library Automation:	

LIBRARY HOUSE KEEPING OPERATION

Subject Code 1641305	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale

The normative principle of Library and Information Science is to stress on the basic concept of the subject - "Books (and information) are for use and books (and information) are for all."

The chapter 'Library House Keeping Operation' has been designed with an aim to fulfill the above objective and in this process effort has been made to acquaint the student with each section of an information centre and the functions undertaken therein.

SL	Topics	Periods
1.	Library House-Keeping (Information)	-
2.	Different Department of a Library	-
3.	Acquisition: Book Selection, Ordering, Allotment	-
4.	Manuscript	-
5.	Rules of Library	-
6.	Library Planning	-
	Total	**50**

Contents : Theory			Hrs/week	Marks
Unit -1	**Content**			
	01	Library House-Keeping (Information)		
	01.01	Definition		
	01.02	Scope and Utility		
	01.03	Purpose and Need		
	01.04	Characteristics of Library House Keeping		
Unit -2	02	**Different Departments of Library**		
	02.01	Reception		
	02.02	Reading Room		
	02.03	Lending Section		
	02.04	Reference Section		
Unit -3	03	**Acquisition: Book Selection, Ordering and Allotment**		
	03.01	Technical Section (Classification & Cataloguing)		
	03.02	Maintenance of Binding/Material-Print & Non-Print Work		
	03.03	Reprography (Xeroxing/Photostat)		
	03.04	Microform Unit		
Unit -4	04	**Manuscript**		
	04.01	Kinds of Manuscript		
	04.02	Maintenance of Manuscript		
	04.03	Duplication of Manuscript		
	04.04	Preservation and Conversion of Manuscript		
Unit -5	05	**Rules of Library**		
	05.01	Membership		
	05.02	Lending		
	05.03	Circulation		
	05.04	Serial		
Unit -6	06	**Library Planning**		
	06.01	Building Plan		
	06.02	Furniture		
	06.03	Fixtures		
	06.04	Equipments		
		Total		

Recommended Books

SL	Title/Publisher	Author
1.	Basic of Library & Information Series, Vikas Publishing House, New Delhi.	K.T.Dilli
2.	सूचना प्राद्यौगिकी के नये आयाम, साम्बर पब्लिकेशन, नई दिल्ली	शंकर सिंह
3.	ग्रन्थालय विज्ञान	श्री दिनेश सिंह

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code 1600306	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
				External	:	35	

Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing various engineering application of computers.

Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Eight experiments to be performed in the laboratory:

Contents : Practical		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	12	
Unit-2	Programming exercise on case Control Statement.	12	
Unit-3	Programming exercise on Decision Control Statement.	12	
Unit-4	Programming exercise on looping.	12	
Unit-5	Programming exercise on recursion technique.	12	
Unit-6	Programming exercise on Structure.	12	
Unit-7	Programs on array implementation.	12	
	Total	**84**	

Text / Reference Books -

1. How to solve it by Computer, Prentice Hall of India, 1992. - R.G. Dromey.
2. The C Programming Language, Prentice Hall of India, 1989. - B.W. Kernighan & D.M. Ritchie.
3. The C Programming Language, Prentice Hall of India, 1989. - Cooper, Mullish
4. Application Programming in C. Macmillain International editions, 1990. - Richa'd Johnson- Baugh & Martin Kalin
5. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
6. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth.
7. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
8. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi - R. Subburaj
10. Programming with C language, Tata McGraw Hill, New Delhi. - C. Balaguruswami
11. Elements of C, Khanna Publishers. Delhi - M. H. Lewin
12. Programming in C - Stephan G. Kochan.
13. Programming in C, Khanna Publishers. New Delhi - B.P. Mahapatra
14. Let us C, BPB Publication. New Delhi - Yashwant Kanetkar
15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

KNOWLEDGE ORGANIZATION CLASSIFICATION LAB

Subject Code 1641307	Practical			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Rationale and Objectives

Arrangement of book and non-book materials according to subject, author, time, place etc. It is the basic need of Library; hence classification of reading materials according to recognized devices have been incorporated in the classification theory papers. The said methods have been put into practice in this chapter. The tools in use are D.D.C. 19th edition and Sear's list of subject heading.

SL	Topics	Perods
1.	Introduction to D.D.C., 19th Edition	10
2.	Construction of Members for Simple Titles	20
3.	Classification Work According to D.D.C., 19th edition	20
	Total-	**50**

Contents : Practical		Hrs/week	Marks
Unit -1	**Content** **01 Introduction to D.D.C., 19th Edition** 01.01 Terminologies 01.02 Summaries	[10]	
Unit -2	**02 Construction of Members for Simple Titles** 02.01 Construction of Members - Methods - Means. 02.02 Titles	[20]	
Unit -3	**03 Classification Work According to D.D.C., 19th Edition** 03.01 Classification of at least 250 titles	[20]	
	Total	**50**	

KNOWLEDGE ORGANIZATION CATALOGUING LAB

Subject Code 1641308	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Rationale and Objectives

- To develop Skills of Cataloguing.
- To understand the ruler and practices of documents description of print and Non-print Materials according to Anglo-American Cataloguing rules-II
- Preparing Catalogue Entries (Main, Added and Reference Entries) for print and Non-Print Materials including electronic resources using Anglo-American Cataloguing Rules-Second revised edition.

SL	Topics	Periods
1.	Cataloguing with AACR-II (Revised)	10
2.	Different Types of Entries	10
3.	Choice of Heading	10
4.	Cataloguing of at least 100 titles with AACR-II	10
	Total	**40**

Contents : Practical		Hrs/week	Marks
Unit -1	**04 Cataloguing with AACR-II (Revised)** 04.01 Introduction to AACR-II 04.02 Salient Features of AACR-II	[10]	
Unit -2	**05 Different Types of Entries** 05.01 Entries in AACR-II 05.02 Main Entry 05.03 Added Entry 05.04 Reference Entry	[10]	
Unit -3	**06 Choice of Headings** 06.01 Choice and Rendering of Heading 06.02 Personal names, Western/Indian names 06.03 Corporate Authors 06.04 Pseudonymous, Anonymous Works and Uniform Titles	[10]	
Unit -4	**07 Cataloguing of at least 100 Titles with AACR-II** 07.01 Personal authors, Single and Joint Authors - 20 each 07.02 Pseudonymous Authors - 20 each 07.03 Anonymous Author - 20 each	[10]	
	Total	**40**	

KNOWLEDGE ORGANIZATION CLASSIFICATION -TW

Subject Code	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1641309	L	T	P/S	Internal	:	15	01
	—	—	02	External	:	35	

Rationale and Objectives

- To develop Skills of Classification.
- To develop skill in subject analysis and synthesis of different facets.
- To develop Proficiency in using Dewe Decimal Classification to Construction class Numbers for documents of different discipline/Subject.

Contents : Term Work		Hrs/week	Marks
Unit -1	Classification of Books and periodical according to DDC 19th Ed.		
Unit -2	Classification of 50 Title of one's own institute Library.		
	Total		

KNOWLEDGE ORGANIZATION CATALOGUING -TW

Subject Code	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	
1641310	L	T	P/S	Internal	:	15	01
	—	—	02	External	:	35	

Rationale and Objectives

Preparation of catalogue entries in a Library is a main function of this course. Stress given more on card from of Catalogue entry in the IIIrd semester Course design, AACP-II has been taken in to Consideration.

Contents : Term Work		Hrs/week	Marks
Unit -1	Arranging institutional library according to the subject.		
Unit -2	Preparation of temporary collection of given subject i.e. local history/Primary education/Women's literacy etc. (or as directed by the teacher)		
Unit -3	Cataloguing with 25 titles according to AACR.		
	Total		

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN MECHANICAL ENGG.

(Effective from Session 2016-17 Batch)

THEORY

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME							
			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	Credits
1.	Applied Mathematics -II	1615301	04	03	10	20	70	100	28	40	03
2.	Mechanical Engineering Drawing	1625302	03	03	10	20	70	100	28	40	03
3.	Mechanics of Solids	1625303	02	03	10	20	70	100	28	40	02
4.	Mechanical Engineering Materials	1625304	03	03	10	20	70	100	28	40	03
5.	Electrical Engineering	1625305	02	03	10	20	70	100	28	40	02
		Total :-	**14**				**350**	**500**			

PRACTICAL

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME					
			Periods per Week	Hours of Exam.	Practical (ESE)		Total Marks (A+B)	Pass Marks in the Subject	Credits
					Internal(A)	External(B)			
6.	Mechanics of Solids Lab.	1625306	02	03	15	35	50	20	01
7.	Electrical Engineering Lab.	1625307	02	03	15	35	50	20	01
8.	Manufacturing Technology Lab.	1625308	04	06	15	35	50	20	03
Total :-			**08**				**150**		

TERM WORK

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME				
			Periods per Week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	Credits
9.	Mechanical Engineering Drawing (TW)	1625309	05	15	35	50	20	02
10.	Development of Life Skills -II (TW)	1625310	03	07	18	25	10	02
11.	Professional Practices-III (TW)	1625311	03	07	18	25	10	02
Total :-			**11**			**100**		
Total Periods per week Each of duration One Hour 33				Total Marks = **750**				**24**

APPLIED MATHEMATICS -II

(CIV/CIV(RURAL)/MECH./MECH.(AUTO)/AUTO. ENGG)

Subject Code	Theory						Credits
1615301	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

CONTENTS :THEORY

	Name of the Topic	Hours	Marks
UNIT-01	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems.	**10**	**20**
	1.5 **Applications of definite integrals.** 1.5.1 Area under the curve. Area bounded by two curves, 1.5.2 Volume of revolution. 1.5.3 Centre of gravity of a rod, plane lamina. 1.5.4 Moment of Inertia of uniform rod, rectangular lamina 1.5.5 Theorems of parallel and perpendicular axes.	**08**	**12**
UNIT-02	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. **2.3 Applications of Differential equations.** **2.3.1 Rectilinear motion (motion under constant and variable acceleration)** 2.3.2 Simple Harmonic Motion.	**10** **08**	**12** **08**
UNIT-03	**Probability Distribution** 3.1 Binomial distribution. 3.2 Poisson's distribution. 3.3 Normal distribution 3.4 Simple examples corresponding to production process.	**08**	**12**
UNIT-04	**Numerical Methods** **4.1 Solution of algebraic equations** Bisection method, Regulafalsi method and Newton – Raphson method. **4.2 Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss Seidal and Jacobi's methods.	**06** **06**	**08** **08**
	Total	**48**	**80**

Text/Reference Books:-		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Advanced Mathematics for Engineers and Scientist	Murray R Spiegel	Schaum outline series McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India New Dehli
Numerical methods for Engg. 4th ed.	Chapra	Tata McGraw Hill
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.
Rajendra Pal, S.N. Malik	Applied Mathematics	Foundation Publishing

MECHANICAL ENGINEERING DRAWING
(MECHANICAL ENGINEERING GROUP)

Subject Code 1625302	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS : THEORY

	Name of the Topic	Hours	Marks
UNIT-01	**Auxiliary views:** - Study of auxiliary planes, Projection of objects on auxiliary planes. Completing the regular views with the help of given auxiliary views (Use first angle method of projection).	08	12
UNIT-02	**Intersection of solids:-** Curves of intersection of the surfaces of the solids in the following cases (a) Prism with prism, Cylinder with cylinder, Prism with Cylinder When (i) the axes are at 90° and intersecting (ii) The axes are at 90° and Offset (b) Cylinder with Cone When axis of cylinder is parallel to both the reference planes and cone resting on base on HP and with axis intersecting and offset from axis of cylinder	08	10
UNIT-03	**Developments of Surfaces**. Developments of Lateral surfaces of cube, prisms, cylinder, pyramids, cone and their applications such as tray, funnel, Chimney, pipe bends etc.	08	10
UNIT-04	**Conventional Representation:-** 1. Standard convention using SP – 46 (1988) (a) Materials C.I., M.S, Brass, Bronze, Aluminum, wood, Glass, Concrete and Rubber (b) Long and short break in pipe, rod and shaft. (c) Ball and Roller bearing, pipe joints, cocks, valves, internal / external threads. (d) Various sections- Half, removed, revolved, offset, partial and aligned sections. (e) Knurling, serrated shafts, splined shafts, and chain wheels. (f) Springs with square and flat ends, Gears, sprocket wheel (g) Countersunk & counterbore. (h) Tapers	04	08
UNIT-05	**Limits, Fits and Tolerances:-** 1. Characteristics of surface roughness- Indication of machining symbol showing direction of lay, roughness grades, machining allowances, manufacturing methods. 2. Introduction to ISO system of tolerencing, dimensional tolerances, elements of interchangeable system, hole & shaft based system, limits, fits & allowances. Selection of fit. 3. Geometrical tolerances, tolerances of form and position and its geometric representation. 4. General welding symbols, sectional representation and symbols used in Engineering practices	04	08

UNIT-06	**Details to Assembly** 1. Introduction- 2. Couplings – Universal couplings & Oldham's Coupling 3. Bearing – Foot Step Bearing & Pedestal Bearing 4. Lathe tool Post 5. Machine vice & Pipe Vice 6. Screw Jack 7. Steam Stop Valve	**08**	**12**
UNIT-07	**Assembly to Details** 1. Introduction – 2. Pedestal Bearing 3. Lathe Tail Stock 4. Drilling Jig 5. Piston & connecting rod 6. Gland and Stuffing box Assembly 7. Valve – Not more than eight parts 8. Fast & loose pulley	**08**	**10**
	Total	**48**	**70**

Text/ Reference Books:

Titles of the Book	**Name of Authors**	**Name of the Publisher**
Machine Drawing	N.D.Bhatt	Charotar Publication, Anand
Code of practice for general engineering drawing.	IS Code SP 46 (1988)	Engineering Drawing Practice for School and colleges
Production Drawing	L.K.Narayanan, P.Kannaich, K.VenkatReddy	New Age International Publication
Machine Drawing	P.S.Gill	S.K.Kataria and Sons
Engineering Graphics (For Topic on Auxiliary Views)	M.L.Dabhade	--
Machine Drawing	Sidheshwar	Tata McGraw Hill
Engineering Drawing	D.Jolhe	Tata McGraw Hill
Mechanical Engineering Drawing	Bishwajeet Ranjan, Deepak Kumar	Foundation Publishing

MECHANICS OF SOLIDS
(MECHANICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
1625303	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	ESE	:	70	
	02	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS :THEORY

	Name of the Topic	Hours	Marks
UNIT-01	**Mechanical Properties of Materials, Simple stresses & Strains** 1.1 Types of loads, Simple stresses & strains viz. tensile, compressive, Shear, Crushing, Thermal stresses, Hoop stresses & corresponding strains, Volumetric Strain, Bulk modulus, Hook's law, Young's modulus, Modulus of Rigidity, stress-strain curves for ductile & brittle materials, Poisson's ratio. 1.2 Concept of stresses & strains in thin cylindrical & spherical shells subjected to internal pressure. 1.3 Concepts of Buckling – Rankine's & Euler's formulae for buckling load for columns / shafts under compression, concepts of equivalent length for various end conditions. 1.4 Concepts of Deflection & slope of beams – relation between bending moment & slope. Deflection of simply supported beams and cantilever beams subjected to point load. (No derivation) (Problems on compressive & tensile stresses, Thermal stresses, butt & lap riveted joints, simple cases of buckling).	10	18
UNIT-02	**Strain Energy** 2.1 Concept, derivation & use of expression for deformation of axially loaded members under gradual, sudden & impact load. 2.2 Strain energy due to self-weight.	03	04
UNIT-03	**Bending Moment & Shear Force** 3.1 Shear force, bending moment & relation between them. 3.2 Shear force & bending moment diagrams for simply supported beam & cantilevers subjected to point loads & Uniformly distribution load, concept of Uniformly varying load & couples acting on beam 3.3 Location of point of contraflexure. (Problems to be based on simply supported & cantilever beams with point load & UDL only)	08	12
UNIT-04	**Moment of Inertia** 4.1 Definition of Moment of inertia, Moment of inertia of different laminae, radius of gyration. 4.2 Parallel & perpendicular axis theorem. 4.3 Moment of inertia of rectangular, circular, semicircular. Triangular, Hollow Rectangular, symmetrical I - Section, Channel section, Tee- section, angle section about centroidal axis. 4.4 Polar moment of inertia.	03	06
UNIT-05	**Bending & Shear stresses** 5.1 Theory of simple bending, equation of bending. 5.2 Assumptions in the theory of bending, moment of resistance, section modulus & neutral axis. 5.3 Shear stresses – concepts of direct & transverse shear stress.	06	06

UNIT-06	**Combination of Bending & Direct stresses** 6.1 Axial load, eccentric load, direct stresses, bending stresses maximum & minimum stresses. 6.2 Application of the above concepts for machine parts such as offset links, C-clamp, Bench vice, Drilling machine frame, stresses at base of a short column, condition for no tension at extreme fibres, total stress variation diagrams. (Simple problems on above applications)	**08**	**10**
UNIT-07	**Principal Planes & Principal Stresses** 7.1 Definition of principal plane & principal stresses. 7.2 Expression for normal and tangential stress, maximum shear stress. 7.3 Stresses on inclined planes. 7.4 Position of principal planes & planes of maximum shear. 7.5 Graphical solution using Mohr's circle of Stresses.	**06**	**08**
UNIT- 08	**Torsion** 8.1 Concept of Pure Torsion, Torsion equation for solid and hollow circular shafts. Assumptions in theory of pure Torsion. 8.2 Comparison between Solid and Hollow Shafts subjected to pure torsion (no problem on composite and non homogeneous shaft)	**04**	**06**
	Total	**48**	**70**

Text /Reference Books:

Titles of the Book	**Name of Authors**	**Name of the Publisher**
Strength of Material	Andrew Pytel Fedrinand L. Singer	Addison-Wesley An imprint of Addison Wesley Longman, Inc. Forth edition
Strength of Material	G.H.Ruder	ELBS with Macmillan third edition
Strength of Material	B.K.Sarkar	Tata McGraw hill New Delhi
A Text Book strength of Material	Dr. R. K.Bansal	Laxmi Publication New Delhi
Strength of Material	S Ramamrutham	Dhanpat Rai & Publication New Delhi
Strength of Material	R.S.Khurmi	S.Chand Company Ltd. Delhi
Materials Science	G.K.Narula K.S.Narula	Tata McGraw hill New Delhi
Mechanics of Solids	Roshan Sinha, Pradeep Kumar	Foundation Publishing

MECHANICAL ENGINEERING MATERIALS
(MECHANICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
1625304	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS : THEORY

	Name of the Topic	Hours	Marks
UNIT-1.	**Engineering Materials and their Properties** 1.1 Introduction, Classification and Application of Engineering materials, I.S specification of materials like plain carbon steel, Grey Cast iron, low alloy steels & bearing Materials. 1.2 Properties of metals 1.2.1 Physical Properties – Structure, Density, Melting point. 1.2.2 Mechanical Properties – Strength, elasticity, ductility, malleability, plasticity, toughness, hardness, hardenability, brittleness, fatigue, thermal conductivity, electrical conductivity, thermal coefficient of linear expansion 1.3 Introduction to Corrosion, types of Corrosion, Corrosion resisting materials.	06	08
UNIT-2.	**Ferrous Metals and Alloys** 2.1 Characteristics and application of ferrous metals 2.2 Phase equilibrium diagram for Iron and Iron Carbide. 2.3 Flow diagram for production of Iron and Steel, Classification, composition and uses of cast iron, effect of sulphur, silicon and phosphorous. 2.4 Classification, composition and application of low carbon steel, medium carbon steel and high carbon steel with their chemical composition. 2.5 Alloy Steels: - Low alloy steel, high alloy steel, tools steel & stainless steel. Effect of various alloying elements such as – Chromium, nickel, manganese, molybdenum, tungsten, vanadium. 2.6 Tool Steels: - High speed Steels (HSS), Hot & cold Working dies, shear, punches etc., properties & applications. 2.7 Magnetic materials: - Properties & Applications of commonly used magnetic materials (Permanent magnets and temporary magnets). 2.8 Special Cutting Tool Materials – Diamond, Stelites & Tungsten Carbide	12	18
UNIT-3.	**Non Ferrous Metals and Alloys** 3.1 Properties, applications & chemical compositions of Copper alloys (naval brass, muntz metal, Gun metal & bronzes), Aluminium alloys (Y-alloy & duralumin) & bearing materials like white metals, leaded bronzes & copper lead alloys. 3.2 Desired properties of bearing materials.	06	10
UNIT-4.	**Heat Treatment of Steels** 4.1 Introduction to Heat treatment processes such as Annealing, subcritical annealing, Normalizing, Hardening, Tempering (Austempering & Martempering) - Principle, Advantages, limitations and applications. 4.2 Surface Hardening - Methods of surface hardening, i) case hardening ii) Flame Hardening, iii) Induction Hardening, iv) Nitriding, v) Carburizing - Principle, advantages, limitations and applications	08	14

UNIT-5.	**Non Metallic Materials** 5.1 Polymeric Materials – Introduction to Polymers- types, characteristics, properties and uses of Thermoplastics, Thermosetting Plastics & Rubbers. 5.2 Thermoplastic Plastics - characteristics and uses of ABS, Acrylics, Nylons and Vinyls 5.3 Thermosetting Plastics - Characteristics and uses of polyesters, Epoxies, Melamines & Bakelites. 5.4 Rubbers – Neoprene, Butadiene, Buna & Silicons – Properties & applications. 5.5 Properties and applications of following Engineering Materials – Ceramics, Abrasive, Adhesive and Insulating materials such as Cork, Asbestos, Thermocole and Glass Wool 5.6 Introduction to Composite Materials – Laminated & Fibre reinforced materials - Structure, Properties & Applications.	**08**	**10**
UNIT-6.	**Powder Metallurgy & Nondestructive Testing** 6.1 Advantages, limitations and applications of Powder Metallurgy for engineering products. Brief Description of Process of Powder Metallurgy – Powder making, blending, compacting, sintering, infiltration & impregnation. 6.3 Applications of Powder metallurgy for tungsten carbide tip tools & porous bearing. 6.4 Importance of Non-destructive testing, Difference between Destructive and Nondestructive testing. 6.5 Nondestructive testing methods - Radiography (X-Ray & Gamma Ray), Ultrasonic crack detection, Dye penetrant test, Magnaflux test – Comparison & applications.	**08**	**10**
	Total	**48**	**70**

Text/Reference Books:

Titles of the Book	Name of Authors	Name of the Publisher
A Text Book of Material Science and Metallurgy	O.P.Khanna	Dhanpat Rai and Sons [1999]
Material Science And Metallurgy	Dr.V.D. Kodgire	Everest Publishing House [1990]
Material Science and Engineering	R.K.Rajput	S.K.Katari and Sons [2002 reprint 2003]
Material Science and Processes	S.K.Hazra and Choudhari	Indian Book Distribution Co. [1982]
Engineering Materials Properties and Selection	Kenneth G. Budinski and Micheal K. Budinski	Pearson Education, New Delhi
ASME Material Manuals	ASME	
Introduction to Physical metallurgy	Sidney H. Avner	Tata Mc Graw Hill edition (2^{nd})
Mechanical Engineering Materials	R.M. Pandey, Umesh Kumar	Foundation Publishing

ELECTRICAL ENGINEERING
(MECHANICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
1625305	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	ESE	:	70	
	02	—	—	TA	:	10	
	—	—	—	CT	:	20	

CONTENTS : THEORY

	Name of the Topic	Hours	Marks
UNIT-01	**Introduction** to Electrical power supply system Generation, Transmission, Distribution & Utilization. AC supply & DC supply	02	02
UNIT-02	**AC Fundamentals**: cycle, frequency, phase, period, max, average, r.m.s. value. Concept of current, voltage, power & energy in R, L, & C circuits	03	06
UNIT-03	Three phase supply: Star & Delta circuit, Line & Phase relationship, power equation.	03	06
UNIT-04	**Measuring Instruments**: Introduction to construction, operation and use of AC & DC ammeter, voltmeter, Electrodynamic Wattmeter, energy meter & digital multimeter, Clip on meter.	04	06
UNIT-05	**DC Motor:** Construction and principle of operation. Speed torque characteristics. Types, specifications & ratings and applications. Types of insulation used.	06	07
UNIT-06	**A. C .Machines :** Transformer: Construction and principle of operation. EMF equation and transformation ratio. Load test, efficiency and regulation. Specifications & rating. Auto transformer & 3 phase transformer concept only. Applications of transformers.	06	09
	AC motor: Construction and principle of operation of 3 phase induction motor. Speed torque characteristics, slip, speed control (VFD), reversal of rotation, starters. Single phase motor, universal motor, stepper motor & servo motor. Motor specification & ratings. Applications of these motors in various fields. Testing of motors.	06	10
	Alternator: Construction, principle of operation & applications. Self and separate excitation. **Synchronous Motor:-** Construction, principle of operation, methods of starting & applications	03	04
UNIT-07	**Utilisation of Electrical Energy**		
	Industrial applications: Classification of drives, factors for selection of motor for different drives, Enclosures & Mountings	02	05
	Electric heating & welding: Working principle & types selection of system, specifications & rating	02	03
	Electrometallurgical & Electro Agro Systems: Concept & principle used in electroplating, Electrical machines used in electro-agro systems (irrigation pumps)	02	03
UNIT-08	**Electric wiring & Illumination**: Simple Electric Installations with 2 sockets,2 fans, 2 lamps, fuses. Introduction to different accessories like MCCB, ELCB, wires & cables. Different types of lamps their specifications,	04	04
UNIT-09	**Electric safety**, tariff & power conservation, necessity of Earthing, types safety tools, first aid measures, types of tariff, pf improvement only methods, energy conservation & audit, fire extinguishing methods adopted in electrical engineering.	05	05
	Total	48	70

Text/Reference Books:

Titles of the Book	Name of Authors	Name of the Publisher
Electrical Technology	E. Hughes	ELBS
Electrical Technology	H. Cotton	Pitman
Electrical Technology Vol I To IV	B. L. Theraja	S. Chand
Electrical Engineering	K.D. Joshi	Foundation Publishing

MECHANICS OF SOLIDS LAB
(MECHANICAL ENGINEERING GROUP)

Subject Code	Practical						Credits
1625306	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS :PRACTICAL

Skills to be developed:

Intellectual Skill:

1 Identification of different parts of machine and their function.

2 Interpretation failure patterns of different metal under different action.

3 Extrapolating test result or observation during test.

4 Testing different metals and comparison of experimental result.

Motor Skill:

1 Sketch of standard specimen, arrangement for test on respective machines.

2 Measurement of different parameters.

3 Handling Instrument.

4 Observing behavior of different metal during test.

	List of Practical:
1.	Study & demonstration of Extensometer.
2.	Tension Test on mild steel, Aluminium & compression test on cast iron on Universal Testing Machine.
3.	Direct Shear Test of mild steel on Universal Testing Machine.
4.	Brinell Hardness Test on Mild Steel.
5.	Rockwell hardness Test on Hardened Steel.
6.	Izod & Charpy - Impact tests of a standard specimen.
7.	Torsion Test on Mild steel bar.
8.	Term Work :- Drawing sheet on shear force & bending Moment diagrams for a given loading (At least four problems.). a) Estimation of principal stresses and maximum shear strain for a given combined loading by analytical & Mohr's circle method. (At least two problems.).

ELECTRICAL ENGINEERING LAB

(MECHANICAL ENGINEERING GROUP)

Subject Code	Practical						Credits
1625307	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS :PRACTICAL

Skills to be developed:

Intellectual skills:

1. Identify and select suitable electrical instruments for measurement.
2. Identify and give specifications of electrical motors and transformers.
3. Interpret wiring diagrams for various applications.
4. Identify safety equipments required.
5. Decide the procedure for setting experiments.

Motor skills:

1. Draw wiring diagram
2. Make wiring connections to connect electrical equipments and instruments.
3. Measure electrical power, earthing resistance and other electrical quantities.
4. Calibrate electrical instruments.
5. Use of safety devices while working.

Prepare energy consumption bill with present tariff structure.

A) List of Practical:

1) For a given resistive & inductive series & parallel circuit, select ammeter, voltmeter & wattmeter. Make the connections and measure current, voltage and power drawn by the circuit. Measure it by clip on meter & compare it.
2) For a given DC Shunt/Series motor, select suitable meters, make connections as per diagram, check the connections and run the motor. Take the meter readings to draw speed torque characteristics. Make suitable changes in the connections to reverse the direction of rotation.
3) For the above given motor prepare a circuit to control its speed above & below normal, plot its graph.
4) List specifications of given single phase transformer. Perform no load test on the transformer to find transformation ratio.
5) Connect an electronic energy meter to a load, take reading & prepare energy consumption bill with present tariff structure
6) Prepare actual wiring on a board to study and operate one lamp controlled by one switch, staircase wiring, go down wiring using casing capping.

B) Field work:

7) Observe Electric wiring of main building in your campus list the accessories used and draw a general layout
8) Observe earthing of your laboratory, measure its resistance & list its significance

C) Mini project:

9) Prepare a simple electric wiring circuit comprising of 2lamps, 2 sockets, 1 fan with a fuse & check it.
10) Prepare trouble-shooting chart of above motors and identify the faults of a motor or a transformer

MANUFACTURING TECHNOLOGY LAB
(MECHANICAL ENGINEERING GROUP)

Subject Code	Practical						Credits
1625308	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
	—	—	—	External	:	35	

Contents :Practical		Hrs/week
Chapter	**Name of the Topic**	**Hours**
Unit-01	**Forging** 1.1 Forging Processes – Drop forging, Upset forging, Die forging or press forging. 1.2 Types of dies - Open Die, Closed Die(Single Impression and Multi-impression) Closed die Forging operations - Fullering, Edging, Bending, Blocking, Finishing 1.3 Forgeable material and forgeability, Forging temperature, Grain flow in forged parts, Types of Presses and hammers.	**03**
Unit-02	**Rolling and Extrusion** 2.1 Principles of rolling and extrusion. 2.2 Hot and cold rolling. 2.3 Types of rolling mills. 2.4 Different sections of rolled parts. 2.5 Methods of extrusion – Direct, Indirect, backward & impact Extrusion, Hot extrusion, Cold extrusion Advantages, disadvantages and applications.	**03**
Unit-03	**Press working** 3.1 Types of presses and Specifications. 3.2 Press working operations - Cutting, bending, drawing, punching, blanking, notching, lancing 3.3 Die set components.- punch and die shoe, guide pin, bolster plate, stripper, stock guide, feed stock, pilot. 3.4 Punch and die Clearances for blanking and piercing, effect of clearance.	**04**
Unit-04	**Lathe Operations** 4.1 Types of lathes – light duty, Medium duty and heavy duty geared lathe, CNC lathe. 4.2 Specifications. 4.3 Basic parts and their functions. Operations and tools – Turning, parting off, Knurling, facing, Boring, drilling, threading, step turning, taper turning.	**03**
Unit-05	**Drilling** 5.1 Classification. 5.2 Basic parts and their functions - Radial drilling machine. 5.3 Types of operations. 5.4 Specifications of drilling machine. 5.5 Types of drills and reamers	**02**
Unit-06	**Milling** 6.1 Classification. 6.2 Basic parts and their functions – column and knee type. 6.3 Types of operations 6.4 Types of milling cutters.	**02**

Unit-07	**Casting** 7.1 Patterns - Material used, types, Patterns allowances, Cores, Core allowances. 7.2 Moulds - Mould materials, Types of sand, Mounding processes Sand molding, Pit molding, machine molding. Shell molding. 7.3 Melting practice. Types of furnaces with specific application Cupola furnace, Electric arc furnace. 7.4 Casting principle and operation 7.5 Special casting processes. viz die casting, centrifugal casting, Investmen casting. 7.6 Casting defects	**08**
Unit-08	**Welding** 8.1 Classification. 8.2 Gas welding techniques. 8.3 Types of welding flames. 8.4 Arc Welding – Principle, Equipment, Applications 8.5 Shielded metal arc welding. 8.6 Submerged arc welding. 8.7 TIG / MIG welding. 8.8 Resistance welding - Spot welding, Seam welding, Projection welding 8.9 Welding defects. 8.10 Brazing and soldering: Types, Principles, Applications	**07**
	Total	**32**

Notes:

1] The workshop instructors should prepare specimen job in each shop as demonstration practice before the student (as per the drawing given by subject teacher/ workshop superintendent)

2] Theory behind practical is to be covered by the concerned subject teacher/ workshop superintendent. 3] Workshop diary should be maintained by each student duly signed by respective shop instructors

Practical:

Skills to be developed:

Intellectual Skills:

1. Identify basic manufacturing processes.
2. Understand need of pattern allowances.
3. Identify joining methods for fabrication.
4. Specify press tool dies for given cutting/forming operations.
5. Understand various sand casting processes.
6. Understand types of pattern, materials of construction and identify casting defects.

Motor Skills:

1. Operate lathes, drilling, milling machines
2. Use welding machines and equipment
3. Set the tools, jobs and decide cutting parameters of machines
4. Make simple pattern out of wood/themocol
5. Inspect diamensions of jobs using measuring instruments

LIST OF PRACTICALS

1) Assignment on forging die nomenclature.
2) One turning job on lathe containing the operations like plain turning, step turning, grooving, knurling, chamfering.
3) One composite welding job having two different joints. (Batch of four students per job.)
4) One simple job on TIG / MIG welding setup or visit to TIG / MIG welding setup and write report.
5) One composite job containing the operations like face milling, side and face milling (slotting), drilling / tapping (drilled hole should be perpendicular to slotting operation).
6) Making of one simple wooden Pattern (max. 4 students per group, each group should make different type of pattern).
7) Making of one Thermo-Cole Pattern (max. 4 students per group, each group should make different

Titles of the Book	Name of Authors	Name of the Publisher
Elements of workshop echnology – Volume I & II	S. K. Hajra Chaudary, Bose, Roy	Media Promoters and Publishers limited
Processes and design for manufacturing	D. L. Wakyl	Prentice Hall
Production Technology - Volume I & II	O. P. Khanna and Lal	--
Workshop Technology - Volume I , II & III	W.A.J. Chapman	--
Introduction to Manufacturing Processes	Jhon A Schey	McGraw Hills International
Manufacturing Technology	M. Aduthan and A. B. Gupta	New Age International
Manufacturing Technology	R.M. Pandey	Foundation Publishing

MECHANICAL ENGINEERING DRAWING - TW
(MECHANICAL ENGG. GROUP)

Subject Code	Term Work						Credits
1625309	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	Internal	:	15	
	—	—	05	External	:	35	

CONTENTS : TERM WORK

List of Term Work :-

(Use first angle method of projection)

1. **Intersection of Solids**

   (i) One Sheet containing atleast two problems.

   (ii) Atleast four problems for home assignment in sketch book.

2. **Development of surfaces**

   Any two problems on development of surfaces of different objects. (one Sheet)

3. **Auxiliary views**

   One sheet containing two problems

   At least two problems as home assignment in sketch book

4. Conventional Representation as per SP – 46 (1988) - one sheet

5. Limit, Fit, Tolerances and Machining Symbols – one sheet

6. Assembly to detailed drawings of components including conventional representation of tolerances and surface finish symbols:

   One sheet covering any one assembly and its details

   At least two problems as home assignment in sketch book.

7. **Details to Assembly**

   Draw One sheet covering any one assembly and its details.

   Solve at least two problems as home assignment in sketchbook.

8. Two problems on assembly drawings using any CAD Package

(Assembly containing maximum 6 to 7 components-minimum 12 hours)

DEVELOPMENT OF LIFE SKILLS II - TW
(MECH.+CIVIL ENGG. GROUP)

Subject Code	Term Work						Credits
1625310	No. of Periods Per Week			Full Marks	:	25	02
	L	T	P/S	Internal	:	07	
	—	—	03	External	:	18	

Contents : Term Work		Hrs/week
	Name of the Topic	**HOURS**
Unit-1	**SOCIAL SKILLS** SOCIETY, SOCIAL STRUCTURE, DEVELOP SYMPATHY AND EMPATHY.	**01**
Unit-2	Swot Analysis – Concept , How to make use of SWOT.	**01**
Unit-3	**Inter personal Relation** Sources of conflict, Resolution of conflict , Ways to enhance interpersonal relations.	**02**
Unit-4	**Problem Solving** **I)STEPS IN PROBLEM SOLVING,** 1)IDENTIFY AND CLARIFY THE PROBLEM, 2)INFORMATION GATHERING RELATED TO PROBLEM, 3)EVALUATE THE EVIDENCE, 4)CONSIDER ALTERNATIVE SOLUTIONS AND THEIR IMPLICATIONS, 5)CHOOSE AND IMPLEMENT THE BEST ALTERNATIVE, 6)REVIEW **II)Problem solving technique**.(any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking	**02**
Unit-5	**Presentation Skills** Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. PRESENTATION SKILL – STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board	**03**
Unit-6	**Group discussion and Interview technique** – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making **INTERVIEW TECHNIQUE** NECESSITY, TIPS FOR HANDLING COMMON QUESTIONS.	**03**
Unit-7	**Working in Teams** UNDERSTAND AND WORK WITHIN THE DYNAMICS OF A GROUPS. TIPS TO WORK EFFECTIVELY IN TEAMS, ESTABLISH GOOD RAPPORT, INTEREST WITH OTHERS AND WORK EFFECTIVELY WITH THEM TO MEET COMMON OBJECTIVES, TIPS TO PROVIDE AND ACCEPT FEEDBACK IN A CONSTRUCTIVE AND CONSIDERATE WAY , LEADERSHIP IN TEAMS, HANDLING FRUSTRATIONS IN GROUP.	**02**

Unit-8	**Task Management** INTRODUCTION, TASK IDENTIFICATION, TASK PLANNING ,ORGANIZING AND EXECUTION, CLOSING THE TASK	**02**
	Total	**16**

List of Assignment: (Any Eight) :-

1) SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats.Following points will be useful for doing SWOT.

a) Your past experiences,

b) Achievements,

c) Failures,

d) Feedback from others etc.

2) Undergo a test on reading skill/memory skill administered by your teacher.

3) Solve the puzzles.

4) Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)

5) Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.

6) Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme.####

7) Conduct an interview of a personality and write a report on it.

8) Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed

9) Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

Mini Project on Task Management. Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management.

Text /Reference Books :

Titles of the Book	Name of Authors	Name of the Publisher
Adams Time management	Marshall Cooks	Viva Books
Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Pretice Hall of India, Pvt Ltd
Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
Decision making & Problem Solving	by Adair, J	Orient Longman
Develop Your Assertiveness	Bishop , Sue	Kogan Page India
Make Every Minute Count	Marion E Haynes	Kogan page India
Organizational Behavior	Steven L McShane and Mary Ann Glinow	Tata McGraw Hill
Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, Pvt Ltd
Presentation Skills	Michael Hatton (Canada – India Project)	ISTE New Delhi
Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
Target setting and Goal	Richard Hale ,Peter Whilom	Kogan page India
Time management	Chakravarty, Ajanta	Rupa and Company
Working in Teams	Harding ham .A	Orient Longman
Development of Life Skill-II	Sudha Ranjan	Foundation Publishing

INTERNET ASSISTANCE

1. http://www.mindtools.com
2. http://www.stress.org
3. http://www.ethics.com
4. http://www.coopcomm.org/workbook.htm
5. http://www.mapfornonprofits.org/
6. http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7. http://eqi.org/
8. http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9. http://www.mapnp.org/library/ethics/ethxgde.htm
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. http://members.aol.com/nonverbal2/diction1.htm
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. http://snow.utoronto.ca/Learn2/modules.html
14. http://www.quickmba.com/strategy/swot/

PROFESSIONAL PRACTICES III - TW
(MECH.+CIVIL ENGG. GROUP)

Subject Code	Term Work						Credits
1625311	No. of Periods Per Week			Full Marks	:	25	02
	L	T	P/S	Internal	:	07	
	—	—	03	External	:	18	

Contents :Term Work		Hrs/week
Chapter	**Activities**	Hours
Unit-1	**Industrial Visits** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. **TWO** industrial visits may be arranged in the following areas / industries : i) Manufacturing organizations for observing various manufacturing processes including heat treatment ii) Material testing laboratories in industries or reputed organizations iii) Auto workshop / Garage iv) Plastic material processing unit v) ST workshop / City transport workshop	**08**
Unit-2	Lectures by Professional / Industrial Expert be organized from **ANY THREE** of the following areas : i) Use of a plastics in automobiles. ii) Nonferrous Metals and alloys for engineering applications iii) Surface Treatment Processes like electroplating, powder coating etc. iv) Selection of electric motors. v) Computer aided drafting. vi) Industrial hygiene. vii) Composite Materials. viii) Heat treatment processes. ix) Ceramics x) Safety Engineering and Waste elimination	**08**

Unit-3	**Individual Assignments :** **Any two** from the list suggested a) Process sequence of any two machine components. b) Write material specifications for any two composite jobs. c) Collection of samples of different plastic material or cutting tools with properties , specifications and applications. d) Preparing models using development of surfaces. e) Assignments on bending moment , sheer forces , deflection of beams and torsion chapters of strength of material. f) Select different materials with specifications for at least 10 different machine components and list the important material properties desirable. g) Select 5 different carbon steels and alloy steels used in mechanical engineering applications and specify heat treatment processes employed for improving the properties. Also give brief description of the heat treatment processes. h) List the various properties and applications of following materials – a. Ceramics b. fiber reinforcement plastics c. thermo plastic plastics d. thermo setting plastics e. rubbers. OR Conduct **ANY ONE** of the following activities through active participation of students and write report i) Rally for energy conservation / tree plantation. ii) Survey for local social problems such as mal nutrition, unemployment, cleanliness, illiteracy etc. iii) Conduct aptitude , general knowledge test , IQ test iv) Arrange **any one** training in the following areas : a) Yoga. B) Use of fire fighting equipment and First aid Maintenance of Domestic appliances	**08**

Unit-4	**Modular courses (Optional) :** A course module should be designed in the following areas for max. 12 hrs. Batch size – min. 15 students. Course may be organized internally or with the help of external organizations. a) Forging Technology. b) CAD-CAM related software. c) Welding techniques. d) Personality development. e) Entrepreneurship development.	**08**
Unit-5	**3-D Design using software** Computer screen, coordinate system and planes, definition of HP,VP, reference planes How to create them in $2^{nd}/3^{rd}$ environment. Selection of drawing site & scale. Commands of creation of Line, coordinate points, Axis, Poly lines, square, rectangle, polygon, sp line, circles, ellipse, text, move, copy, offset, Mirror, Rotate, Trison, Extend, Break, Chamfer, Fillet, Curves, Constraints fit tangency, perpendicularity, dimensioning Line convention, material conventions and lettering. The Student should draw – different orthographic Views (including sections), Auxiliary views according to first/ Third angle method of projection. (Minimum two sheets, each containing two problems) after learning the contents as above.	**16**
	Total	**48**

Text /Reference Books :		
Titles of the Book	**Name of Authors**	**Name of the Publisher**
Professional Practices-III	Sudha Ranjan	Foundation Publishing

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN MODERN OFFICE PRACTICE

(Effective from Session 2016-17 Batch)

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.	Language and Communication Skill-II (English+Hindi)	1626301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C '	1600302	03	03	10	20	70	100	28	40	03
3.	Managerial Economics	1626303	03	03	10	20	70	100	28	40	03
4.	Management Information System	1626304	03	03	10	20	70	100	28	40	03
5.	E-Typing-I	1626305	03	03	10	20	70	100	28	40	03
		Total:-	**16**				**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.	Computer Programming Through 'C ' Lab	1600306	06	03	15	35	50	20	03
7.	Language and Communication Skill Lab -II (English+ Hindi)	1626307	04	03	30	70	100	40	02
8.	E-Typing Lab - I	1626308	04	03	15	35	50	20	02
		Total:-	**14**				**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	
9.	Language and Communication Skill-II (English+ Hindi) & Group Discussion (TW)	1626309	03	15	35	50	20	02
		Total:-	**03**			**50**		
Total Periods per week Each of duration one Hours = 33						**Total Marks = 750**		**24**

LANGUAGE & COMMUNICATION SKILL – II (ENGLISH+ HINDI)

Subject Code 1626301	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
				CT	:	20	

ENGLISH

Rationale:

Communication is the most important part of managerial process. It is expected by the diploma students to excel in written and oral communication and also to put up an effective presentation both in Hindi and English language.

The aim of the subject 'Language and Communication Skill-English' is to provide the theoretical knowledge for acquiring skills in effective Communication along with their higher authorities and sub-ordinates. The Course will also help to develop students personality and subsequently prepare them for a successful professional life as an office assistant / Salesman/ Library assistant/ Librarian/ Designer/ receptionist, etc. Therefore, the theory curriculum has been designed to meet the above need by bringing about an improvement in their presentation method.

Creative writing helps to enhance writing and fluency skill in any language. Writing helps to express our views directly originating from our mind. Creative Writing also enhances our verbal skills. After all, writing makes a man perfect.

Objectives:

The students will be able to –

- Develop their personality traits.
- Make them enable to understand the conversation with their higher authorities/ sub ordinates/ other persons concerned.
- Expose their personality effectively.
- Develop good relations/ contacts with different types of persons concerned.
- Develop skill of imprompter well as public speech.
- Develop writing skill.

Contents : Theory		Hrs/week	Marks
Units-1	Forms of Communication	[02]	
Units-2	Personality Development	[03]	
Units-3	Power of Expression	[02]	
Units-4	Practice on polishing one`s voice	[02]	
Units-5	Effective Communication	[02]	
Units-6	Courtesy.	[02]	
Units-7	Conversation on telephone	[02]	
Units-8	Careful listening	[03]	
Units-9	Mannerism	[03]	
Units-10	Presentation	[03]	
Units-11	Organising your presentation	[03]	
Units-12	Group Discussion	[02]	
Units-13	Extempore speech	[02]	
Units-14	Body language	[03]	
Units-15	Feedback	[02]	
Units-16	Creative Writing	[03]	
Units-17	Essay Writing	[03]	
Units-18	Reportage	[03]	
Units-19	Feature	[02]	
Units-20	Personal Interview	[03]	
	Total	**50**	

Books Recommended:

Text Books

1. Fearless and Flowless Public Speaking with power, polish and pizzaz, S.Chand & Company - Marry Ellen Diamond

HINDI

वृहत् आधार एवं उद्देश्यः–

'भाषा एवं संचार कला–हिन्दी' विषय के पाठयक्रम का उद्देश्य छात्राों को हिन्दी भाषा एवं संचार कला का महत्व समझने एवं उसमें दक्षता प्राप्त करने में सहायता प्रदान करना है, जिससे छात्रा विभिन्न सरकारी एवं निजी संगठनों में व्यक्तिगत सहायक, सचिव, स्वागतकर्त्ता, पुस्तकालय सहायक, कम्प्यूटर प्रवर्त्तक या व्यावसायिक के रूप में सफल हो सकें। स्वरोजगार की ओर उन्मुख होने वाले छात्राों के लिए भी पाठयक्रम विशेष दक्षता प्रदान करने में सहायक है।

प्रभावशाली संचार आधुनिक युग की आवश्यकता है अतः, हिन्दी एवं अंग्रेजी दोनों ही भाषाओं में प्रभावकारी अभिव्यक्ति की क्षमता रखना छात्राों के लिए नितान्त आवश्यक है। डिप्लोमा छात्राों से उम्मीद की जाती है उनका व्यक्तित्व विकसित हो और वे प्रभावशाली प्रस्तुतीकरण की क्षमता रखते हों, अतः पाठयक्रम में मुख्यतः दो बातों पर बल दिया गया है–1. मौखिक संप्रेषण 2. सृजनात्मक लेखन।

पाठयक्रम छात्राों के व्यक्तित्व के विभिन्न पहलुओं का विकास कर उन्हें एक अच्छे वक्ता के रूप में तैयार करता है और रचनात्मक लेखन के लिए प्रेरित करता है ताकि वे भविष्य में अपने संपर्क में आने वाले लोगों एवं अधिनस्थों को संतुष्ट कर पाने में सक्षम हो सकें।

संचार प्रबंधन का आधार है और संचार की कला प्रबंधकीय क्षमता का एक महत्वपूर्ण पहलू है। संचार कला की उपेक्षा कर कोई भी प्रबंधन सफल नहीं हो सकता। वास्तव में निर्णय लेने वाले व्यक्ति एवं उस परअमल करने वाले के बीच प्रभावशाली संचार एक महत्वपूर्ण सेतु की तरह है। प्रबंधकीय प्रक्रिया में निहित संचार के विभिन्न स्वरूपों की जानकारी के साथ–साथ उपयुक्त शब्दों का चुनाव, सटीक वाक्य एवं सुघड़ शैली, सब मिल कर ही संचार को प्रभावशाली बना पाते हैं। समस्त प्रबंधकीय क्रियाएँ प्रभावशाली संचार पर निर्भर करती हैं।

भाषा के साथ शारीरिक भाषा अथवा सांकेतिक भाषा का सही समन्वय हो तो, मौखिक संप्रेषण की विश्वसनीयता एवं प्रभाव में कई गुना वृद्धि हो जाती है। छात्राों को शारीरिक भाषा के समुचित प्रयोग के तकनीक की जानकारी पाठ्यक्रम में दी गयी है जिससे वे प्रभावकारी मौखिक संप्रेषण को विकसित करने का प्रयास कर सके। लेखन व्यक्तित्व को संपूर्णता प्रदान करता है। सृजनात्मक लेखन से संबंधित जानकारी भी पाठ्यक्रम में दी गई है ताकि छात्र अपनी रचनात्मक क्षमता के विकास का अधिकाधिक प्रयास कर सकें।

उद्देश्य

- छात्रा–छात्राओं के व्यक्तित्व–रेखा का विकास करना।
- मौखिक संप्रेषण का विकास करना।
- शारीरिक भाषा द्वारा संप्रेषण शक्ति का विकास करना।
- वाचन–कला के तकनीक की जानकारी देना।
- वाचन–कला का विकास करना।
- सृजनात्मक लेखन की पहचान करना।
- सृजनात्मक लेखन क्षमता का विकास करना।

क्रम संख्या	विषय	व्याख्यान
1.	भाषा का रूप	[02]
2.	निर्भीकता	[03]
3.	शिष्टतायुक्त वाणी	[03]
4.	शारीरिक भाव–भंगिमा युक्त भाषा	[03]
5.	प्रस्तुतीकरण	[03]
6.	हास्य एवं दृश्य द्वारा प्रस्तुतीकरण	[05]
7.	शिष्टाचार	[05]
8.	वाचन–कला	[03]
9.	श्रवण	[03]
10.	फीडबैक	[05]
11.	सृजनात्मक लेखन	[05]
12.	निबंध लेखन	[05]
13.	रिपोतार्ज लेखन	[03]
14.	फीचर लेखन	[02]

Contents: Theory		Hrs/week	Marks
Unit -1	**भाषा के रूप** मौखिक भाषा लिखित भाषा सारांश	[02]	
Unit -2	**नर्भीकता** बोलने की निर्भीकता श्वास–क्रिया उचित स्थान पर बैठाने की क्रिया सारांश	[03]	
Unit -3	**शिष्टतायुक्त वाणी** आवश्यकता वाणी में उतार–चढ़ाव_दूरभाष–वार्त्तालाप	[03]	
Unit -4	**शारीरिक भाव–भंगिमा युक्त भाषा** संप्रेषण में शारीरिक भाषा का प्रयोग नेत्रा द्वारा संचार सारांश	[03]	
Unit -5	**प्रस्तुतीकरण** प्रस्तुतीकरण की तैयारी बोलने की तैयारी सारांश	[03]	
Unit -6	**हास्य एवं दृश्य द्वारा प्रस्तुतीकरण** प्रभावकारी दृश्य की रचना हास्य का प्रयोग प्रभावकारी परचा, पोस्टर, पम्फलेट्स की रचना सारांश	[05]	
Unit -7	**शिष्टाचार** व्यक्तित्व परिचय बोलने में शिष्टाचार कार्य का परिचय शिष्टाचार का माध्यम अच्छा परिचय और संतुष्टि वक्ता का शिष्टाचार सारांश	[05]	
Unit -8	**वाचन–कला** प्रश्नों का प्रतिपादन श्रोताओं से प्रश्न लेना व्यापार करने का साधन	[03]	
Unit -9	**श्रवण** मोहित श्रोता प्रभावकारी श्रवण के लिए आवश्यक संकेत	[03]	
Unit -10	**फीडबैक** फीडबैक की जाँच फीडबैक को प्रभावकारी बनाना फीडबैक प्राप्त करना जाँच के द्वारा सीखना	[05]	
Unit -11	**सृजनात्मक लेखन** परिचय अर्थ क्षेत्रा, महत्व	[05]	
Unit -12	**निबंध लेखन** वैचारिक निबंध निबंध एवं अन्य विधायें सारांश	[05]	
Unit -13	**रिपोर्ताज लेखन** निबंध एवं रिपोतार्ज रिपोतार्ज लेखन	[03]	
Unit -14	**फीचर लेखन** निबंध एवं फीचर फीचर लेखन सारांश	[02]	
	Total		

उपयोगी पुस्तकें

1 हिन्दी वांड्.मय बीसवी शती, पुस्तक मदिर, आगरा – डॉ नागेन्द्र(संपादक)

2 जनसंचारः विविध आयाम, राधाकृष्ण प्रकाशन, दिल्ली – बृजमोहन गुप्त

3 संचार और विकास, प्रकाशन विकास, सूचना एवं प्रसारण मंत्राालय, भारत सरकार, नई दिल्ली – श्यामाचरण दूबे

4 फीचर लेखन, प्रकाशन विकास, सूचना एवं प्रसारण मंत्राालय, भारत सरकार, नई दिल्ली – प्रेमनाथ चतुर्वेदी

5 अशोक के फूल, लोकभारती प्रकाशन, इलाहाबाद – आचार्य हजारी प्रसाद द्विवेदी

6 Fearless and Flowless Public Speaking with power, polish and pizzaz, S. Chand & Co. – Mary Ellen Droummonnd

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

S.No.	Topics	Periods
01	Introduction to Programming	(03)
02	Algorithm for Problem Solving	(08)
03	Introduction to 'C' Language	(08)
04	Condition and Loops	(07)
05	Arrays	(07)
06	Functions	(07)
07	Structures and Unions	(04)
08	Pointers	(06)
	Total :	**(50)**

Contents: Theory			Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		[03]	
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		[08]	
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		[08]	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		

Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		[7]	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Perator.		
	04.03	If statement, it-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		[7]	
Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.		[7]	
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,		[4]	
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.		[6]	
		Total		

Book Recommended:

1.	Programming with C. Second Edition. Tata McGraw-Hill, 2000	-	Byron Gottfried
2.	How to solve by Computer, Seventh Edition, 2001, Prentice hall of India.	-	R.G. Dromey
3.	Programming with ANSI-C, First Edition, 1996, Tata McGraw hill.	-	E. Balaguruswami
4.	Programming with ANSI & Turbo C. First Edition, Pearson Education.	-	A. Kamthane
5.	Programming with C. First Edition, 1997, Tara McGraw hill.	-	Venugopla and Prasad
6.	The C Programming Language, Second Edition, 2001, Prentice Hall of India.	-	B. W. Kernighan & D.M. Ritchie
7.	Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi.	-	R. Subburaj
8.	Programming with C Language, Tara McGraw Hill, New Delhi.	-	C. Balagurswami
9.	Elements of C, Khanna Publishers, Delhi.	-	M. H. Lewin
10.	Programming in C.	-	Stephen G. Kochan
11.	Programming in C, khanna Publishers, Delhi.	-	B. P. Mahapatra
12.	Let us C, BPB Publication, New Delhi.	-	Yashwant kanetkar
13.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa
14.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
15.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth
16.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
17.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
18.	Pointers in C, BPB publication, New Delhi.	-	Yashwant Kanetkar

MANAGERIAL ECONOMICS

Subject Code 1626303	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale & Objective:

Basic aims and objective of this subject is to tell how best to achieve a firm objective in particular situation. Since it provides an intelligent understanding of the environment in which the business must operate.

This understanding enables a student to adjust in the best possible manner with external forces over which he has no control but which play a crucial role in the well being of his concern

Contents : Theory		Hrs/week	Marks
Unit -1	Definition of Economics	**(01)**	
Unit -2	The role of Economist	**(01)**	
Unit -3	Nature and Scope of Economics	**(01)**	
Unit -4	Micro & Macro Economics	**(01)**	
Unit -5	Theory of Consumption	**(01)**	
Unit -6	Consumer Behaviour (Marginal Utility)	**(01)**	
Unit -7	The law of Diminishing Marginal Utility	**(01)**	
Unit -8	The law of Equi. Marginal Utility	**(01)**	
Unit -9	Consumer's Surplus	**(01)**	
Unit -10	Law of Demand	**(01)**	
Unit -11	Price line & Equilibrium of Consumer	**(01)**	
Unit -12	The substitution effect & Income effect	**(01)**	
Unit -13	Elasticity of Demand, Giffon goods	**(01)**	
Unit -14	Theory of Production	**(01)**	
Unit -15	Thoery of Production function	**(01)**	
Unit -16	Law of Production	**(01)**	
Unit -17	ISO Product Curve	**(01)**	
Unit -18	Linear Programming (1) Graphical Method (2) Simpler Method	**(01)** **(01)**	
Unit -19	Theory of Exchange/Product Pricing	**(01)**	
Unit -20	The concept of cost and curve	**(01)**	
Unit -21	Market & Market Structures	**(01)**	
Unit -22	Revenue and Revenue Curve	**(01)**	
Unit -23	Price under perfect Competition	**(01)**	
Unit -24	Price Under Monopoly	**(01)**	
Unit -25	Monopolistic Competition	**(01)**	
Unit -26	Oligo poly	**(01)**	
Unit -27	Public Finance	**(02)**	

Unit -28	Importance of Public Finance	**(02)**	
Unit -29	Meaning of Tax & Type of Tax	**(02)**	
Unit -30	Meaning of Public Debt	**(02)**	
Unit -31	Sources of Public Debt	**(02)**	
Unit -32	Budget	**(02)**	
Unit -33	Meaning and Importance of a Budget	**(02)**	
Unit -34	Balance of and Unbalanced Budget	**(02)**	
Unit -35	Economic System	**(01)**	
Unit -36	Features of Capitalist Economy	**(01)**	
Unit -37	Features of Socialist Economy	**(01)**	
Unit -38	Features of Mixed Economy	**(01)**	
Unit -39	Comparative Study of all the system of Economy	**(01)**	
Unit -40	Economic Planning	**(01)**	
Unit -41	Planning in an under developed Economy	**(01)**	
	Total	**50**	

MANAGEMENT INFORMATION SYSTEM

Subject Code 1626304	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale and Objectives

The systems model of management shows that Communication is needed for carrying out the managerial functions and to link the organization with its external environment. The Management Information System provides the communication link and makes managing possible.

It helps the student to know that how external information is necessary for preparing the policy and strategy of a control.

CONTENTS : THEORY		Hrs/week	Marks
Unit-1	Concept and Process of Control	**[02]**	
Unit-2	Strategic Planning Managerial Control	**[02]**	
Unit-3	Accounting and Control	**[0 2]**	
Unit-4	Major Control System	**[04]**	
Unit-5	Responsibility Accounting	**[04]**	
Unit-6	Management Reporting System	**[04]**	
Unit-7	Conceptual Frame-Work of Management	**[0 4]**	
Unit-8	Basic Information System	**[04]**	
Unit-9	Management Information System and Decision Making	**[04]**	
Unit-10	MIS Planning (Concept & Process)	**[04]**	
Unit-11	Techniques of MIS Planning	**[03]**	
Unit-12	MIS Designing	**[03]**	
Unit-13	Implementation of MIS	**[03]**	
Unit-14	Evaluation of MIS (Review & Revision of MIS)	**[03]**	
Unit-15	Role of Computers in MIS	**[01]**	
Unit-16	Database Management	**[03]**	
	Total	**50**	

Recommended Books

SL	Title/Publisher	Author
1.	Essential of Management	Koontz & O'Deonnel
2.	Principles of Management	L. M. Prasad
3.	Introduction to Accountancy	T. S. Grewal
4.	Financial Management	Prasanna & Chandra

E-TYPING - I

Subject Code 1626305	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

E-TYPEWRITING-I (ENGLISH/HINDI)

RATIONALE

COMPUTER is used in the offices for typing letters, bills, invoices, forms, notices, reports, statements and other written forms of communication. The students of this programme must have the necessary skills to operate the key-board of computer which is having similar key positions. The proficiency in e-typing will enable the students to perform in the written communication, necessary for modern offices, efficiently and effectively. Through the series of courses in typing the necessary skills shall by developed in the students of this diploma programme.

CONTENTS : THEORY (ENGLISH)

1. E-Typewriting :-
   - Introduction and Importance of E-Typewriting.
   - Difference between manual typewriting and E-typewriting.
   - Job Opportunities.
2. Qualities required to become an efficient and effective typist
3. Basics of good e-keyboarding skills
4. Importance of Proper Physical Environment for typing work, Proper Lighting, Proper Furniture.
5. Typing Ergonomics and Positioning :-
   - Position of Monitor, Keyboard, Mouse etc.
   - Body Positioning.
6. Introduction to Keyboard :-
   - In-script, Qwerty, etc.
   - Types of Keys : Alphanumeric Keys, Punctuation Keys and Special Keys.
   - Ergonomic Keyboard.
7. Methods of Typewriting :-
   - Touch Typewriting
   - Sight Typewriting

8. Approaches to Typewriting :-

- Vertical Approach
- Horizontal Approach

9. Finger Placement according to Touch Typewriting :-

- Home Row
- Upper Row
- Bottom Row
- Number Row

10. Importance of Typing Rhythm

11. Use of Spacing in Punctuation Signs

12. Knowledge of various errors which may be committed in key board operation.

13. Importance of Accuracy over speed

14. Keyboarding drill exercises

Note :- Practice of typing in a word processing package, typing software and on-line.

CONTENTS : THEORY (HINDI)

टंकण विज्ञान –थ्योरी (सैद्धान्तिक)

1. टंकण विज्ञान का परिचयांकन

टाइपराइटर की उपयोगिता, महत्व और विकास।

विभिन्न प्रकार की मशीनें – हस्तचालित मानक यंत्रा, वहनीय, ध्वनी–रहित, ब्रेल–राइटर,

इलेक्टॉनिक यंत्रा, कंप्यूटर एवं लैप–टॉप का विकास।

2. कुंजीपटल संचालक

टाइप करने की तैयारी– बैठने का ढंग।

टंकण विध्यिां– दृश्य एवं स्पर्श विधि।

आधर पंक्ति या दूसरी पंक्ति का अभ्यास,

तीसरी पंक्ति का अभ्यास, प्रथम या निम्न पंक्ति का अभ्यास,

संख्या या चौथी पंक्ति का संचालन,

विशेष चिह्नों का प्रयोग, रोमन संख्याएं आदि का संचालन।

3. **सुंदर प्रस्तुतीकरण के नियम**

हाशिए छोड़ना – समतल, बाएं, दाएं एवं ध्र्वमुखी हाशिये छोड़ना,

शीर्षक का केन्द्रण, उप–शीर्षक का केन्द्रण, पंक्ति अंतरण,

व्याकरणिक चिह्नों का प्रयोग एवं नियम, पैराग्रापफ/अनुच्छेद टाइप करना, पत्रा एवं नोट टाइप करना।

शब्दों का विभाजन, गति गणना,

सारणी टाइप करने की विध्यिा।

Books Recommended :-

1. Typewriting Made Easy For beginners by Dr. O.P. Kuthiala; Pitman Publications.
2. Typewriting Speed and Accuracy by Dr. O.P. Kuthiala; Pitman Publications.
3. Typewriting Speed and Accuracy by Dr. R.C. Bhatia, Sterling Publishers, Pvt. Ltd.
4. English Typewriting Instructor by Dr. G.D. Bisht, Published by Short hand House.
5. Typewriting Theory and Practice by Dr. R.C. Bhatia; Sterling Publishers Pvt, Ltd.

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code 1600306	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
				External	:	35	

Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Eight experiments to be performed in the laboratory:

Contents : Practical		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	12	
Unit-2	Programming exercise on case Control Statement.	12	
Unit-3	Programming exercise on Decision Control Statement.	12	
Unit-4	Programming exercise on looping.	12	
Unit-5	Programming exercise on recursion technique.	12	
Unit-6	Programming exercise on Structure.	12	
Unit-7	Programs on array implementation.	12	
	Total	**84**	

Text / Reference Books -

1. How to solve it by Computer, Prentice Hall of India, 1992. - R.G. Dromey.
2. The C Programming Language, Prentice Hall of India, 1989. - B.W. Kernighan & D.M. Ritchie.
3. The C Programming Language, Prentice Hall of India, 1989. - Cooper, Mullish
4. Application Programming in C. Macmillain International editions, 1990. - Richa'd Johnson- Baugh & Martin Kalin
5. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
6. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth.
7. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
8. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi - R. Subburaj
10. Programming with C language, Tata McGraw Hill, New Delhi. - C. Balaguruswami
11. Elements of C, Khanna Publishers. Delhi - M. H. Lewin
12. Programming in C - Stephan G. Kochan.
13. Programming in C, Khanna Publishers. New Delhi - B.P. Mahapatra
14. Let us C, BPB Publication. New Delhi - Yashwant Kanetkar
15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

LANGUAGE AND COMMUNICATION SKILL LAB - II

(ENGLISH+ HINDI)

Subject Code 1626307	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	ESE	:	100	
	—	—	04	Internal	:	30	
				External	:	70	

ENGLISH

Rationale :

The primary aim of the practical of the given course is to help the students put into practice the theoretical speech of communication with a view to acquiring skill of communication for communicating effectively with their higher authorities as well be helpful to develop their personality and subsequently for a successful professionals life as an office assistant/salesman/receptionist etc.

The Vocal curriculum has therefore been designed as to meet the above requirements by bringing about a important in their method of presentation. If seeks to develop the student's power of oral communication through effective use of body language. The course will bring over all improvement in their personality through constant practice.

Objectives:

The Students will be able to:

- Develop their personal traits
- Make them able to understand the conversation with their higher authorities/subordinates/other persons concerned.
- Exposure their personality effectively.
- Develop good relations/contacts with different types of persons concerned.
- Develop skill of importantly speech as well public speech.
- Develop skill of creative writing.

Contents : Practical		Hrs/week	Marks
Unit -1	Personal Interview		
Unit -2	Other forms of Collection or Communication		
Unit -3	Personality Development		
Unit -4	Debate Elocution and Entempore speech		
Unit -5	Practice through mock Interviews		
Unit -6	Creating Writing.		
	Total		

HINDI

वृहत् आधार एवं उद्देश्यः–

प्रस्तुत पाठ्यक्रम सैद्धान्तिक पाठ्यक्रम का व्यावहारिक पक्ष है जिसमें, अभ्यास को प्रमुखता प्रदान की गयी है। सैद्धान्तिक पाठ्यक्रम द्वारा प्राप्त की गयी जानकारी का मूल्यांकन इसका मुख्य उद्देश्य है जिससे छात्राों की अभ्यास क्षमता का परिचय मिल सकता है। इस पाठयक्रम से छात्राों को अपनी काल्पनिक और सृजनात्मक क्षमता का विकास करने में मदद मिलेगी। मौखिक संप्रेषण एवं सृजनात्मक लेखन के अभ्यास से छात्राों के व्यक्तित्व का विकास संभव हो सकेगा।

उद्देश्य

पाठ्यक्रम के अध्ययन के पश्चात, छात्रा–

- मौखिक संप्रेषण के महत्व को समझ सकेंगे।
- मौखिक संप्रेषण के प्रभाव में वृद्धि कर सकेंगे।
- सृजनात्मक लेखन के क्षेत्रा एवं महत्व से परिचित होंगे।
- व्यक्तित्व के विभिन्न पहलुओं का विकास कर सकेंगे।
- रचनात्मक क्षमता का विकास कर सकेंगे।

क्रम संख्या	विषय	व्याख्यान
1	शिष्टतायुक्त वाणी	(05)
2	दूरभाष वार्त्तालाप	(03)
3	प्रस्तुतीकरण	(02)
4	सृजनात्मक लेखन	(02)
5	निबंध लेखन	(02)
6	रिपोतार्ज एवं फीचर	(02)
7	मुहावरे एवं लोकोक्तियाँ	(02)
	कुल–	**50**

उपयोगी पुस्तकें

1	हिन्दी वांड्.मय बीसवी शती, पुस्तक मदिर, आगरा	–	डॉ नागेन्द्र(संपादक)
2	जनसंचारः विविध आयाम, राधाकृष्ण प्रकाशन, दिल्ली	–	बृजमोहन गुप्त
3	संचार और विकास, प्रकाशन विकास, सूचना एवं प्रसारण मंत्राालय, भारत सरकार, नई दिल्ली	–	श्यामाचरण दूबे
4	फीचर लेखन, प्रकाशन विकास, सूचना एवं प्रसारण मंत्राालय, भारत सरकार, नई दिल्ली	–	प्रेमनाथ चतुर्वेदी
5	अशोक के फूल, लोकभारती प्रकाशन, इलाहाबाद	–	आचार्य हजारी प्रसाद द्विवेदी
6	Fearless and Flowless Public Speaking with power, polish and pizzaz, S. Chand & Co.	–	Mary Ellen Droummonnd

E-TYPING LAB - I

Subject Code 1626308	Practical			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Computer typing Practice of Passages from books megazines, Journal and newspaper for enhancing its speed and accuracy.

E-TYPEWRITING-I (ENGLISH/HINDI)

RATIONALE

COMPUTER is used in the offices for typing letters, bills, invoices, forms, notices, reports, statements and other written forms of communication. The students of this programme must have the necessary skills to operate the key-board of computer which is having similar key positions. The proficiency in e-typing will enable the students to perform in the written communication, necessary for modern offices, efficiently and effectively. Through the series of courses in typing the necessary skills shall by developed in the students of this diploma programme.

CONTENTS : PRACTICAL (ENGLISH)

1. E-Typewriting :-
   - Introduction and Importance of E-Typewriting.
   - Difference between manual typewriting and E-typewriting.
   - Job Opportunities.
2. Qualities required to become an efficient and effective typist
3. Basics of good e-keyboarding skills
4. Importance of Proper Physical Environment for typing work, Proper Lighting, Proper Furniture.
5. Typing Ergonomics and Positioning :-
   - Position of Monitor, Keyboard, Mouse etc.
   - Body Positioning.
6. Introduction to Keyboard :-
   - In-script, Qwerty, etc.
   - Types of Keys : Alphanumeric Keys, Punctuation Keys and Special Keys.
   - Ergonomic Keyboard.
7. Methods of Typewriting :-
   - Touch Typewriting
   - Sight Typewriting

8. Approaches to Typewriting :-

   - Vertical Approach
   - Horizontal Approach

9. Finger Placement according to Touch Typewriting :-

   - Home Row
   - Upper Row
   - Bottom Row
   - Number Row

10. Importance of Typing Rhythm

11. Use of Spacing in Punctuation Signs

12. Knowledge of various errors which may be committed in key board operation.

13. Importance of Accuracy over speed

14. Keyboarding drill exercises

Note :- Practice of typing in a word processing package, typing software and on-line.

LIST OF PRACTICALS

1. Operation of the key Board and location of various keys on the computer.

2. Margin fixing.

3. Paragraphing.

4. Line Space.

5. Operation of home keys with repetitive exercises.

6. Operation of top row keys with repetitive exercises.

7. Operation of bottom row keys with repetitive exercises.

8. Operation of shift Keys.

9. Speed practice starting from words, sentences to paragraphs.

10. Spacing after punctuation.

BTE Examination Scheme :-

(1) Practical – Accuracy Passage for typing (200 Words)

Books Recommended (English)

1. Typewriting Made Easy For beginners by Dr. O.P. Kuthiala; Pitman Publications.
2. Typewriting Speed and Accuracy by Dr. O.P. Kuthiala; Pitman Publications.
3. Typewriting Speed and Accuracy by Dr. R.C. Bhatia, Sterling Publishers, Pvt. Ltd.
4. English Typewriting Instructor by Dr. G.D. Bisht, Published by Short hand House.
5. Typewriting Theory and Practice by Dr. R.C. Bhatia; Sterling Publishers Pvt, Ltd.

CONTENTS : PRACTICAL (HINDI)

टंकण विज्ञान –

1. टंकण विज्ञान का परिचयांकन

टाइपराइटर की उपयोगिता, महत्व और विकास।

विभिन्न प्रकार की मशीनें – हस्तचालित मानक यंत्रा, वहनीय, ध्वनी–रहित, ब्रेल–राइटर,

इलेक्टॉनिक यंत्रा, कंप्यूटर एवं लैप–टॉप का विकास।

2. कुंजीपटल संचालक

टाइप करने की तैयारी– बैठने का ढंग।

टंकण विध्यिां– दृश्य एवं स्पर्श विधि।

आधर पंक्ति या दूसरी पंक्ति का अभ्यास,

तीसरी पंक्ति का अभ्यास, प्रथम या निम्न पंक्ति का अभ्यास,

संख्या या चौथी पंक्ति का संचालन,

विशेष चिह्नों का प्रयोग, रोमन संख्याएं आदि का संचालन।

3. **सुंदर प्रस्तुतीकरण के नियम**

हाशिए छोड़ना – समतल, बाएं, दाएं एवं ध्र्वमुखी हाशिये छोड़ना,

शीर्षक का केन्द्रण, उप–शीर्षक का केन्द्रण, पंक्ति अंतरण,

व्याकरणिक चिह्नों का प्रयोग एवं नियम, पैराग्रापफ/अनुच्छेद टाइप करना, पत्रा एवं नोट टाइप करना।

शब्दों का विभाजन, गति गणना,

सारणी टाइप करने की विध्यिा।

Part-I- **टंकण विज्ञान (हिन्दी)–**

1. बैठने की सही स्थिति सिखाना और टंकण के महत्व, गति एवं शद्धुता के बारे में समझाना। कुंजीपटल का संचालन स्पर्श विधि या टच मैथड से सिखाना। आधर पंक्ति एवं परी संख्या का सही अभ्यास कराना। निम्न पंक्ति एवं संख्या पंक्ति एवं पिफट कुंजी का संचालन। गति बढ़ाना और शुद्धता पर ध्यान देना।

2. हाशिये लगाना, बाएं, दायें हाशिये लगाना, पंक्ति अंतरण करना, शीर्षक, उप–शीर्षक का केन्द्रण करना, एवं व्याकरणिक चिह्नों का प्रयोग। शब्दों के विभाजन, पैराग्रापफ टाइप करने एवं विशेष चिह्नों का प्रयोग एवं अभ्यास करना।

3. सारणीयन – सारणी टाइप करना, कॉलम बनाना, उनका सैटिंग करना। साधरण या व्यक्तिगत पत्रा टाइप करना और सही पेज में पफॉरमेट करना।

परीक्षा एवं मूल्यांकन विधि– व्यावहारिक परीक्षा प्रशिक्षक द्वारा ली जाएगी।

1. 200 शब्दों का या 1000 स्टोक्स का एक अनुच्छेद 20 श.प्र.मि. की गति से 10 मिनट तक टाइपराइटर/कंप्यूटर पर टाइप करना होगा। 20

2. व्यक्तिगत या आवेदन–पत्रा को सही प्रारू‍प में 20 मिनट में कंप्यूटर पर टाइप करना होगा और उसे फ्लापी, सीडी या पैन ड्राइव पर सेव करके उसका प्रिंट लेना होगा। 20

3. पहले से उपलब्ध फाइलों को ढूंढकर उनमें परिवर्त्तन या संशोधन करना होगा। 20

4. वार्षिक व्यावहारिक कार्य की फाइल रखनी होगी जिसे देखकर परीक्षक प्रदान करेगा। 10

LANGUAGE & COMMUNICATION SKILL – II (ENGLISH + HINDI) & GROUP DISCUSSION -TW

Subject Code 1626309	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	00	
	—	—	03	Internal	:	15	
				External	:	35	

Rationale:

The Sessional curriculum of given course has therefore been so designed as to meet the requirements by bringing about an overall improvement in their way of presentation. It seeks to develop the student's power of oral and written communication through effective use of various worksheets and exercises given in the curriculum.

Objectives:

The Students will be able to:

- Develop their personal traits.
- Make them able to understand the conversation with their higher authorities/subordinates/other persons concerned.
- Exposure their personality effectively.
- Develop good relations/contacts with different types of persons concerned.
- Develop skill of importantly speech as well public speech.
- Develop skill of creative writing.

S.No.	Topics	Periods
01	Writing Effective bio-data/C.V.	(03)
02	Writing good resume, post group discussion/Interview.	(02)
03	Exercise on describe ownself.	(02)
04	Communication Profile.	(02)
05	Exercise on overcoming fears and building personal power.	(05)
06	Assessment of Voice.	(05)
07	Appearance Check list presentation.	(05)
08	Exercise on organising group discussion.	(10)
09	Practice on Written communication (a) Letter Writing (b) Precis Writing (c) Essay Writing (d) Reportage Writing (e) Feature Writing	(10)
	Total :	**(50)**

HINDI

वृहत् आधार एवं उद्देश्य:

प्रस्तुत पाठ्क्रम का उद्देश्य छात्रों की वाचन कला और क्षमता का विकास करना है। विभिन्न अभ्यासों के द्वारा छात्रा अपनी लिखित और मौखिक संप्रेषण को प्रभावशाली बना सकेंगे। समाचार पत्रों और पत्रिकाओं में प्रकाशित होने वाले विभिन्न विषयों से संबंधित लेखों का अध्ययन भी छात्रों के लिए लाभदायक होगा।

उद्देश्य:

पाठ्यक्रम के अध्ययन के पश्चात, छात्रा–

- कल्पना–शक्ति को विकसित कर सकेंगे।
- रचनात्मक क्षमता को विकसित कर सकेंगे।
- मौखिक संप्रेषण को अधिक प्रभावशाली बना सकेंगे।
- लेखन कौशल का परिचय दे सकेंगे।
- भाषा और शैली को पठनीय एवं रचनात्मक बना सकेंगे।

क्रम संख्या	विषय	व्याख्यान
1	व्यक्ति–परिचय	[02]
2	शिष्टाचार	[03]
3	शारीरिक भाषा	[05]
4	सामूहिक परिचर्चा, वाद–विवाद	[05]
5	निबंध लेखन	[05]
6	रिपोर्ताज	[03]
7	फीचर	[02]
8	पत्रा–पत्रिकाओं एवं विभिन्न पुस्तकों का अध्ययन	[25]
	कुल	**25**

परीक्षा का आयोजन

सात्रिक परीक्षा हेतु आर्थिक, सामाजिक, सांस्कृतिक, विज्ञान, पर्यावरण एवं खेल–कूद जैसे क्षेत्रों से विषय का चयन कर, सामूहिक परिचर्चा करना, वाद–विवाद करना, निबंध, रिपोर्ताज एवं फीजर लेखन का अभ्यास करना और संबंधित अभिलेख प्रस्तुत करना छात्रों के लिए अनिवार्य होगा।

GROUP DISCUSSION

Group Discussion involves coming together of a number of persons with varying ideas and points of view to discuss on certain topic or come with a view to solving a problem they have in common. To make group discussion effective following points have to be remembered:

ENGLISH

CONTENTS : PRACTICAL		Hrs/week	Marks
Unit -1	Discussion must be goal directed.		
Unit-2	Every member must be responsible for group effectiveness.		
Unit-3	Every member must aim for cooperation & have positive attitude: conflict should be avoided.		
Unit-4	Effective discussion requires leadership.		
Unit-5	Elements/ features of interaction in a successful group discussion: Verbal communication – talking & listening		
Unit-6	Non-verbal behaviour – facial gestures, physical position, eye contact, tone of voices convey significant messages.		
Unit-7	Norms & Conformity: being polite, listening to others points & views, not being too over hearing, giving others a fare chance to participate.		
Unit-8	Power: through efficiency & competition a candidate is able to impress the group & garner support of them. So participants in a group speak more to a member who demonstrates power.		
Unit-9	Cohesion: It comes only when members are willing to sacrifice personal opinions to uphold group norms or when there are shared needs, intents or goals.		
Unit-10	Discussion making styles: a) Consensus b) Negotiations c) Voting		

समूहिक परिचर्चा

समूहिक परिचर्चा अनेक व्यक्ति को विविध विचारों एवं दृष्टिकोण के साथ किसी एक निर्धारित विषय पर विमर्श अथवा किसी समान्य समस्या के समाधान के लिए आयोजि किया जाता है। इस प्रकार की परिचर्चा में प्रभावशाली प्रदर्शन के लिए भाषा पर नियंत्रण अनिवार्य है ताकि विचारों की अभिव्यक्ति समुचित ढंग से की जा सकें। प्रभावशाली मौखिक संप्रेषण के लिए शब्दों का समुचित प्रयोग एवं सही उच्चारण भी अत्यंत महत्वपूर्ण है। वर्तमान समय में नियुक्तियों के लिए सामूहिक परिचर्चा अभ्यर्थी के व्यक्तित्व के मूल्यांकन में विशिष्ट महत्व रखता है।
छात्रों को इस विषय में जागरूक एवे प्रशिक्षित करने हेतु पाठ्यक्रम में सम्मिलित किया गया है :–

Hindi

CONTENTS : PRACTICAL		Hrs/week	Marks
Unit -1	परिचर्चा का लक्ष्य		
Unit -2	समूहिक दायित्व		
Unit -3	सकारात्मक दृष्टिकोण के साथ सहभागिता		
Unit -4	परिचर्चा के लिए आवश्यक नेतृत्व क्षमता		
Unit -5	पारस्परिक संप्रेषण कौशल		
Unit -6	भाषिक संप्रेषण : वाचन एवं श्रवण		
Unit -7	शारीरिक भाषा का प्रयोग : मुखमुद्रा, भाव भंगिमा एवं नेत्र संचार द्वारा संप्रेषण		
Unit -8	सौम्य व्यवहार, श्रवण क्षमता, स्वस्थ प्रतियोगिता		
Unit -9	समुचित सहभागिता, एकजुटता, संबद्धता		
Unit -10	आम सहमति, सर्वसम्मति		

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III SEMESTER DIPLOMA IN PRINTING TECHNOLOGY

(Effective from Session 2016-17 Batch)

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.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	1600302	03	03	10	20	70	100	28	40	03
3.	Basics of Printing Technology	1627303	03	03	10	20	70	100	28	40	03
4.	Printer's Science	1627304	03	03	10	20	70	100	28	40	03
5.	Press Work	1627305	03	03	10	20	70	100	28	40	03
		Total:-	**16**				**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.	Computer Programming Through 'C ' Lab.	1600306	06	03	15	35	50	20	03
7.	Basics of Printing Technology-Lab.	1627307	04	03	15	35	50	20	02
8.	Printer's Science Lab.-I	1627308	04	03	15	35	50	20	02
Total:-			**14**				**150**		

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.	Press Work (TW)	1627309	03	30	70	100	40	02
Total:-			**03**			**100**		
Total Periods per week Each of duration One Hours			**= 33**			**Total Marks = 750**		**24**

APPLIED MATHEMATICS -I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code 1600301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents :Theory		Hrs/week	Marks
Unit -1	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems. 1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area between two curves. 1.5.3 Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0, 2l), (-l, l), (0, 2\pi), (-\pi, \pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**Numerical Methods** 5.1 Solution of algebraic equations Bisection method. Regularfalsi method. Newton – Raphson method. 5.2 **Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	**05** **05**	**07** **07**
	Total	**48**	**70**

Text /Reference Books:

Name of Authors	**Titles of the Book**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session : 42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale:

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective:

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

Contents : Theory			Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		**[03]**	
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices.		**[08]**	
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		**[08]**	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		**[07]**	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Operator.		
	04.03	If statement, if-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		**[07]**	

Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.	**[07]**	
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	**[04]**	
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	**[06]**	
	Total	**42**	

Text / Reference Books -

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India. - R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill. - E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education. - A. Kamthane
5. Programming with C. First Edition, 1997, Tara McGraw hill. - Venugopla and Prasad
6. The C Programming Language, Second Edition, 2001, Prentice Hall of India. - B. W. Kernighan & D.M. Ritchie
7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - R. Subburaj
8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami
9. Elements of C, Khanna Publishers, Delhi. - M. H. Lewin
10. Programming in C. - Stephen G. Kochan
11. Programming in C, khanna Publishers, Delhi. - B. P. Mahapatra
12. Let us C, BPB Publication, New Delhi. - Yashwant kanetkar
13. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa
14. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
15. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth
16. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
17. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
18. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

BASICS OF PRINTING TECHNOLOGY

Subject Code 1627303	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Objective

This subject deals with the basic knowledge in Printing that will given the students to understand the detailed study of the trade in further studies.

Sl.No.	Topics	Period
1.	Introduction to Printing Technology	(08)
2.	Introduction to Printing Inks	(07)
3.	Introduction to Printing Substracts	(07)
4.	Introduction to Printing Plates	(07)
5.	Introduction to Printing Design	(07)
6.	Education in Printing Technology	(07)
7.	Careers in Printing Technology	(07)

Contents : Theory		Hrs/week	Marks
Unit -1	**Introduction to Printing Technology** 01.01 : Definition of Printing 01.02 : Scope of Printing Technology in modern day world.	(08)	
Unit -2	Introduction to Printing Inks 02.01 : Its role in Printing 02.02 : Types of Printing Inks 02.03 : Drying Processes of Printing inks.	(07)	
Unit -3	**Introduction to Printing Substracts** 03.01 : Printing Paper 03.02 : Plastics 03.03 : Aluminium foiz	(07)	
Unit -4	**Introduction to Printing Plates** 04.01 : Suitabizity of Nature of plate as per Printing Process. 04.02 : Different Printing plates used today	(07)	
Unit -5	**Introduction to Printing Design** 05.01 : Role of Design on Printing Products 05.02 : Originals used in Printing	(07)	
Unit -6	**Education in Printing Technology** 06.01 : Certificate Level courscs in Printing Technology imparted in I.T.I's 06.02 : Diploma level courses available in polytechnic's 06.03 : Degree level courses in Colleges & Universities	(07)	
Unit -7	**Careers in Printing Technology** 07.01 : Careers in operating of Printing Machines & equipments. 07.02 : Supervisory level career. In Printing houses, Publishing houses, advertising agencies & a lot more 07.03 : Management & top level management careers in Printing & allied Trades.	(07)	
	Total	**50**	

PRINTER'S SCIENCE

Subject Code 1627304	Theory			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale & Objective:

The student will learn the scientific approach to the different printing materials. They will also learn about the testing of material for quality control. The subject will make the students to learn about the chemical reactions involved in various stages of Reproduction Photography, Surface Preparation, Presswork etc.

Sl. No. Topics Periods

01 Materials used for Image Carriers (10)
02 Photographic Materials. (10)
03 Polymers (10)
04 Colloids (10)
05 Substrates. (10)
06 PH (10)

Total 60

Contents : Theory		Hrs/week	Marks
Unit -1	**MATERIAL USED FOR IMAGE CARRIERS** 01.01 Relief process, Type metal alloys, original plates; Zinc & Copper for Blocks, Photopolymer plates, Duplicate plates; Stereo and Electro.. 01.02 Planography: Zinc, aluminium, anodized aluminium, bi-metallic and tri-metallic plates, presensitised plates, photopolymer plates. 01.03. Intagllo: Metals used for gravure cylinders and plating. 01.04 Materials used for other processes, e.g. Flexography, Screen, Dry offset.	10	
Unit -2	**PHOTOGRAPHIC MATERIALS:** 02.01 Basic Ingredients of emulsion and their functions. 02.02 Emulsion process, control of sensitometric qualities and sensitometric properties, emulsion structure. 02.03 Developer`s constituents and their functions. 02.04 Chemicals for after –treatment. 02.05 Introduction to non-silver material.	10	
Unit -3	**POLYMERS:** 03.01 Monomers and Polymers. 03.02 Homopolymers and Copolymers. 03.03 Types of polymerisation reactions: Addition polymerisation and condensation polymerisation. 03.04 Types of polymers: Plastics, Rubber and Fibres. 03.05 Composition and characteristic properties of the polymers printing Ink resin and vehicles, adhesives, film base, cellulose and gelatin.	10	
Unit -4	**COLLOIDS** 04.01 Characteristics. 04.02 Methods of preparation and properties. Application in printing industry.	10	
Unit -5	**SUBSTRATES:** 05.01 Fibrous and non-fibrous raw materials used in paper and board manufacture. 05.02 Surface treatment related to ultimate use. 05.03 Varieties of papers and boards: Characteristics, Classifications, identification selection of choice for different classes of print jobs and printing processes. 05.04 Other substrates: Metal foil, plastic, cellophane, etc.	10	

Unit -6	**pH** 06.01 PH Scale, range of acidity and alkalinity 06.02 PH of fountain Solutions, optimum range required, problems encountered when PH is higher or lower than the optimum range. 06.03 Optimum PH of printing inks, problem encountered when pH is higher or lower than the optimum range. 06.04 PH of paper, problems encountered when pH is higher or lower than the optimum range. 06.05 PH of adhesives used in laminating printed materials, optimum value required, problems encountered when PH is higher or lower than the optimum value.		
	Total	**50**	

PRESS WORK

Subject Code 1627305	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale & Objective:

This subject deals with the Printing Techniques, Relief printing process, Planographic Printing Process and Silk Screen. Intaglio Printing; Knowledge of this subject is very essential for diploma Holder.

S.No.	Topics	Period
01	Relief Printing.	(10)
02	Planographic Printing	(10)
03	Secreen Printing	(10)
04	Intaglio Printing	(10)
05	Flexography Printing	(10)
		Total 50

Contents :Theory		Hrs/week	Marks
Unit -1	**RELIEF PRINTING:** 01.01 Letter press planten machine, kinds-purpose sizes of machine, Different kinds of inking systems- Markeready systems. 01.02 Letterpress cylinder machine single revolution, perfecting machine sizes-speeds-suitability, inking systems, make ready, Feeding and delivery systems. 01.03. Web-fed printing machine and their characteristics.	[10]	
Unit -2	**PLANOGRAPHIC PRINTING:** 02.01 Offset machine (sheet-fed), kinds of presses-sizes-speeds suitability, single, two and multi-colour and perfecting machine. 02.02 Different Kinds of feeding system and its control(ramp controls) 02.03 Plate cylinder, Blanket cylinder, impression cylinder. Packing of these cylinder-their purposes. 02.04 Inking systems-Dempening Systems-drying system-different kinds of delivery systems.	[10]	
Unit -3	**SCREEN PRINTING:** 03.01 Screen printing machine and printing tables, its flatbod machine their accessories-suitability.	[10]	
Unit -4	**INTAGLIO PRINTING** 04.01 Intaglio: sheet fed machine kinds-sizes and suitability.	[10]	
Unit -5	**FLAXOGRAPHY PRINTING** 05.01 Flexography-sheet fed machine, web fed, kinds-sizes and suitability. 05.02 Features, classification of various presses. 05.03 Various unwinding and rewinding units, printing units.	[10]	
	Total	**50**	

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code	Practical			No. of Period in one session : 84			Credits
	No. of Periods Per Week			Full Marks	:	50	
1600306	L	T	P/S	ESE	:	50	03
	—	—	06	Internal	:	15	
				External	:	35	

Rationale:

Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

Objective

The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Contents : Practical		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	12	
Unit-2	Programming exercise on case Control Statement.	12	
Unit-3	Programming exercise on Decision Control Statement.	12	
Unit-4	Programming exercise on looping.	12	
Unit-5	Programming exercise on recursion technique.	12	
Unit-6	Programming exercise on Structure.	12	
Unit-7	Programs on array implementation.	12	

Text / Reference Books -

1. How to solve it by Computer, Prentice Hall of India, 1992. - R.G. Dromey.
2. The C Programming Language, Prentice Hall of India, 1989. - B.W. Kernighan & D.M. Ritchie.
3. The C Programming Language, Prentice Hall of India, 1989. - Cooper, Mullish
4. Application Programming in C. Macmillain International editions, 1990. - Richa'd Johnson- Baugh & Martin Kalin
5. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
6. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth.
7. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
8. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi - R. Subburaj
10. Programming with C language, Tata McGraw Hill, New Delhi. - C. Balaguruswami
11. Elements of C, Khanna Publishers. Delhi - M. H. Lewin
12. Programming in C - Stephan G. Kochan.
13. Programming in C, Khanna Publishers. New Delhi - B.P. Mahapatra
14. Let us C, BPB Publication. New Delhi - Yashwant Kanetkar
15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

BASICS OF PRINTING TECHNOLOGY LAB

Subject Code 1627307	Practical			No. of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Contents : Practical		Hrs/week	Marks
Unit -1	Introduction to Primary & Secondary Colours-Lab demonstration		
Unit-2	Mixing of Primary Colours to get a secondary Colour.		
Unit-3	Practical demonstration of different thicknesses of papers & bonds.		
Unit-4	Making designs of different Printing Products.		

PRINTER'S SCIENCE LAB - I

Subject Code 1627308	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	TA	:	15	
				CT	:	35	

	Contents : Practical	Hrs/week	Marks
Unit -1	Mass, Ink Tests, tone and under tone tests.		
Unit -2	Opacity test		
Unit -3	Drying and Bleeding tests.		
Unit -4	Emulsification tests.		
Unit -5	Test for end use requirements of Ink and Papers.		
Unit -6	PH meter & Desito meter application.		

PRESS WORK -TW

Subject Code	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	
1627309	L	T	P/S	Internal	:	30	02
	—	—	03	External	:	70	

Sl.No. Topics

01 Letter Press.
02 Offset

	Contents : Term Work	Hrs/week	Marks
Unit -1	**LETTER PRESS:** 01.01 Automatic platens and cylinder machine makeready operations for text, line and halftone, setting of feeding, inking and delivery units, levelling the impression. 01.02 Simple imposition schemes. 01.03.Printing problem and their remedies for sheet-fed presses. 01.04 Mounting and locking of Blocks.		
Unit -2	**OFFSET:** 02.01 Adjustment of autometic feaders. 02.02 Mounting of plate on cylinder, fitting of offset blanket, preparing it for printing. 02.03 Preparation of fountain solution, dampening rollers setting. 02.04 Adjustment of inking and dampening rollers, ink fountain zero setting. 02.05 Colour mixing and matching. 02.06 Make-ready and printing of line and halftone, one-and-two colour work. 02.07 Ink roller wash up, cleaning & storing plates.		

STATE BOARD OF TECHNICAL EDUCATION, BIHAR
Scheme of Teaching and Examinations for
III SEMESTER DIPLOMA IN TEXTILE ENGINEERING
(Effective from Session 2016-17 Batch)

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.	Applied Mathematics-I	1600301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	1600302	03	03	10	20	70	100	28	40	03
3.	Textile Fibres	1628303	02	03	10	20	70	100	28	40	03
4.	Yarn Manufacture-I	1628304	03	03	10	20	70	100	28	40	03
5.	Fabric Manufacture-I	1628305	03	03	10	20	70	100	28	40	03
		Total:	**15**				**350**	**500**			

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHIN GSCHEME	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.	Computer Programming through "C" Lab.	1600306	06	03	15	35	50	20	03
7.	Yarn Manufacture Lab. – I	1628307	04	03	15	35	50	20	02
8.	Fabric Manufacture Lab. – I	1628308	04	03	15	35	50	20	02
Total: - 14							**150**		

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	
10.	Yarn Manufacture –I (TW)	1628309	02	15	35	50	20	01
11.	Fabric Manufacture – I (TW)	1628310	02	15	35	50	20	01
Total:- 04						**100**		
Total Periods per week Each of duration one Hours = **33**						Total Marks = **750**		**24**

APPLIED MATHEMATICS -I

(Elect./Chem./Textile/Agri./C.Sc.&E/Electro/Ceramic/Print/Ec.&Comm./Inst.& Cont.)

Subject Code 1600301	Theory			No of Period in one session :48			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents: Theory

	Name of the Topic	Hrs/week	Marks
Unit -1	**Integration:** 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4 Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems. 1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area between two curves. 1.5.3 Mean and RMS values	**12**	**20**
Unit -2	**Differential Equation** 2.1 Definition of differential equation, order and degree of Differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as Variable separable type, reducible to Variable separable, Homogeneous, Non-homogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Laws of voltage and current related to LC, RC, and LRC Circuits.	**10**	**15**
Unit - 3	**Laplace Transform** 3.1 Definition of Laplace transform, Laplace transform of standard functions. 3.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 3.3 Inverse Laplace transforms. Properties- linearly first shifting, second Shifting. Method of partial fractions, 3.4 Convolution theorem. 3.5 Laplace transform of derivatives, 3.6 Solution of differential equation using Laplace transform (up to second order equation).	**08**	**14**
Unit - 4	**Fourier Series** 4.1 Definition of Fourier series (Euler's formula). 4.2 Series expansion of continuous functions in the intervals $(0,2l),(-l,l),(0,2\pi),(-\pi,\pi)$ 4.3 Series expansions of even and odd functions. 4.4 Half range series.	**08**	**07**

Unit - 5	**Numerical Methods** 5.1 Solution of algebraic equations Bisection method. Regula-falsi method. Newton – Raphson method. 5.2 **Solution of simultaneous equations containing 2 and 3 unknowns** Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	**05** **05**	**07** **07**
	Total	**48**	**70**

Text /Reference Books:

Name of Authors	**Titles of the Book**	**Name of the Publisher**
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 1600302	Theory			No of Period in one session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale: Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

Objective: The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in "C" language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in "C".

Contents : Theory

	Name of the Topic		Hrs/week	Marks
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		**03**	
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices.		**08**	
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		**08**	
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.		
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.		
	03.03	Simple assignment statement. Basic input/output statement.		
	03.04	Simple 'C' programs of the given algorithms		
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		**08**	
	04.01	Decision making within a program		
	04.02	Conditions, Relational Operators, Logical Perator.		
	04.03	If statement, it-else statement.		
	04.04	Loop statements		
	04.05	Break, Continue, Switch		
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		**07**	

Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.	**06**	
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,	**04**	
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.	**06**	
	Total	**50**	

Text / Reference Books -

1.	Programming with C. Second Edition. Tata McGraw-Hill, 2000	-	Byron Gottfried
2.	How to solve by Computer, Seventh Edition, 2001, Prentice hall of India.	-	R.G. Dromey
3.	Programming with ANSI-C, First Edition, 1996, Tata McGraw hill.	-	E. Balaguruswami
4.	Programming with ANSI & Turbo C. First Edition, Pearson Education.	-	A. Kamthane
5.	Programming with C. First Edition, 1997, Tara McGraw hill.	-	Venugopla and Prasad
6.	The C Programming Language, Second Edition, 2001, Prentice Hall of India.	-	B. W. Kernighan & D.M. Ritchie
7.	Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi.	-	R. Subburaj
8.	Programming with C Language, Tara McGraw Hill, New Delhi.	-	C. Balagurswami
9.	Elements of C, Khanna Publishers, Delhi.	-	M. H. Lewin
10.	Programming in C.	-	Stephen G. Kochan
11.	Programming in C, khanna Publishers, Delhi.	-	B. P. Mahapatra
12.	Let us C, BPB Publication, New Delhi.	-	Yashwant kanetkar
13.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa
14.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
15.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth
16.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
17.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
18.	Pointers in C, BPB publication, New Delhi.	-	Yashwant Kanetkar

TEXTILE FIBRES

Subject Code 1628303	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	02	—	—	TA	:	10	
				CT	:	20	

Rationale: Textile fibres are an extremely important part of the textile manufacturing process. In this course the students will explore various kinds of textile fibres and learn what makes them right for the job.

Objectives: The students will be able to –

- Know about various kinds of textile fibres.
- Explain properties and uses of different textile fibres.
- Identify various textile fibres.

Contents : Theory

Name of the Topic		Hrs/w	Marks
Unit -1	**INTRODUCTION TO TEXTILES** 01.01 Textile, Textile Technology, Textile Engineering, Texture and importance of Textile 01.02 Textile fibres and filament (definition with examples). 01.03 Classification of textile fibres according to source of occurrence.	02	
Unit -2	**PROPERTIES OF TEXTILE FIBRES** 02.01 Fiber morphology, the macro and micro structure of a textile fibre and filament, microscopic appearance. 02.02 Important Physical Properties of Textile Fibres: staple length, strength, elasticity, uniformity, cohesiveness or spinnability, softness and fineness, resiliency, flexibility, pliability, plasticity, lustre, absorbency, density and specific gravity, colour, abrasion resistance etc.	04	
Unit -3	**NATURAL FIBRES:** **03.01 Cotton Fibres** 03.01.01 Introduction 03.01.02 Growth, cultivation and production of cotton fibres, grading and growing countries, commercial classification or varieties of cotton. 03.01.03 Microscopic Appearance and chemical composition of cotton. 03.01.04 Physical Properties, Chemical Properties, Thermal Properties and Biological Properties. 03.01.05 Uses of Cotton fibres. **03.02 Wool Fibres** 03.02.01 Introduction 03.02.02 Growing of wool, grading of wool (fine, medium, long, crossbreed. mixed). 03.02.03 Types of wool (Merino, British, Cross- breed, and carpet). 03.02.04 Microscopic structure and appearance, chemical composition. 03.02.05 Physical Properties, Chemical Properties, Thermal properties and Electrical properties. 03.02.06 Felting of wool. 03.02.07 Brief idea of conversion of wool fibres into woollens and worsted yarns. 03.02.8 Uses. **03.03 Silk** 03.03.01 Introduction 03.03.02 Types of silk (Mulberry, Tassar, Eri and Muga silk). 03.03.03 Production of silk:- Sericulture, Reeling of silk and Throwing of silk. 03.03.04 Wild silk, spun silk, Degumming of silk, chemical composition of silk. 03.03.05 Physical Properties, Chemical Properties and Electrical properties of Silk. 03.03.06 Microscopic appearance, uses of silk. **03.04 Jute Fiber** 03.04.01 Introduction. 03.04.02 Growth and cultivation: Harvesting, Retting and stripping of jute fibres. 03.04.03 Properties and Uses of jute fibres.	20	

Unit -4	**MAN – MADE FIBERS** 04.01 Viscose Rayon: Introduction, properties and uses of viscose rayon. 04.02 Polynosic Rayon: Introduction, properties and uses of polynosic rayon. 04.03 Cuprammonium Rayon: Introduction, chemical constitution, manufacture with flow sheet, properties and uses of cuprammonium rayon. 04.04 Acetate Rayon: Rayon: Introduction, manufacture with flow sheet, properties and uses of acetate rayon. **04.05 Synthetic Fibers** 04.05.01 Polyamide fibers (Nylon): Introduction, properties and uses of polyamide fibers (nylon 6 & nylon 66)	18	
Unit -5	**IDENTIFICATION AND APPLICATION OF TEXTILE FIBRES:** 05.01 Identification of textile fibers. 05.01.01 Non-Technical Test: Feeling test, burning test, staining test. 05.01.02 Technical Test: Microscope test, Density measurement, Chemical test. 05.02 Application of Fibers and Textiles: Apparel textiles, bedding and home textiles, interior textile and technical textiles. 05.02.01 Technical textiles: Mobile textiles, Geo textiles, Construction textiles, Industrial textiles, Medical textiles, Safety textiles	06	
	Total	**50**	

Books Recommended:-

1	Textiles Fibers.	-	Dr. V.A.. Shenai
2	Textiles Fibers.	-	Mathew
3	Introduction to Textiles Fibers.	-	Murthy
4	Man-Made fibers.	-	R.W. Moncrieff
5	Textiles Fibers	-	ATA
6	Textiles Science.	-	Gohl
7	A Textiles Book of Fiber Science and Techonology	-	S.P. Mishra
8	Textiles Fibers to Fabric	-	Carbman
9	Fabric Care	-	D'Souza
10	Essential of Textiles	-	Joseph
11	Textile Fibres and Their Use	-	Hess

YARN MANUFACTURE –I

Subject Code 1628304	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale: Yarn Manufacture is one of main activities for a diploma holder technician in Textile Engineering. He is required to handle the yarn manufacture machineries, tools and equipments and also supervise the yarn manufacturing processes. He must be well versed with the subject of Yarn Manufacture.

The subject is being introduced to develop the understanding of yarn manufacturing processes. It will help in discharge of his duties in the world of work as he can understand a problem, analyse the same and take an appropriate decision as and when the job demand.

Objectives: After completion of the course student will be able to

-Define the terminologies related with textile machineries and processes.
-Explain the principle and working of the machine
-Sketch the machine parts and label them
-Understand the process of production and their related problem

S .No	Topic	periods
01	Ginning and Bailing	05
02	Mixing, opening and cleaning	15
03	Carding	12
04	Draw frame	07
05	Combing	11
	Total -	**50**

Contents : Theory

Name of the Topic		Hrs/week	Marks
Unit-1	**Ginning and Bailing** 01.01 Objects of Ginning. 01.02 Description and working of different types of gins- Macarthy Roller gin, Saw gin, Knife Roller gin 01.03 Defects in ginning. 01.04 Objects of bailing 01.05 Bailing process 01.06 Standard bale sizes and weights of bales from important cotton growing countries. 01.07 Bale densities, Different impurities or trash present in the cotton bales. 01.08 Grading of cotton.	**05**	
Unit-2	**Mixing, opening and cleaning** 02.01 Objects and methods of mixing, opening and cleaning. 02.02 Difference between mixing and blending 02.03 Detailed Study of blow room machineries for different varieties of cotton. 02.03.01 Hopper Bale Breaker and Hopper feeder. 02.03.02 Types of conventional openers- Porcupine openers, vertical openers, Two and Three bladed beater, Krischner beater 02.03.03 Study of Step cleaner, Axi-flow, Unimix, Uniflex, Cleanomat, and Dedusting machine-Dustex. Study of the chute feed system of transport of material to card. 02.04 Detailed Study of conventional scutcher 02.05 Lap forming, Delivery cages, filters and dust trunk, grid bars, leaf bars, major and minor cleaning points.	**15**	

	02.06 Cotton conveying – Lattice and pneumatic conveying 02.07 Advantages of single process blow room line. 02.08 Cleaning efficiency of blow room and idea of lap regularity and lap rejection. 02.09 Speeds, and production calculations 02.10 Modern developments in blow room machinery 02.11 Evaluation of blow room performance 02.12 Opening lines required for processing of various blends with appropriate speeds and settings.		
Unit-3	**<u>Carding</u>** 03.01 Objects of carding; Basic concepts of Carding Process. 03.02 Construction of revolving flat carding machineries 03.03 Detailed study and its working, speeds and productions for various types of cotton. 03.04 Setting of different parts and effects of changing the setting on sliver quality. 03.05 Methods of Stripping and Grinding. 03.06 Card clothing – flexible Clothing, Metallic clothing. 03.07 Comparison of flexible wire and metallic wire card clothing. 03.08 Cleaning efficiency, Nep count. 03.09 Features and requirements of high speed Cards. 03.10 Auto-Levelling at Card. 03.11 Modern developments in high speed cards. 03.12 Speeds, settings and production calculations of various types of cotton.	**12**	
Unit-4	**<u>Draw frame</u>** 04.01 Objects of Draw frames 04.02 Principles of roller drafting 04.03 Detailed study of draw frame mechanism 04.04 Drafting system and their calculations. 04.05 Roller slip and its remedies 04.06 Roller weighting, Roller settings 04.07 Modern drafting on high speed draw frames 04.08 Features of high speed draw frames. 04.09 Condensation and its effect on sliver quality. 04.10 Speeds, setting and production Calculations pertaining to draw frames.	**07**	
Unit-5	**<u>Combing</u>** 05.01 Objects of combing process 05.02 Need for preparatory process for comber. 05.03 Construction and working of preparatory machines to combing – sliver lap machine, Ribbon lap machine, super lap machine. 05.04 Effect of hook formation at carding on comber lap performance at combing. 05.05 Amount of pre-comber draft. 05.06 Recent development in preparatory machines to combing 05.07 Salient features of modern lap preparatory system. 05.08 Basic Principle of cotton combing. 05.09 Construction and working of Nesmith Comber. 05.10 Setting and timings of different parts of the comber. Adjustment for changing waste percentage on comber. Faults and their remedies. 05.11 Recent developments in comber. 05.12 Performance evaluation of combers. 05.13 Speeds, Settings and production calculation pertaining to combing machineries.	**11**	
	Total	**50**	

Books Recommended

1. Manual of cotton spinning – vol I to IV, Ed AFW coulson, Textile Institute, Manchester
2. The Institute of Textile Technology USA series on textile processing , S. ZALOSKI
3. Technology of short- staple spinning – Vol I to IV , wklein, Textile institute pub, Manchester
4. Spun yarn Technology , E Ostoby, Butter worths Londen
5. Hand Book of Cotton spinning – William Taggart, universal pub, corp,
6. Essential facts of practical cotton spinning – T.K. Pattabhiram, Soumya pub. Bombay.
7. Cotton spinning calculations – T.K. Pattabhiram, Soumya pub. Bombay
8. Cotton opening & cleaning, Cotton carding, Cotton drawing & roving , Cotton combing – G.R. Merrill .

FABRIC MANUFACTURE-I

Subject Code 1628305	Theory			No of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Rationale: The subject is designed to give the basic information of fabric manufacturing methods and complete flowchart details of weaving processes. It also includes motions of looms and their details.

Objectives:

- Learning the basic operations on the loom for the production of fabric.

Contents : Theory

	Name of the Topic	Hrs/week	Marks
Unit -1	**MOTIONS OF WEAVING:** 01.01 Principle and definition of fabric manufacture. 01.02 Motions in weaving: Primary motions, Secondary motions and Tertiary motions.	02	
Unit -2	**LOOM:** 02.01 Introduction 02.02 Types of Loom 02.03 Handloom – Brief idea of handloom. 02.04 Power loom - Details study of plain tappet looms. 02.05 Various parts of loom and its functions.	06	
Unit -3	**SHEDDING MECHANISM:** 03.01 Definition, Types of shed. 03.02 Shedding mechanisms and its kinds. 03.03 The scope of tappet, dobby and jacquard shedding.	05	
Unit -4	**Tappet Shedding** 04.01 Tappets, cam and Difference between cam and tappets. 04.02 Types of tappet shedding: Negative and positive tappet shedding. 04.03 Various types of tappet shedding: Inside Outside tappet shedding. 04.04 Condition of good shedding 04.05 Early shedding and late shedding.	08	
Unit -5	**PICKING MECHANISM:** 05.01 Introduction, Methods of picking mechanism. 05.02 Types of picking mechanism: cone – over pick mechanism, cone – under pick mechanism and other conventional picking mechanism, Comparison between under pick and over pick. 05.03 Shuttle and its types, defects in shuttle and shuttle cop. 05.04 Defects in negative picking. 05.05 Essential feature to a good pick. 05.06 Early and late picking. 05.07 Study of the following: picker, picking band, buffer, check strap, swell spring, shuttle guard, shuttle flying, shuttle trapping.	10	
Unit -6	**BEAT-UP MECHANISM:** 06.01 Introduction, Construction and Mechanism 06.02 Eccentricity of sley motion and its effect on loom working. 06.03 Factors affecting the sley, motion.	03	

Unit -7	**TAKE-UP MOTION:** 07.01 Introduction, Classification of take up motion: Negative and positive take up motion. 07.02 Five wheel and seven wheel take - up motion. 07.03 Dividend of loom, calculated dividend and practical dividend, Calculated regarding dividend. 07.04 Changing the number of picks/ inch.	06	
Unit -8	**LET- OFF MOTION:** 08.01 Objects 08.02 Types of let- off motion: Negative and positive let- off motion. 08.03 Types of negative let –off motion: Frictional let-off motion, Chain, lever and weight let-off motion, Advantages and disadvantages of chain, lever and weight let-off motion. 08.04 Conditions to good let – off motion	04	
Unit -9	**WEFT FORK MOTION:** 09.01 Objects and principles 09.02 Types of Weft fork motion: Side Weft fork motion and centre weft fork motion. 09.03 Relative advantages and disadvantages between a side weft fork and centre weft fork motion	03	
Unit -10	**WARP PROTECTING MOTION:** 10.01 Introduction 10.02 Types of Warp Protecting motion: Loose Reed, Fast reed and Electromagnetic Warp Protecting motion. 10.03 Loom knocking off or banging off; Defects of Knocking off.	03	
	Total	**50**	

Books Recommended:-

01.	Weaving Mechanism. Vol. I & II.	-	N.N. Banerjee
02.	The Mechanism of weaving	-	Fox
03.	Principles of weaving	-	Robinson and Marks
04.	Cotton Weaving and Designing	-	J.B. Taylor
05.	Cotton Yarn Weaving	-	A.T.A.
06.	Tappet and Dobby Looms	-	T. Robberts
07	Weaving, Machines, Mechanisms, Management	-	Talukdar
08.	Weaving Technology	-	Kulkarni

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code 1600306	Practical			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	—	—	06	Internal	:	10	
				External	:	20	

Rationale: Computer Play a vital role in present day life, more so, in the professional life of technician engineer. In order to enable the students use the computer effectively in problem solving, this course offers the modern programming language C along with exposing to various engineering application of computers.

Objective: The objectives of this course are to make the students able to:

- Use the various constructs of a programming Language viz. Conditional Iteration and recursion
- Implement the algorithm in C language
- Use Simple data structures like arrays, stacks and Linked list solving problems.
- Handling file in C

Eight experiments to be performed in the laboratory:

Contents : Practical

List of Experiments :-		Hrs/week	Marks
Unit -1	Programming exercise on executing a C program.	10	
Unit-2	Programming exercise on case Control Statement.	10	
Unit-3	Programming exercise on Decision Control Statement.	10	
Unit-4	Programming exercise on looping.	10	
Unit-5	Programming exercise on recursion technique.	08	
Unit-6	Programming exercise on Structure.	06	
Unit-7	Programs on array implementation.	06	
	Total	**60**	

Text / Reference Books -

1. How to solve it by Computer, Prentice Hall of India, 1992. - R.G. Dromey.
2. The C Programming Language, Prentice Hall of India, 1989. - B.W. Kernighan & D.M. Ritchie.
3. The C Programming Language, Prentice Hall of India, 1989. - Cooper, Mullish
4. Application Programming in C. Macmillain International editions, 1990. - Richa'd Johnson- Baugh & Martin Kalin
5. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
6. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth.
7. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
8. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi - R. Subburaj
10. Programming with C language, Tata McGraw Hill, New Delhi. - C. Balaguruswami
11. Elements of C, Khanna Publishers. Delhi - M. H. Lewin
12. Programming in C - Stephan G. Kochan.
13. Programming in C, Khanna Publishers. New Delhi - B.P. Mahapatra
14. Let us C, BPB Publication. New Delhi - Yashwant Kanetkar
15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

YARN MANUFACTURE LAB - I

Subject Code 1628307	Practical			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Rationale: Diploma holder technician in Textile Engineering is very frequently required to set the machines for their efficient running. The course is introduced to develop the skills to measure the diameter of pulley, set machines, and sketch the machine parts for better understanding of the subject.

Objectives: Able to develop skill to
-measure diameter of pulley
-Set machines for optimum operation and productivity
-Sketch gear and gearing
-Sketch different machine parts
-Dismantle, resetting the machine parts for better understanding of their functioning.

Sr. No.	Topic	periods
1	Blow room	30
2	Carding	12
3	Draw frame	09
4	Combing	09
	Total	**60**

Contents : Practical

	List of Experiments:-	Hrs/week	Marks
Unit -1	**Blow room** 01.01 Detailed Study of the working of opening and cleaning machinery in relation to setting and speeds. 01.02 Sketching the line and gearing diagrams of blow room machinery 01.03 Major and minor cleaning points. 01.04 Piano feed regulating motion, Knock- off motion 01.05 Show passage of material through each machine of blow room 01.06 Calculation of speed, Production, Hank of lap.	**30**	
Unit -2	**Carding** 02.01 Detailed study of the card and show passage of the material through carding machine 02.02 Functions of the Card in relation to various parts of the machine 02.03 Practicing, stripping , Grinding, setting, oiling, cleaning, 02.04 Sketching the line and gearing diagrams of carding machine 02.05 Practicing card clothing and mounting of fillet on cylinder, doffer and flats 02.06 Calculation of speeds and production of the machines.	**12**	
Unit -3	**Draw frame** 03.01 Sketching the line and gearing diagrams of draw frame 03.02 Demonstration of the working of draw frames. 03.03 Dismantling refitting and resetting of the draw frames for different cottons and hanks. 03.04 Calculations of speeds , drafts and production pertaining to the above machines	**09**	
Unit -4	**Combing** 04.01 Sketching the line and gearing diagrams of preparatory machines to the comber 04.02 Demonstration of the working of the preparatory machines to the comber 04.03 Dismantling, refitting and resetting of the machines for different cottons and counts. 04.04 Sketching the line and gearing diagrams of combing machines. 04.05 Calculations of speeds, drafts and production pertaining to the above machines.	**09**	
	Total-	**60**	

FABRIC MANUFACTURE LAB-I

Subject Code 1628308	Practical			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	04	Internal	:	15	
				External	:	35	

Contents : Practical

List of Experiments :-		Hrs/week	Marks
Unit -1	**PRIMARY MOTIONS:** 05.01 Detailed study of primary motions 05.01.01 Shedding 05.01.02 Picking 05.01.03 Beat Up 05.02 Dismantling and resetting of the parts of the above motions. 05.03 Sketching the above motion parts.	20	
Unit -2	**SECONDARY MOTIONS:** 06.01 Detailed study of secondary motions 06.01.01 Take Up Motion (5 wheels and 7 wheels) 06.01.02 Let Off Motion 06.02 Dismantling and resetting of the parts of the motions. 06.03 Sketching the above motion parts.	15	
Unit -3	**TERTIARY MOTIONS:** 07.01 Detailed study of the tertiary motions 07.01.01 Weft Fork Motion 07.01.02 Warp Protecting Motion (Loose reed & fast reed) 07.02 Dismantling and resetting of the above motions. 07.03 Sketching the above motion parts.	15	
Unit -4	**LOOMS:** 08.01 Study the handloom and practice of weaving on them. 08.02 Study the Power loom and practice of weaving on them.	10	
	Total	**60**	

YARN MANUFACTURE I - TW

Subject Code 1628309	Term Work			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	Internal	:	15	
	—	—	02	External	:	35	

Contents : Term Work

List of Term Work:-		Hrs/week	Marks
Unit -1	**Blow room** 01.07 Detailed Study of the working of opening and cleaning machinery in relation to setting and speeds. 01.08 Sketching the line and gearing diagrams of blow room machinery 01.09 Major and minor cleaning points. 01.10 Piano feed regulating motion, Knock- off motion 01.11 Show passage of material through each machine of blow room 01.12 Calculation of speed, Production, Hank of lap.	30	
Unit -2	**Carding** 02.07 Detailed study of the card and show passage of the material through carding machine 02.08 Functions of the Card in relation to various parts of the machine 02.09 Practicing, stripping , Grinding, setting, oiling, cleaning, 02.10 Sketching the line and gearing diagrams of carding machine 02.11 Practicing card clothing and mounting of fillet on cylinder, doffer and flats 02.12 Calculation of speeds and production of the machines.	12	
Unit -3	**Draw frame** 03.05 Sketching the line and gearing diagrams of draw frame 03.06 Demonstration of the working of draw frames. 03.07 Dismantling refitting and resetting of the draw frames for different cottons and hanks. 03.08 Calculations of speeds , drafts and production pertaining to the above machines	09	
Unit -4	**Combing** 04.06 Sketching the line and gearing diagrams of preparatory machines to the comber 04.07 Demonstration of the working of the preparatory machines to the comber 04.08 Dismantling, refitting and resetting of the machines for different cottons and counts. 04.09 Sketching the line and gearing diagrams of combing machines. 04.10 Calculations of speeds, drafts and production pertaining to the above machines.	09	
	Total-	60	

FABRIC MANUFACTURE I - TW

Subject Code 1628310	Term Work			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	Internal	:	15	
	—	—	02	External	:	35	

Contents : Term Work

List of Term Work : -		Hrs/week	Marks
Unit -1	**PRIMARY MOTIONS:** 05.01 Detailed study of primary motions 05.01.01 Shedding 05.01.02 Picking 05.01.03 Beat Up 05.02 Dismantling and resetting of the parts of the above motions. 05.03 Sketching the above motion parts.	20	
Unit -2	**SECONDARY MOTIONS:** 06.01 Detailed study of secondary motions 06.01.01 Take Up Motion (5 wheels and 7 wheels) 06.01.02 Let Off Motion 06.02 Dismantling and resetting of the parts of the motions. 06.03 Sketching the above motion parts.	15	
Unit -3	**TERTIARY MOTIONS:** 07.01 Detailed study of the tertiary motions 07.01.01 Weft Fork Motion 07.01.02 Warp Protecting Motion (Loose reed & fast reed) 07.02 Dismantling and resetting of the above motions. 07.03 Sketching the above motion parts.	15	
Unit -4	**LOOMS:** 08.01 Study the handloom and practice of weaving on them. 08.02 Study the Power loom and practice of weaving on them.	10	
	Total	**60**	