STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III RD SEMESTER DIPLOMA IN AGRICULTURAL ENGINEERING

(Effective from Session 2020-21 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	2000301	04	3	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	2000302	03	3	10	20	70	100	28	40	03
3.	Surveying and Levelling	2011303	03	3	10	20	70	100	28	40	03
4.	Refrigeration & Air-Conditioning	2011304	03	3	10	20	70	100	28	40	03
5.	Principles of Agricultural Production	2011305	03	3	10	20	70	100	28	40	03
	Total: -		**16**				**350**	**500**			15

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.	2000306	6 50% Physical 50% Virtual	3	15	35	50	20	03
7.	Surveying & Levelling Lab.	2011307	4 50% Physical 50% Virtual	3	15	35	50	20	02
Total: -			**10**				**100**		**05**

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)	2011308	2	15	35	50	20	01
9.	Principles of Agricultural Production (TW)	2011309	3	23	52	75	30	02
10.	**Python / Others** (TW)	2000310	2	07	18	25	10	01
Total: -			**07**			**150**		**04**
Total Periods per week Each of duration One Hours = 33						**Total Marks = 750**		**24**

APPLIED MATHEMATICS

Subject Code 2000301	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:		Hrs.	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 seidel 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	Lipschitz	Schamus outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Delhi
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Delhi
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 2000302	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	

Course Learning Objective:

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 array, stacks and linked list solving problems.
- Handling File in "C".

	Contents: Theory	Hrs	Marks
Unit -1	**Introduction to computer software:** Classification of computer software. System software. Application software. Programming languages. Machine languages. Assembly languages. High level programming languages. Algorithms and flowchart.	[03]	
Unit -2	**Fundamental of C languages.** Introduction. Background. Characteristics of C. Uses of C. Structure of a C program. Writing the first C program. Files used in a C program. Source code files. Header files. Object files. Binary executable files. Compiling and Executing C programs. Using comments. Characters used in C. Identifier. Keyword or Reserved words. Tokens. Constants.	[08]	

	Numeric constant. String Character constant. Variables. Variable Declaration. Basic Data Types. Additional Data types. Operators and Expressions. Operator Precedence and Associativity. Type conversion and Type casting. Input/ Output statements in C.		
Unit -3	**Decision Control and Looping Statements:** Introduction to Decision control statements. Conditional Branching statements. If statement. If-else statement. If-else-if statement. Switch case. Iterative statements. While loop. Do-while loop. For loop. Nested loops. Break and continue statements. Break statement. Continue statement. Goto statement.		
Unit -4	**Functions in 'C'.** Uses of functions. User defined functions. Function Declaration. Calling a function. Actual and formal Arguments. Rules to call a function. Function prototype. Recursion. Use of Recursive function. Local or Internal variables. Global or External variables. Void function. Storage classes in C. Auto or Automatic Storage class. Static Storage class. Extern Storage class. Register Storage class.	[07]	

Unit -5	**Arrays.** Introduction. Declaration of Arrays. Accessing the Elements of an Array. Calculating the address of Array elements. Calculating the length of an Array. Storing values in Arrays. Initializing Arrays during Declaration. Inputting values from the keyboard. Assigning values to Individual Elements. Operations on Arrays. Traversing an Array. Inserting an Element in an Array. Deleting an Element from an Array. Merging Two Arrays. Searching for a value in an Array. Passing Arrays to functions. Two dimensional Arrays. Declaring Two-dimensional Arrays. Initializing Two-dimensional Arrays. Accessing the Elements of two dimensional Arrays. Operations on Two-dimensional Arrays.	[07]	
Unit -6	**Pointers.** Understanding the Computer's Memory. Introduction to pointers. Declaring pointer variables. Pointer Expressions and pointer Arithmetic. Null pointers. Passing Arguments to function using pointer. Pointers and Arrays. Passing an Array to a Function. Dynamic Memory Allocation. Malloc ( ) function. Calloc ( ) function. Realloc ( ) function. Free ( ) function.	[07]	
Unit -7	**Structures and Unions.** Structures. Structure variables and Arrays. Initialization of structure variable and Array. Dot (•) Operator. Assigning value of a structure to Another structure. Structure within structures. Site of ( ) of a structure. Unions. Site of ( ) unions. Difference between a structure and an union. Enum Data Type. Typedef Declaration.	[04]	

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.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa
10.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
11.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth
12.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
13.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
14.	Pointers in C, BPB publication, New Delhi.	-	Yashwant Kanetkar

SURVEYING AND LEVELLING

Subject Code 2011303	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:

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 leveling has also been covered in details.

Contents: Theory		Hrs.	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, Numerical 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. 5.1 Effects of Earths Magnetism. 5.2 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	UBLISHER'S NAME
1.	Surveying & Levelling Vol.I	**P**	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	
	L	T	P/S	ESE	:	70	03
2011304	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	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 vapors		
	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 numerical)		
	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-Conditioner's 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	03
	L	T	P/S	ESE	:	70	
2011305	03	—	—	TA	:	10	
				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.	Marks
Unit -1	**INTRODUCTION** 1.1 Introductory idea about Agricultural Engineering and its relation to crop production 1.2 Basic information about Agricultural operations with Agricultural Implements and Machineries	[02]	[06]
Unit -2	**SOIL** 2.1 Classification of soils 2.2 Soil formation 2.3 Composition of soil 2.4 Soil fertility and plant nutrients	[03]	[06]
Unit -3	**CROP ROTATION AND SYSTEM OF CROPPING** 3.1 Crop rotation 3.1.1 Principles of crop rotation 3.1.2 Advantages of crop rotation 3.2 System of cropping 3.2.1 Mixed cropping 3.2.2 Multiple cropping 3.2.3 Inter cropping 3.2.4 Their principles and advantages	[04]	[08]
Unit -4	**TECHNIQUES OF RAISING FIELD CROPS** 4.1 Cereals 4.1.1 Paddy 4.1.2 Wheat 4.1.3 Maize 4.2 Legumes 4.2.1 Soyabean 4.2.2 Moong 4.2.3 Arhar 4.2.4 Gram 4.3 Cash Crops 4.3.1 Sugar cane 4.3.2 Potato 4.4 Oil Seeds 4.4.1 Rape seed and Mustard 4.4.2 Sunflower 4.4.3 Groundnut	[16]	[16]

Unit -5	**TECHNIQUES OF RAISING HORTICULTURAL CROPS** 5.1 Fruit crops 5.1.1 Mango 5.1.2 Papaya 5.1.3 Guava 5.1.4 Banana 5.1.5 Litchi 5.2 Vegetable crops 5.2.1 Cole Crops 5.2.2 Root-Crops 5.2.3 Lady's finger 5.2.4 Tomato 5.2.5 Brinjal 5.3 Flowering crops 5.3.1 Rose 5.3.2 Dhalia 5.3.3 Chrysanthemum	[07]	[16]
Unit -6	**WEEDS AND THEIR CONTROL** 6.1 Characteristics of weeds 6.2 Harmful effects of weeds 6.3 Usefulness of weeds 6.4 Classification of weeds 6.5 Medium of weeds seed dispersal 6.6 Method of weed control	[04]	[08]
Unit -7	**MISCELLANEOUS** 7.1 Methods of irrigation 7.2 Water management practices 7.3 Soil management practices 7.4 Seed 7.4.1 Characteristics of good seed 7.4.2 Types of seeds 7.4.3 Seed treatment 7.5 Methods of fertilizer application	[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: 72			Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	03
2000306	—	—	06	Internal	:	15	
				External	:	35	

Course Learning Objectives:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

Course outcomes:

Student should be able to write code snippets, and then compile, debug and execute them.

Content: Practical		Hrs	Marks
Unit – 1	Familiarization with programming environment (Editor, Compiler, etc.)		
Unit – 2	Programs using, I/O statements and various operators		
Unit – 3	Programs using expression evaluation and precedence		
Unit – 4	Programs using decision making statements and branching statements		
Unit – 5	Programs using loop statements		
Unit – 6	Programs to demonstrate applications of n dimensional arrays		
Unit – 7	Programs to demonstrate use of string manipulation functions		
Unit – 8	Programs to demonstrate parameter passing mechanism		
Unit – 9	Programs to demonstrate recursion		
Unit – 10	Programs to demonstrate use of pointers		
Unit – 11	Programs to demonstrate command line arguments		
Unit – 12	Programs to demonstrate dynamic memory allocation		
Unit – 13	Programs to demonstrate file operations		

The language of choice will be C. This is a skill course. More you practice, better it will be.

Reference Books:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

SURVEYING & LEVELLING LAB.

Subject Code	Practical			No of Period in one session: 40			Credits
	No. of Periods Per Week			Full Marks	:	50	
2011307	L	T	P/S	ESE	:	50	02
	—	—	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	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.	[02]	
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	[08]	
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	[04]	
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.	[06]	
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.	[06]	

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.	[08]	
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	**40**	

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: 24			Credits
	No. of Periods Per Week			Full Marks	:	50	
2011308	L	T	P/S	Internal	:	15	01
	—	—	02	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

GROUPA
(REFRIGERATION)

1 Principles of Thermodynamics

2 Method of Refrigeration

3 Air Refrigeration Systems

4 Simple Vapour Compression System

5 Refrigerants

S.No. Topics

GROUP B (AIR-CONDITIONING)

1 Introduction to Psychrometry

2 Different Psychrometric Processes

3 Requirements of Comfort Air-conditioning (only introduction)

4 Air-conditioning Systems (introduction only)

5 Household Refrigerators, Cold Storage, Air cooler and Window Air-conditioners

Contents: Term Work

Group- A (REFRIGERATION)		Hrs.	Marks
Unit -1	**PRINCIPLE OF THERMODYNAMICS** 1.1 Pressure 1.2 Thermodynamic systems 1.3 Property, state, path and process 1.4 Internal energy, Flow energy and work 1.5 Specific heat, sensible heat and latent heat 1.6 Quality of vapours 1.7 Enthalpy and Entropy	[02]	
Unit -2	**METHOD OF REFRIGERATION** 2.1 Ice refrigeration 2.2 Evaporative refrigeration 2.3 Refrigeration by expansion of air 2.4 Steam jet refrigeration system 2.5 Dry ice refrigeration system 2.6 Unit of refrigeration	[02]	
Unit -3	**AIR REFRIGERATION SYSTEMS** 3.1 Reversed Carnot Cycle 3.2 Bell-Coleman refrigeration system (simple numerical) 3.3 Advantages and disadvantages of air refrigeration system	[02]	
Unit -4	**SIMPLE VAPOUR COMPRESSION SYSTEM** 4.1 Ideal Vapour compression 4.2 Vapour Compression System 4.3 Wet Compression 4.4 Dry Compression single stage only 4.5 Superheated compression (simple numerical only)	[04]	
Unit -5	**REFRIGERANTS** 6.1 Classification of refrigerants. 6.2 Different properties of NH_3, CO_2, SO_2 refrigerants.	[03]	
Group-B (AIR-CONDITIONING)			
Unit -6	**PSYCHROMETRY** 1.1 Meaning of air-conditioning 1.2 Psychrometry and psychrometric properties 1.3 Psychrometric relations 1.4 Psychrometric chart	[02]	
Unit -7	**DIFFERENT PSYCHROMETRIC PROCESSES** 2.1 Sensible cooling and heating 2.2 Adiabatic humidification and dehumidification (simple numerical) 2.3 Summer air-conditioning, winter air-conditioning and year round conditioning	[03]	
Unit -8	**REQUIREMENTS OF COMFORT AIR-CONDITIONING (INTRODUCTION ONLY)** 3.1 Elements of comfort air-conditioning 3.2 Thermodynamics human body 3.3 Ventilation and Ventilation standard	[02]	
Unit -9	**AIR-CONDITIONING SYSTEM (INTRODUCTION ONLY)** 4.1 Central air-conditioning system 4.2 Unitary air-conditioning system 4.3 Problems in air-conditioning system	[02]	

Unit -10	**HOUSEHOLD REFRIGERATORS, COLD STORAGE, AIR COOLER AND WINDOWS AIR-CONDITIONERS** 6.1 Household Refrigerator 6.2 Cold Storage line diagram only 6.3 Air Cooler 6.4 Window Air-Conditioners	[02]	
	Total	**24**	

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 2011309	Term Work		No of Period in one session : 36				Credits
	No. of Periods Per Week		Full Marks		:	75	02
	L	T	P/S	Internal	:	23	
	-	-	03	External	:	52	

Rationale:

A diploma student of Agricultural Engineering has to install and maintain agricultural and irrigational equipment's. 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.	Marks
Unit-1	Study about scientific names of major crops of cereals, pulses, oil seeds, fiber crops, sugar cane, tuber and root crops, spices and condiments, forage grasses, forage legumes and plantation crops.	[02]	
Unit-2	Study about characteristics and suitability of various fertilizer for various crops.	[02]	
Unit-3	Study about methods of fertilizer application.	[02]	
Unit-4	Study about plant deficiencies symptoms.	[02]	
Unit-5	Study about schedule for seed treatment of major crops.	[02]	
Unit-6	Study about main diseases, its symptoms and control measures for major crops.	[02]	
Unit-7	Study about major pests of stored products.	[02]	
Unit-8	Study about main insects and its control measures for major crops.	[02]	
Unit-9	Study about weed control practices for important crops.	[02]	
Unit-10	Study about the schedule of important agro-techniques for major crops .	[02]	
Unit-11	Study about most prominent varieties for major crops.	[02]	
Unit-12	Study about crop rotation for major crops.	[02]	
	Total	**24**	

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

PYTHON / Others -TW

Subject Code 2000310	Term Work					Credits
	No. of Periods Per Week		Full Marks	:	25	01
	L	T	P/S	Internal	:	07
	-	-	02	External	:	18

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

STATE BOARD OF TECHNICAL EDUCATION BIHAR

Scheme of Teaching and Examinations for

III[rd] SEMESTER DIPLOMA IN MECHANICAL (Automobile) ENGINEERING

(Effective from Session 2020-21 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.	Automobile Transmission System	2033301	03	03	10	20	70	100	28	40	03
2.	Material Science & Engineering	2025302	04	03	10	20	70	100	28	40	03
3.	Fluid Mechanics & Hydraulic Machinery	2025303	04	03	10	20	70	100	28	40	03
4	Vehicle Maintenance	2033304	04	03	10	20	70	100	28	40	03
5.	Thermal Engineering - I	2025305	04	03	10	20	70	100	28	40	03
		Total :-	19				350	500			15

PRACTICAL

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME					
			Periods per Week	Hours of Exam.	Practical(ESE)		Total Marks (A+B)	Pass Marks	Credits
					Internal(A)	External(B)			
6.	Automobile Transmission Systems Lab	2033306	02 50% Physical 50% Virtual	03	15	35	50	20	01
7.	Fluid Mechanics & Hydraulic Machinery LAB	2025307	02 50% Physical 50% Virtual	03	07	18	25	10	01
8	Web Technology Lab	2018308	02 50% Physical 50% Virtual	03	07	18	25	10	01
9.	Thermal Engineering LAB – I	2025309	02 50% Physical 50% Virtual	03	07	18	25	10	01
	Total : –		**08**				**125**		**04**

TERMWORK

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.	Essence of Indian Knowledge and Tradition	2025310	4	15	35	50	20	02
11	Python	2018311	2	07	18	25	10	01
12.	Summer Intern ship-I (4 weeks)	2025312	-	15	35	50	20	02
	Total:-06					**125**		05
Total Periods per week Each of duration One Hour			33	Total Marks = 750				**24**

Automobile Transmission System

Subject Code	Theory						Credits
2033301	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course objectives:

- **To understand General Principles of Mechanical Engineering.**
- **To understand laws of thermodynamics, thermal and thermodynamic Processes.**
- **To understand working principles of power developing and power absorbing devices.**
- **To understand basic materials and manufacturing processes.**

CONTENTS: THEORY

Unit	Name of Topics	Hrs	Marks
Unit-I	**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.	**8**	**12**
Unit-II	**Clutches:-** **2.1** Principle, function and requirements 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.	**12**	**14**
Unit-III	**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, 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	**12**	**14**
Unit-IV	**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.	**6**	**10**
Unit-V	**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.	**8**	**12**

	5.4 Transmission in two-wheeler- chain drive and belt drive. **5.5** Spur differential construction.		
Unit-V	**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	**6**	**8**
	Total	**52**	**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	

Course outcomes:

At the end of the course, the student will be able to:

CO1 Understand Structure and component of chassis, loads acting and classification of frame
CO2 Understand mechanism of power transfer, classification, construction and working of clutches.
CO3 Understand gear shift mechanism, types of gear box, construction and working
CO4 Identify various joints, use and construction of propeller shaft
CO5 Understand construction and working of differential gear
CO6 Understand types of wheels and tyres, construction and materials used

MATERIAL SCIENCE & ENGINEERING

Subject Code	Theory						Credits
2025302	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course objectives:

- To understand crystal structures and atomic bonds.
- To understand the properties of different types of ferrous metals and alloys.
- To understand the properties of different types of non-ferrous metals and alloys.
- To understand various metallic failures and acquire the knowledge of testing of materials.
- To understand the concept of corrosion and its prevention.

CONTENTS: THEORY

Unit	Name of Topics	Hrs	Marks
Unit-I	**1.1** Crystal structures and Bonds - Unit cell and space lattice: Crystal system: The seven basic crystal systems; Crystal structure for metallic elements: BCC, FCC and HCP; Coordination number for Simple Cubic, BCC and FCC; Atomic radius: definition, atomic radius for Simple Cubic, BCC and FCC; Atomic Packing Factor for Simple Cubic, BCC, FCC and HCP; Simple problems on finding number of atoms for a unit cell. **1.2** Bonds in solids - Classification - primary or chemical bond, secondary or molecular bond; Types of primary bonds: Ionic, Covalent and Metallic Bonds; Types of secondary bonds: Dispersion bond, Dipole bond and Hydrogen bond.	**12**	
Unit-II	**2.1** Phase diagrams, Ferrous metals and its Alloys - Isomorphs, eutectic and eutectoid systems; Iron-Carbon binary diagram; Iron and Carbon Steels; flow sheet for production of iron and steel; **2.2** Iron ores – Pig iron: classification, composition and effects of impurities on iron; Cast Iron: classification, composition, properties and uses; Wrought Iron: properties, uses/applications of wrought Iron; comparison of cast iron, wrought iron and mild steel and high carbon steel; **2.3** standard commercial grades of steel as per BIS and AISI; Alloy Steels – purpose of alloying; effects of alloying elements – Important alloy steels: Silicon steel, High Speed Steel (HSS), heat resisting steel, spring steel, **2.4** Stainless Steel (SS): types of SS, applications of SS – magnet steel – composition, properties and uses	**12**	
Unit-III	**3.1** Non-ferrous metals and its Alloys - Properties and uses of aluminium, copper, tin, lead, zinc, magnesium and nickel; Copper alloys: Brasses, bronzes – composition, properties and uses; Aluminium alloys: Duralumin, hindalium, magnelium – composition, properties and uses; Nickel alloys: Inconel, monel, nicPerome – composition, properties and uses. **3.2** Anti-friction/Bearing alloys: Various types of bearing bronzes - Standard	**12**	

	commercial grades as per BIS/ASME.		
Unit-IV	**4.1** Failure analysis & Testing of Materials - Introduction to failure analysis; Fracture: ductile fracture, brittle fracture; cleavage; notch sensitivity; fatigue; endurance limit; characteristics of fatigue fracture; variables affecting fatigue life; creep; creep curve; creep fracture; **4.2** Destructive testing: Tensile testing; compression testing; Hardness testing: Brinell, Rockwell; bend test; torsion test; fatigue test; creep test. **4.3** Non-destructive testing: Visual Inspection; magnetic particle inspection; liquid penetrant test; ultrasonic inspection; radiography	**12**	
Unit-V	**5.1** Corrosion & Surface Engineering - Nature of corrosion and its causes; Electrochemical reactions; Electrolytes; Factors affecting corrosion: Environment, Material properties and physical conditions; Types of corrosion; Corrosion control: Material selection, environment control and design; **5.2** Surface engineering processes: Coatings and surface treatments; Cleaning and mechanical finishing of surfaces; Organic coatings; Electroplating and Special metallic plating; Electro polishing and photo-etching; Conversion coatings: Oxide, phosphate and chromate coatings; Thin film coatings: PVD and CVD; **5.3** Surface analysis; Hard-facing, thermal spraying and high-energy processes; Process/material selection. Pollution norms for treating effluents as per standards.	**12**	
	Total	**60**	

Reference Books:

1. **A Text Book of Material Science & Metallurgy – O.P. Khanna, Dhanpath Rai and Sons, New Delhi. 2003.**
2. **Material Science & Engineering – R.K. Rajput, S.K. Kataria & Sons, New Delhi, 2004.**
3. **Material Science – R.S. Khurmi, S. Chand & Co. Ltd., New Delhi, 2005.**

Course outcomes

At the end of the course, the student will be able to:

- **CO1 Explain about crystal structures and atomic bonds.**
- **CO2 Describe about classification of ferrous metals and their properties.**
- **CO3 Explain about non-ferrous metals, cutting tool materials and composites along with their properties.**
- **CO4 Describe about the various metallic failures and knowledge in testing of materials.**
- **CO5 Explain the principle of corrosion, their types and its prevention methods along with the various surface engineering processes.**

FLUID MECHANICS & HYDRAULIC MACHINERY

Subject Code	Theory						Credits
2025303	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course objectives:

- **To understand fluid flow & related machinery for power generation, water supply and irrigation.**
- **To Select and use appropriate flow measuring device.**
- **To Select and use appropriate pressure measuring device.**
- **To understand and analyze the performance of pumps and turbines.**

CONTENTS: THEORY

Unit	Name of Topics	Hrs	Marks
Unit-I	**1.1** Properties of fluid - Density, Specific gravity, Specific Weight, Specific Volume, Dynamic Viscosity, Kinematic Viscosity, Surface tension, Capillarity, Vapour Pressure, Compressibility. **1.2** Fluid Pressure & Pressure Measurement - Fluid pressure, Pressure head, Pressure intensity, Concept of vacuum and gauge pressures, atmospheric pressure, absolute pressure, Simple and differential manometers, Bourdan pressure gauge. **1.3** Concept of Total pressure on immersed bodies, center of pressure, Simple problems on Manometers.	**12**	
Unit-II	**2.1** Fluid Flow: Types of fluid flows, Path line and Stream line, Continuity equation, Bernoulli's theorem **2.2** Principle of operation of Venturimeter, Orifice meter and Pitot tube, Derivations for dis- charge, coefficient of discharge and numerical problems. **2.3** Flow Through Pipes: Laminar and turbulent flows; Darcy's equation and Chezy's equation for frictional losses, Minor losses in pipes, Hydraulic gradient and total gradient line, Numerical problems to estimate major and minor losses	**14**	
Unit-III	**3.1** Impact of jets: Impact of jet on fixed vertical, moving vertical flat plates, Impact of jet on curved vanes with special reference to turbines & pumps, Simple Numerical on work done and efficiency.	**12**	
Unit-IV	**4.1** Hydraulic Turbines: Layout of hydroelectric power plant, Features of Hydroelectric power plant, Classification of hydraulic turbines, Selection of turbine on the basis of head and discharge available **4.2** Construction and working principle of Pelton wheel, Francis and Kaplan turbines, Draft tubes – types and construction, Concept of cavitation in turbines. **4.3** Calculation of Work done, Power, efficiency of turbines, Unit quantities and simple numerical.	**10**	
Unit-V	**5.1** Centrifugal Pumps: Principle of working and applications, Types of casings and impellers. **5.2** Concept of multistage, Priming and its methods, Cavitation, Manometric head, Work done, Manometric efficiency, Overall efficiency. Numerical on calculations of overall efficiency and power required to drive pumps. **5.3** Reciprocating Pumps: Construction, working principle and applications of single and double acting reciprocating pumps, Concept of Slip, Negative slip, Cavitation and separation.	**12**	
	Total	**60**	**70**

Reference Books:

1.Fluid Mechanics & Hydraulic Machines, S.S. Rattan, Khanna Publishing House, New Delhi
2.Hydraulic, fluid mechanics & fluid machines – Ramamrutham S, Dhanpath Rai and Sons, New Delhi.
3.Hydraulics and fluid mechanics including Hydraulic machines – Modi P.N. and Seth S.M., Stan- dard Book House. New Delhi
4.One Thousand Solved Problems in Fluid Mechanics – K. Subramanya, Tata McGraw Hill.
5.Hydraulic, fluid mechanics & fluid machines – S. Ramamrutham, Dhanpat Rai and Sons, New Delhi
6.Fluid Mechanics and Hydraulic Machines – R. K. Bansal, Laxmi Publications, New Delhi

Course outcomes

At the end of the course, the student will be able to:

i. **Measure various properties such as pressure, velocity, flow rate using various instruments.**
ii. **Calculate different parameters such as co-efficient of friction, power, efficiency etc of various Systems.**
iii. **Describe the construction and working of turbines and pumps.**
iv. **Test the performance of turbines and pumps.**
v. **Plot characteristics curves of turbines and pumps.**

VEHICLE MAINTENANCE

Subject Code	Theory						Credits
2033304	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Unit	Name of Topics	Hrs	Marks
Unit-I	Auto Workshop Layout & Equipment: **1.1** General safety precautions and procedures. **1.2** Functions of General shop equipment and tools (of the below mentioned tools and equipment only) -wheel balancer, wheel aligner, crankshaft aligner and straightener, engine analyzer, arbor press, drill press, battery charger, Tyre changer, car washer, lift, FIP calibration machine, head light aligner, valve grinder, honing machine, cylinder boring machine. **1.3** Layout with equipment required for dealers of two- wheeler, Four wheelers - cars and commercial vehicles. For road - side garages. Layout of modern workshop for specialized job work, crankshaft grinding, engine (re-boring), F.I.P repairs, crankshaft journal boring, brake drum boring	**6**	**10**
Unit-II	Maintenance management and record Keeping: **2.1** Necessity of maintenance **2.2** Types of maintenance and their applications **2.2.1** Preventive maintenance system. **2.2.2** Scheduled maintenance system **2.2.3** Break down maintenance system **2.3** General maintenance schedule -Daily, weekly, monthly & periodic maintenance. for various vehicles -Two –wheelers, LMV, HMV **2.4** General servicing procedure. Decision to repair or replace. **2.5** Workshop records- history sheet, work order, activity file	**6**	**8**
Unit-III	Engine Maintenance Part A: **3.1** Troubles, Causes & remedies in engine, fuel system, cooling system, lubrication system & MPFI Engine. **3.2** Checking and Servicing of following engine components: cylinder head, cylinder block, cylinder liners, piston, piston ring, crank-shaft, connecting rod, valves. **3.3** Tuning of engine Part B: **3.4** Fuel feed system service carburetor dismantling, cleaning and tuning, injector cleaning and testing, FIP phasing and calibration, MPFI -injector testing and cleaning. Sensor testing). **3.5** Lubrication system service. – change oil filter, check oil pump, and diagnose causes for excessive oil consumption, external oil leakage, and low oil pressure in an automobile engine.	**17**	**26**
Unit-IV	Chassis & Body Maintenance: **4.1** Checking and repairing of Clutch for clutch plate thickness, runout, rivet depth, warpage of pressure plate. **4.2** Adjustment of clutch. **4.3** Troubles, Causes and remedies of clutch. **4.4** Checking gearbox for run out of main shaft and lay shaft, for wear of synchronizer and worn bearings, checking oil seals. **4.5** Troubles, Causes and remedies of gearbox	**10**	**14**

	4.6 Checking and adjusting differential for ring gear run-out, backlash in ring gear, tooth contact between ring gear and pinion, bearing preload. **4.7** Troubles, Causes and remedies of propeller shaft, differential and rear axle. **4.8** Inspection and repair of master cylinder, wheel cylinder, brake drum, brake disc, brake linings and brake pads. **4.9** Adjustment of hydraulic brakes – shoe clearance, brake pedal free travel, pedal to wall clearance, parking brake adjustment. **4.10** Bleeding of hydraulic brakes **4.11** Troubles, Causes and remedies in brake system.		
Unit-V	**5.1** Troubles, Causes and remedies of suspension system. Lubrication of leaf springs **5.2** Procedure of wheel alignment (after chassis height adjustment) by wheel alignment gauges and procedure of wheel balancing. Troubles, Causes and remedies of steering system. **5.3** Care of wheels and tires, retreading of tires and vulcanizing. Tire rotation. **5.4** Frame repairs (cracks, loose rivets, and skewness in frames) and alignments. **5.5** Body repairs- denting, denting tools and equipment **5.6** Repainting procedure, patch work. **5.7** Painting defects. **5.8** Adjustment of doors and locks	**9**	**12**
	Total	**60**	**70**

Text / Reference Books:

1. Automotive Service - Tim Gills - Delmar Publisher Inc.
2. Automobile Mechanics - Crouse / Anglin - TATA McGraw – HILL
3. Automobile Engineering Vol. III Auto Marketing and Workshop Techniques - Anil Chikara - Satya Prakashan, New Delhi
4. Automobile Engineering Vol. IV Body repair techniques - Anil Chikara - Satya Prakashan, New Delhi
5. Automobile Engineering Vol. V Paint techniques - Anil Chikara - Satya Prakashan, New Delhi
6. Automobile Engineering Vol. I - Dr. Kirpal Singh - Standard Publishers.
7. Motor Automotive Technology - Anthony Schwaller - Delmar Publisher Inc.
8. Automotive Engine Performance - Ken Layne - Prentice Hall Career Technology
9. Automotive Mechanics - S.Srinivasan - Tata McGraw Hill.

THERMAL ENGINEERING - I

Subject Code	Theory						Credits
2025305	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Unit	Name of Topics	Hrs	Marks
Unit-I	**1.1** Sources of Energy - Brief description of energy Sources: Classification of energy sources-Renewable, Non-Renewable; Fossil fuels, including CNG, LPG; **1.2** Solar Energy: Flat plate and concentrating collectors & its applications (Solar Water Heater, Photovoltaic Cell, Solar Distillation); **1.3** Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Bio-diesel; Hydraulic Energy, Nuclear Energy; Fuel cell.	**8**	
Unit-II	**2.1** Internal Combustion Engines - Assumptions made in air standard cycle analysis; Brief description of Carnot, Otto and Diesel cycles with P-V and T-S diagrams; Internal and external combustion engines; advantages of I.C. engines over external combustion engines; **2.2** Classification of I.C. engines; neat sketch of I.C. engine indicating component parts; Function of each part and materials used for the component parts - Cylinder, crank case, crank pin, crank, crank shaft, connecting rod, wrist pin, piston, cooling pins cylinder heads, exhaust valve, inlet valve; **2.3** Working of four-stroke and two-stroke petrol and diesel engines; Comparison of two stroke and four stroke engines; Comparison of C.I. and S.I. engines; Valve timing and port timing diagrams for four stroke and two stroke engines. (Related simple problems only).	**12**	
Unit-III	**3.1** I.C. Engine Systems - Fuel system of Petrol engines; Principle of operation of simple and Zenith carburetors; Fuel system of Diesel engines; Types of injectors and fuel pumps; **3.2** Cooling system-air-cooling, water-cooling system with thermos-siphon method of circulation and water-cooling system with radiator and forced circulation (description with line diagram). Comparison of air cooling and water-cooling system; **3.3** Ignition systems – Battery coil ignition and magneto ignition (description and working). Comparison of two systems; **3.4** Types of lubricating systems used in I.C. engines with line diagram; Types of governing of I.C. engines – hit and miss method, quantitative method, qualitative method and combination methods of governing; their applications; Objective of super charging. (Related simple problems only).	**12**	
Unit-IV	**4.1** Performance of I.C. Engines - Brake power; Indicated power; Frictional power; Brake and Indicated mean effective pressures; Brake and Indicated thermal efficiencies; Mechanical efficiency; Relative efficiency; **4.2** Performance test; Morse test; Heat balance sheet; Methods of determination of B,P., I.P. and F.P.; **4.3** Simple numerical problems on performance of I.C. engines.	**14**	
Unit-V	**5.1** Air Compressors - Functions of air compressor; Uses of compressed air; Types of air compressors; Single stage reciprocating air compressor - its construction and working (with line diagram) using P-V diagram; Multi stage compressors – Advantages over single stage compressors; Rotary compressors: Centrifugal compressor, axial flow type compressor and vane type compressors. **5.2** Refrigeration & Air-conditioning - Refrigeration; Refrigerant; COP; Air Refrigeration system: components, working & applications; Vapour Compression system: components, working & applications; Air conditioning; Classification of	**14**	

	Air-conditioning systems; Comfort and Industrial Air-Conditioning; Window Air-Conditioner; Summer Air-Conditioning system, Winter Air-Conditioning system, Year-round Air-Conditioning system. (Related simple problems only).		
	Total	**60**	**70**

Reference Books:

1. **Introduction to Renewable Energy – Vaughn Nelson, CRC Press**
2. **Thermal Engineering – P.L. Ballaney, Khanna Publishers, 2002**
3. **A Course in Thermal Engineering – S. Domkundwar & C.P. Kothandaraman, Dhanpat Rai.**
4. **Thermal Engineering – R.S. Khurmi and J.K. Gupta, 18th Edition, S. Chand & Co, NewDelhi.**
5. **Thermal Engineering – R. K. Rajput,8th Edition, Laxmi publications Pvt Ltd, New Delhi.**

Course outcomes:

At the end of the course, the student will be able to:

CO1 **Know various sources of Energy and their applications.**

CO2 **Classify I.C. engines and understand their working and constructional features.**

CO3 **Draw the energy flow diagram of an I.C. engine and evaluate its performance.**

CO4 **Describe the constructional features of air compressor and working of different air compressors.**

CO5 **Know the applications of refrigeration and Classify air-conditioning systems.**

AUTOMOBILE TRANSMISSION SYSTEMS LAB

Subject Code	Theory						Credits
2033306	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	TA	:	15	
	—	—	—	CT	:	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 odynometer.

Motor skill:

1. Sketch the different devices.
2. Handle tools, equipment, and instrument.
3. Observe the behaviors of various systems 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 drives.

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.

FLUID MECHANICS & HYDRAULIC MACHINERY LAB

Subject Code	Practical						Credits
2025307	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	ESE	:	25	
	—	—	02	Internal	:	07	
	—	—	—	External	:	18	

Course Objectives:

- To calibrate the given flow measuring device.
- To apply the knowledge acquired in theory subject.
- To analyse the performance of turbines and pumps.

Course Content:

S.No.	Topics
I	Verification of Bernoulli's theorem.
II	Determination of Coefficient of Discharge of Venturi meter.
III	Determination of Coefficient of Discharge, coefficient of contraction and coefficient of velocity of Orifice meter.
IV	Determination of coefficient of friction of flow through pipes.
V	Determination of force exerted by the jet of water on the given vane.
VI	Determination of minor losses of flow through pipes.
VII	Calibration of pressure gauge using dead weight pressure gauge tester.
VIII	Trial on centrifugal pump to determine overall efficiency.
IX	Trial on reciprocating pump to determine overall efficiency.
X	Trial on Pelton wheel to determine overall efficiency.
XI	Trial on Francis/Kaplan turbine to determine overall efficiency.

Reference Books:

N. Kumara Swamy, Fluid Mechanics and Machinery Laboratory Manual, Charotar Publishing House Pvt. Ltd., ANAND 388 001, Ed. 2008

Course outcomes:

At the end of the course, the student will be able to:

CO1 Measure various properties such as pressure, velocity, flow rate using various instruments.

CO2 Calculate different parameters such as co-efficient of friction, power, efficiency etc. of var- ious systems.

CO3 Understand the need and importance of calibration of pressure gauges.

CO4 Describe the construction and working of turbines and pumps.

CO5 Test the performance of turbines and pumps and Plot characteristics curves.

WEB TECHNOLOGY LAB

SUBJECT CODE: 2018308	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:		25	01
			P/S	ESE		25	
			02	Internal		07	
				External		18	

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies'. Some of the things that should necessary be covered in lab.

Course outcomes:

Student will be able to program web applications using and will be able to do the following:

- Use LAMP Stack for web applications
- Write simple applications with Technologies like HTML, Java script, AJAX, PHP
- Connect to Database and get results
- Parse XML files Student will be able to develop/build a functional website with full features.

Content		Hrs.	Marks
Unit – 1	Home page Development static pages (using Only HTML) of an online Book store.		
Unit – 2	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.		
Unit – 3	Write a PHP program to display a digital clock which displays the current time of the server.		
Unit – 4	Write an HTML code to display your CV on a web page.		
Unit – 5	Write an XML program to display products.		
Unit – 6	Create a web page with all types of Cascading style sheets.		
Unit – 7	Write a PHP program to display a digital clock which displays the current time of the server.		
Unit – 8	Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.		

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson
2. "Internet & World Wide Web How to Program", Deitel, Deitel, Goldberg, Pearson Education
3. "Web programming- Building Internet Application", Chris Bales
4. Web Applications: Concepts and Real-World Design, Knuckles

Thermal Engineering Lab – I

Subject Code	Practical						Credits
2025309	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	ESE	:	25	
	—	—	02	Internal	:	07	
	—	—	—	External	:	18	

Course Objectives:

- To understand the importance of fuel properties and learn the methods of determination of various properties of fuels.
- To understand the working principles of various methods used in determination of properties of fuels.
- To observe different parts of I.C. engine and understand their working.
- To identify the physical differences between S.I. and C.I. engines and 2-S and 4-S engines.

Course Content:

S.No. Topics for practice

I Flash & Fire point tests using Able's/Cleveland/Pensky Martin Apparatus

II Viscosity measurement use/Say bolt viscometer

III Calorific value tests using Bomb Calorimeter (Solid and Liquid fuels) and Junkers Gas Calorimeter (Gaseous fuels)

IV Carbon residue test using Conradson's apparatus.

V Assembling and disassembling of I.C. Engines

VI Port timing diagram of Petrol engine

VII Port timing diagram of Diesel engine

VIII Valve timing diagram of Petrol engine

IX Valve timing diagram of Diesel engine

X Study of petrol and diesel engine components and Models

Reference Books:

1. Thermal Engineering – P.L. Ballaney, Khanna Publishers, 2002
2. A Course in Thermal Engineering – S. Domkundwar & C.P. Kothandaraman, Dhanpat Rai & Publication New Delhi
3. Thermal Engineering – R.S. Khurmi and J.K. Gupta, 18th Edition, S. Chand & Co, NewDelhi

Course outcomes:

At the end of the course, the student will be able to:

CO1 Understand the determination of flash and fire point of a given sample of fuel using given apparatus (Abels, Cleveland & Penesky martin)

CO2 Understand the determination of Viscosity of a given sample of oil using given apparatus.

CO3 Understand the determination of Calorific value of a given sample of fuel using given ap- paratus.

CO4 Understand the determination of amount of carbon residue of a given sample of petroleum product.

CO5 Draw VTD /PTD of given I.C. Engine and understand how the processes are controlled during its operation.

CO6 Understand the functions of various parts of IC engines and the working of IC engines.

TERM WORK

ESSENCE OF INDIAN KNOWLEDGE AND TRADITION

Subject Code	Practical						Credits
2025310	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S		:		
	—	—	4	Internal	:	15	
	—	—	—	External	:	35	

Course Content:

Basic Structure of Indian Knowledge System:

- Basic Structure of Indian Knowledge System:

  (i) वेद, (ii) उन्नवेद (आयुवेद, धनुवेद, गन्धवेद, स्थान्त्य आदद) (iii) वेदांग (शिक्षा, कल्न, ननरुत, व्याकरण, ज्योनतष छांद), (iv) उन्नाइग (धर्म सिि, रीशांसा, नुराण, तकमिास्न)

- Modern Science and Indian Knowledge System
- Yoga and Holistic Healthcare
- Case Studies.

SUGGESTED TEXT/REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1.	Cultural Heritage of In- dia-Course Material	V. Sivaramakrishna	Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2.	Modern Physics and Vedant	Swami Jitatmanand	Bharatiya Vidya Bhavan
3.	The wave of Life	Fritzof Capra	
4.	Tao of Physics	Fritzof Capra	
5.	Tarkasangraha of Annam Bhatta, Inernational	V N Jha	Chinmay Foundation, Velliarnad, Amaku,am
6.	Science of Consciousness Psychotherapy and Yoga Practices	RN Jha	Vidyanidhi Prakasham, Delhi, 2016

TERM WORK
Python

Subject Code	Practical						Credits
2018311	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S		:	--	
	—	—	02	Internal	:	07	
	—	—	—	External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

TERM WORK
Summer Internship-I (4 weeks)

Subject Code	Practical						Credits
2025312	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S		:		
	—	—	-	Internal	:	15	
	—	—	—	External	:	35	

- How important is it really to do an internship before applying for a job?
- Do you need to get the hands-on experience that is talked about when discussing the importance of internships or is it a matter of just landing the right job?

During the Course duration year, students may feel overwhelmed with coursework, sports, or co-curricular activities that may keep them extremely busy while leaving no time to think of doing an internship or a job. Many students may also feel that they are caught in a bind since they need to make money to pay for their expenses but they can only find unpaid internships in their field.

Getting Your Feet Wet

Internships are a proven way to gain relevant knowledge, skills, and experience while establishing important connections in the field. Internships are also a way to get your feet wet and find out if a specific field is something you could see yourself doing full-time.

Internships may be completed during fall or spring semester or full time over the course of the summer. Unpaid internships may be easier to get but may also pose problems if making money is necessary, especially during the summer. There are many who cannot afford to work for no pay, so they are forced into doing menial jobs such as wait staff or bartending to work their way through college. It may preclude some from doing an internship which may be a detriment when hoping to get a full-time job.

Financial Considerations

Financial considerations when looking for an internship can make a big difference in the decision-making process. Sometimes, students will take a part-time or full-time job to supplement the time that they are spending at their internship. Whether an internship is paid or unpaid, there are many things that need to be taken into consideration to decide if an internship is worthwhile. It's important to decide if an internship will ultimately be in the best interest of the student to help meet the requirements needed when applying for a full-time job.

How to Get Funding for an Internship

Some colleges also offer funded internships for students. Check with your college to see if they offer a funded internship program that may help to meet the requirements of your college curriculum while offering experiences that employers seek when hiring new college graduates for entry-level jobs. Many foundations and organizations offer financing to college students so they may try writing to a number of them to see if they provide funding for college students seeking to do internships in their field.

Having an Internship and a Job

Students may elect to do a summer internship a couple of days per week while working a

part-time job for the remainder of the time. For those who need to maximize the amount of money they make over the course of the summer, they may look into doing an internship during the academic year when they are less likely to expect to make money to help defray their college expenses.

In addition to internships, volunteer opportunities can also be an excellent way to gain experience and exposure to the workforce. Employers love to see volunteer experiences on a student's resume. Volunteering shows commitment to causes and certain values that are intrinsic to the individuals who have participated in these types of experiences. Employers look for employees who are publicly engaged and who take an interest in community service and in doing good work.

What Employers Want

Internships and volunteer experiences make candidates more competitive in the job market. In addition to gaining exposure and experience in the field, they also provide an opportunity to see if the particular career field is the right one based on getting personal experience in the field. No matter what opportunities you engage in, it's important to maintain professionalism and take on the individual responsibility that is required.

The Benefits of Completing an internship

By doing a great job and completing more than what is required of you in your internship, you will be creating a great impression that can provide a great reference letter at the least, and may even potentially lead to a potential job offer. When you leave the organization at the end of the internship, you should ask for a recommendation letter that you can keep on file for future reference.

Internships Are a Learning Experience

Internships are a great way to learn the ropes so even if you find yourself filing or making coffee, as long as you're learning about the field take advantage of the opportunity and don't take the experience lightly. Asking questions is one key to learning in an internship and keeping yourself flexible throughout the internship can open many doors.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

IIIRD SEMESTER DIPLOMA IN CERAMIC ENGINEERING

(Effective from Session 2020-21 Batch)

THEORY

Sr. No.	SUBJECTS	SUBJECTCODE	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	2000301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	2000302	03	03	10	20	70	100	28	40	03
3.	Ceramic and raw Materials	2013303	03	03	10	20	70	100	28	40	03
4.	Glass Technology – I	2013304	03	03	10	20	70	100	28	40	03
5.	Enamel Technology	2013305	03	03	10	20	70	100	28	40	03
		Total: - 16					**350**	**500**			15

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	2000306	06 50% Physical 50% Virtual	03	15	35	50	20	03
7.	Ceramic Processes Workshop-I	2013307	02 50% Physical 50% Virtual	03	15	35	50	20	01
8.	Ceramic Engineering Workshop Practice – I (Glass & enamel)	2013308	02 50% Physical 50% Virtual	03	15	35	50	20	01
9.	Ceramic Engineering Lab-I	2013309	02 50% Physical 50% Virtual	03	07	18	25	10	01
	Total: - 12						**175**		06

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.	**Python / Others** (TW)	2000310	02	07	18	25	10	01
11.	Ceramic Engineering Workshop Practice – I (Glass & Enamel) (TW)	2013311	03	15	35	50	20	02
	Total: - 05					**75**		03
Total Periods per week Each of duration one Hours **= 33**						**Total Marks = 750**		**24**

APPLIED MATHEMATICS

Subject Code 2000301	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Contents:		Hrs.	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. Regula-falsi method. Newton – Raphson method. 5.2 Solution of simultaneous equations containing 2 and 3 unknowns Gauss elimination method. Iterative methods- Gauss seidel 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	Lipschitz	Schamus outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Delhi
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall of India, New Delhi
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 2000302	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	

Course Learning Objective:

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 array, stacks and linked list solving problems.
- Handling File in "C".

Contents: Theory		Hrs.	Marks
Unit -1	**Introduction to computer software:** ➢ Classification of computer software. • System software. • Application software. ➢ Programming languages. • Machine languages. • Assembly languages. • High level programming languages. ➢ Algorithms and flowchart.	[03]	
Unit -2	**Fundamental of C languages.** ➢ Introduction. • Background. • Characteristics of C. • Uses of C. ➢ Structure of a C program. ➢ Writing the first C program. ➢ Files used in a C program. • Source code files. • Header files. • Object files. • Binary executable files. ➢ Compiling and Executing C programs. ➢ Using comments.	[08]	

	➢ Characters used in C. ➢ Identifier. ➢ Keyword or Reserved words. ➢ Tokens. ➢ Constants. • Numeric constant. • String Character constant. ➢ Variables. ➢ Variable Declaration. ➢ Basic Data Types. ➢ Additional Data types. ➢ Operators and Expressions. ➢ Operator Precedence and Associativity. ➢ Type conversion and Type casting. ➢ Input/ Output statements in C.		
Unit -3	**Decision Control and Looping Statements:** ➢ Introduction to Decision control statements. ➢ Conditional Branching statements. • If statement. • If-else statement. • If-else-if statement. • Switch case. ➢ Iterative statements. • While loop. • Do-while loop. • For loop. ➢ Nested loops. ➢ Break and continue statements. • Break statement. • Continue statement. ➢ Go to statement.		

Unit -4	**Functions in 'C'.** ➢ Uses of functions. ➢ User defined functions. ➢ Function Declaration. ➢ Calling a function. ➢ Actual and formal Arguments. ➢ Rules to call a function. ➢ Function propotype. ➢ Recursion. • Use of Recursive function. ➢ Local or Internal variables. ➢ Global or External variables. ➢ Void function. ➢ Storage classes in C. • Auto or Automatic Storage class. • Static Storage class. • Extern Storage class. • Register Storage class.	[07]	
Unit -5	**Arrays.** ➢ Introduction. ➢ Declaration of Arrays. ➢ Accessing the Elements of an Array. • Calculating the address of Array elements. • Calculating the length of an Array. ➢ Storing values in Arrays. • Initializing Arrays during Declaration. • Inputting values from the keyboard. • Assigning values to Individual Elements. ➢ Operations on Arrays. • Traversing an Array. • Inserting an Element in an Array. • Deleting an Element from an Array. • Merging Two Arrays. • Searching for a value in an Array. ➢ Passing Arrays to functions. ➢ Two dimensional Arrays. • Declaring Two-dimensional Arrays. • Initializing Two-dimensional Arrays. • Accessing the Elements of two dimensional Arrays. ➢ Operations on Two-dimensional Arrays.	[07]	

Unit -6	**Pointers.** ➢ Understanding the Computer's Memory. ➢ Introduction to pointers. ➢ Declaring pointer variables. ➢ Pointer Expressions and pointer Arithmetic. ➢ Null pointers. ➢ Passing Arguments to function using pointer. ➢ Pointers and Arrays. ➢ Passing an Array to a Function. ➢ Dynamic Memory Allocation. • Malloc ( ) function. • Calloc ( ) function. • Realloc ( ) function. • Free ( ) function.	[07]	
Unit -7	**Structures and Unions.** ➢ Structures. ➢ Structure variables and Arrays. • Initialization of structure variable and Array. • Dot (•) Operator. • Assigning value of a structure to Another structure. ➢ Structure within structures. ➢ Site of ( ) of a structure. ➢ Unions. ➢ Site of ( ) unions. ➢ Difference between a structure and an union. ➢ Enum Data Type. ➢ Typedef Declaration.	[04]	

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.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa
10.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
11.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth
12.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
13.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
14.	Pointers in C, BPB publication, New Delhi.	-	Yashwant Kanetkar

CERAMIC AND RAW MATERIALS

Subject Code	Theory			No of Period in one session: 60			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	03
2013303	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.

Learning Outcome: At the end of this course, the students will be able to:

Explain status of ceramic industries in India.

Enlist different ceramic products and their raw materials.

Explain classification of ceramic materials.

Identify physical properties of different ceramic materials.

List the different raw materials required for manufacturing of refractory, pottery, glass, enamel, cement.

	Contents (Theory)	Hrs	Marks
Unit -1	**INTRODUCTION OF CERAMIC** Introduction with its History and uses.	[05]	
Unit -2	**CERAMIC PRODUCTS:** 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, Coloring 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	Theory			No of Period in one session: 60			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	
2013304	03	—	—	TA	:	10	03
				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 kindof furnaces. It also deals with the raw materials used in Glass Industry.

Learning Outcome: At the end of this course, the students will be able to:

Define glass, state properties and use of glass.

Enlist different types of glass.

List out different raw materials used in glass industries.

Explain properties of different raw materials.

Perform handling and mixing of raw materials for batch.

Prepare batch for glass.

Describe construction ad function of different glass making furnaces.

	Contents (Theory)	Hrs	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, Alumino-silicate 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, PhosphoricOxide, 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	Theory			No of Period in one session: 60			Credits
	No. of Periods Per Week			Full Marks	:	100	
	L	T	P/S	ESE	:	70	
2013305	03	—	—	TA	:	10	03
				CT	:	20	

RATIONALE:

Enamel is Ceramic Engineering based product which is made by fusing powdered glass to a substrate by firing. It is usedas 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.

Learning Outcome: At the end of this course, the students will be able to:

Define enamel and use of enamel.
List out different raw materials used in enamel making.
Explain properties of different raw materials for enamel.
Prepare enamel batch, enamel slip and substrate.
Perform application of enamel slip.
Describe construction and function of different enameling furnace.
Identify the defects and remedies in enamel.

	Contents (Theory)	Hrs	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	Practical			No. of Period in one session: 50			Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	03
2000306	—	—	06	Internal	:	15	
				External	:	35	

Course Learning Objectives:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

Course outcomes:

Student should be able to write code snippets, and then compile, debug and execute them.

Content: Practical		Hrs	Marks
Unit – 1	Familiarization with programming environment (Editor, Compiler, etc.)		
Unit – 2	Programs using, I/O statements and various operators		
Unit – 3	Programs using expression evaluation and precedence		
Unit – 4	Programs using decision making statements and branching statements		
Unit – 5	Programs using loop statements		
Unit – 6	Programs to demonstrate applications of n dimensional arrays		
Unit – 7	Programs to demonstrate use of string manipulation functions		
Unit – 8	Programs to demonstrate parameter passing mechanism		
Unit – 9	Programs to demonstrate recursion		
Unit – 10	Programs to demonstrate use of pointers		
Unit – 11	Programs to demonstrate command line arguments		
Unit – 12	Programs to demonstrate dynamic memory allocation		
Unit – 13	Programs to demonstrate file operations		

The language of choice will be C. This is a skill course. More you practice, better it will be.

Reference Books:

1. Let Us C, Yashavant Kanetkar

2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House

3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry

4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India

5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill

6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

CERAMIC PROCESSES WORKSHOP-I

Subject Code 2013307	Practical			No of Period in one session: 90			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

Rationale:

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

Learning Outcome: At the end of this course, the students will be able to:

- Apply Processing techniques used in pottery making.
- Explain Process adopted in making refractories.
- Explain Glass forming methods by using process techniques and machine.
- Perform Cement and Concrete application.
- Perform Decoration techniques with finishing.
- Prepare Moulid

Contents (Theory)		Hrs.	Mark
Unit -1	Introduction of shaping, mounding, casting, pressing and all other processes.		
Unit -2	Cement and concrete application.		
Unit -3	Decoration and finishing of pottery and other ceramic wares techniques		
Unit -4	Moulid making		
	Total		

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 2013308	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

RATIONALE:

This Workshop is kept mainly to get students work with hand on various process involved in making glass and Enamelproducts.

It provides practical knowledge on operations required to be carried out in industry on laboratory scale.

Learning Outcome: At the end of this course, the students will be able to:

- Prepare the raw materials for different glass.
- Perform batching and mixing of glass batch.
- Explain Glass melting techniques and decoration.
- Prepare metal surface for enameling.
- Prepare frit batch and make enamel slip.
- Apply enamel on metal plate.

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

Text/ Reference Books:

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

CERAMIC ENGINEERING LAB – I

Subject Code 2013309	Practical						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	ESE	:	25	
	—	—	02	Internal	:	07	
				External	:	18	

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.

Learning Outcome: At the end of this course, the students will be able to:

- Explain physical properties of clay.
- Perform testing of different properties of pottery, refractory, glass and enamel.
- Explain defects of enamel.

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

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

PYTHON / Others (TW)

Subject Code	Term Work			No of Period in one session: 30			Credits
	No. of Periods Per Week			Full Marks	:	25	
2000310	L	T	P/S	Internal	:	07	01
	—	—	02	External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

CERAMIC ENGG. WORKSHOP PRACTICE – 1
(GLASS AND ENAMEL) (TW)

Subject Code	Term Work			No of Period in one session: 30			Credits
	No. of Periods Per Week			Full Marks	:	50	
2013311	L	T	P/S	Internal Examiner	:	15	02
	—	—	03	External Examiner	:	35	

RATIONALE:

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

Learning Outcome: At the end of this course, the students will be able to:

- Prepare the raw materials for different glass.
- Perform batching and mixing of glass batch.
- Explain Glass melting techniques and decoration.
- Prepare metal surface for enameling.
- Prepare frit batch and make enamel slip.
- Apply enamel on metal plate.

	Contents (Term Work)	Hrs	Mark
	GLASS		
Unit -1	**PREPARATION OF RAW MATERIALS**: For: soda Lime Silica Glass, Potash Glass and Colored Glass etc.	[03]	
Unit -2	**FORMATION AND MIXING OF BATCH**: For all kind of Glasses with Frit and colors 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[rd] SEMESTER DIPLOMA IN CHEMICAL ENGINEERING

(Effective from Session 2020-21 Batch)

THEORY

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING	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.	Introduction to Chemical Engineering	2014301	03	03	10	20	70	100	28	40	03
2.	Chemical Process Calculations	2014302	04	03	10	20	70	100	28	40	04
3.	Industrial Chemistry	2014303	03	03	10	20	70	100	28	40	03
4.	MechanicalOperation	2014304	03	03	10	20	70	100	28	40	03
5.	Momentum Transfer	2014305	04	03	10	20	70	100	28	40	03
	Total:- 17						**350**	**500**			16

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.	Momentum Transfer Lab	2014306	02 50% Physical 50% Virtual	03	15	35	50	20	01
7.	Mechanical OperationLab	2014307	02 50% Physical 50% Virtual	03	15	35	50	20	01
8.	Web Technology Lab	2018308	02 50% Physical 50% Virtual	03	07	18	25	10	01
	Total: - 06						**125**		**03**

TERM WORK

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING	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.	Development of Life Skills-II (TW)	2014309	04	15	35	50	20	02
10.	Professional Practices-III (TW)	2014310	04	15	35	50	20	02
11.	Python	2018311	02	07	18	25	10	01
	Total: - 10					**125**		**05**
Total Periods per week Each of duration One Hours = 33						**Total Marks = 750**		**24**

INTRODUCTION TO CHEMICAL ENGINEERING

SUBJECT CODE: 2014301	Theory			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	03	-	-	T.A.	:	20	
				C.T.	:	10	

Course Learning Objectives:

- To give a comprehensive knowledge on various aspects practiced in chemical engineering.
- To give the sources of information on related topics.

Course Content:

UNIT I	Chemistry, Chemical Engineering and Chemical Technology; Chemical process industries: History and their role in Society; Role of Chemical Engineer; History and Personalities of Chemical Engineering; Greatest achievements of Chemical Engineering.
UNIT II	Components of Chemical Engineering: Role of Mathematics, Physics, Chemistry and Biology; Thermodynamics, Transport Phenomena, Chemical Kinetics and Process dynamics, design and control.
UNIT III	Concept of Unit Processes and Unit Operations; Description of different Unit Processes and Unit Operations; Designing of equipment's; Flowsheet representation of process plants,
UNIT IV	Role of Computer in Chemical Engineering; Chemical Engineering Software; Relation between Chemical Engineering and other engineering disciplines; Traditional vs. modern Chemical Engineering; Versatility of Chemical Engineering: Role of Chemical Engineers in the area of Food, Medical, Energy, Environmental, Biochemical, Electronics etc.
UNIT V	Paradigm shifts in Chemical Engineering; Range of scales in Chemical Engineering; Opportunities for Chemical Engineers; Future of Chemical Engineering.

REFERENCE BOOKS:

1. S. K. Ghosal, S. K., Sanyal and S. Datta, "Introduction to Chemical Engineering", Tata McGraw Hill Education Pvt. Ltd., New Delhi.
2. Pushpavanam.S., "Introduction to Chemical Engineering", PHI Learning Pvt. Ltd., New Delhi,
3. Badger W.L. and Banchero J.T., "Introduction to Chemical Engineering", 6thEdition, Tata McGraw Hill, 1997.
4. Dryden, C.E., "Outlines of Chemicals Technology", Edited and Revised by Gopala Rao, M. and M.Sittig, 2nd Edition, Affiliated East-West press, 1993.

Chemical Process Calculations

SUBJECT CODE: 2014302	Theory			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	100	04
	L	T	P/S	ESE	:	70	
	04	-	-	T.A.	:	20	
				C.T.	:	10	

CONTENT

UNIT-I:	Basics of unit operations and unit processes, Units and dimensions.
UNIT-II:	Stoichiometric principles – composition relations, density and specific gravity. Behavior of Ideal gases - application of ideal gas law - gaseous mixtures - volume changes with change in composition.
UNIT-III:	Vapour pressure - effect of Temperature on vapour pressure - vapour pressure plots – vapour pressure of immiscible liquids - solutions. Humidity and Solubility: Humidity - saturation -vaporization - wet and dry bulb thermometry.
UNIT-IV:	Material Balance - Processes involving chemical reaction - Combustion of coal, fuel gases and Sulphur - Recycling operations - bypassing streams - Degree of conversion – excess reactant -limiting reactant. Unsteady state problems
UNIT-V:	Energy Balance: Thermo chemistry - Hess's law of summation - heat of formation, reaction, combustion and mixing - mean specific heat - Theoretical Flame Temperature.

REFERENCE BOOKS

1. K.V. Narayanan and B. Lekshmikutty, "Stoichiometry and Process Calculations", Prentice Hall of India Ltd, New Delhi..
2. V.Venkataramani, N.Anantharaman and K.M. Meera Sheriffa Begum, 'Process Calculations' Prentice Hall of India Ltd, New Delhi.
3. B. I. Bhatt, "Stoichiometry", Tata McGraw Hill Publishers Ltd., New Delhi.
4. C. M. Narayanan & B. C Bhattacharya, 'Unit operations and Processes' Vol-I, CBS Publishers & Distributors

Industrial Chemistry

SUBJECT CODE: 2014303	Theory			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	03	-	-	T.A.	:	20	
				C.T.	:	10	

CONTENT

UNIT-I:	Organic Chemistry Nomenclatures of organic compounds, functional groups
UNIT-II:	Classification of organic compounds, aliphatic Compounds, closed chain compounds, unsaturated. Alkanes, alkenes, alkynes, cycloalkanes. Halogenations, saturated halogenation Reaction of alkenes, oxidation, halogenation, Nitration, pyrolysis, isomerization dehydrogenation, Structures and reactivity of alkanes, cycloalkanes. Alkenes, preparation, properties and reactions, Action of ozone, hydrogenation, halogenation, action of halogen acids, sulfuric acid, polymerization, uses of alkenes.
UNIT-III:	Aromatic Compounds, alkyl halides, alcohol and phenols. Concept of aromaticity, structure of benzene, properties of benzene, reactions of benzene, halogenation, hydrogenation, pyrolysis, Classification of alkyl halides, isomerism in alkyl halides, properties of alkyl halides, substitution reaction, elimination reaction, alcohols. Classification of alcohols, preparation, properties, reaction, phenols Classification, preparation, reaction.
UNIT-IV:	Phase rule, Phase rule, phase, component, degrees of freedom, One component system
UNIT -V:	Adsorption Definition, nature of adsorption, types of adsorption Langmuir adsorption isotherm, Freundlich adsorption Isotherm, application, Solutions and Indicators Ideal solution, non-ideal solution, Azeotropic Mixture, and theory of indicators.

REFERENCE BOOKS:

1. R. T. Morrison, R. N. Boyd and S.K. Bhattacharjee, ‘Organic Chemistry” Pearson.
2. V Raghavan, “Material Science & Engineering” PHI Learning Pvt. Ltd.
3. P.L. Sony and H.M. Chawla, “Text book of organic Chemistry”, Sultan Chand & Sons – Tb
4. B.R. Puri, L.R. Sharma and M.S. Padania, “Principles of physical chemistry” Vikas Publishing House Pvt Ltd.,
5. K. S. Tewari, S. N Mehrotra, N. K. Vishnoi, “Textbook of organic chemistry” Vikas Publishing House Pvt Ltd

Mechanical Operation

SUBJECT CODE: 2014304	Theory			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	03	-	-	T.A.	:	20	
				C.T.	:	10	

CONTENT

UNIT-I:	Characteristics of Particulate Material: Properties and characterization of particulate solids, Flow properties of particulates.
UNIT-II:	Introduction to size reduction equipment, energy and power requirement in milling operations
UNIT-III:	Separation of solids, Solid – Solid Separation Equipment's
UNIT-IV:	Particulate Processes: Solid-Liquid and Gas-Solid separation methods, Equipment's Classification by size, agitation and mixing of solids and liquids,
UNIT- V:	Handling of Particulate Material: Conveying methods, Storage methods, Feeders and elevators.

REFERENCE BOOKS

1. Anup. K.Swain, Hemlata Patra, G.K.Roy., "Mechanical Operations", McGraw Hill Education.
2. McCabe and J.C.Smith," Unit Operation of Chemical Engineering", McGraw Hill., New York.
3. M. Coulson and J.F. Richardson, "Chemical Engineering", Vol. II, Butterworth-Heinemann
4. Badger and Banchero, "Introduction to Chemical Engineering", McGraw Hill, New York.

Momentum Transfer

SUBJECT CODE: 2014305	Theory			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	04	-	-	T.A.	:	20	
				C.T.	:	10	

CONTENT:

UNIT-I:	Properties of fluids and concept of pressure: Introduction - Nature of fluids - physical properties of fluids - types of fluids. Fluid statics: Pressure - density - height relationships. Pressure measurement. Dimensional analysis. Similarity - forces arising out of physical similarity - dimensionless numbers.
UNIT-II:	Momentum Balance and their Applications: Kinematics of fluid flow; Newtonian and non-Newtonian fluids - Reynolds number - experiment and significance - Momentum balance - Forces acting on stream tubes - Bernoulli's equation - Correction for fluid friction
UNIT-III:	Flow of incompressible fluids in pipes – laminar and turbulent flow through closed conduits - velocity profile & friction factor for smooth and rough pipes - Head loss due to friction in pipes, fitting etc.
UNIT-IV:	Flow of Fluids through Solids: Form drag - skin drag - Drag co-efficient. Flow around solids and packed beds. Friction factor for packed beds. Ergun's Equation - Motion of particles through fluids - Terminal settling velocity. Fluidization - Mechanism, types, general properties – applications
UNIT-V:	Transportation and Metering: Measurement of fluid flow: Orifice meter, Venturi meter, Pitot tube, Rotameter, weirs and notches Wet gas meter and dry gas meter. Hot wire and hot film anemometers. Transportation of fluids: Fluid moving machinery performance. Selection and specification. Positive displacement pumps, Rotary and Reciprocating pumps, Centrifugal pumps and characteristics, Introduction to Fans, Blowers & Compressors

REFERENCE BOOKS:

1. A. K. Mohanty, "Fluid Mechanics", Prentice Hall of India Ltd, New Delhi.
2. W. L. McCabe, J.C. Smith and P. Harriot, "Unit operations of Chemical Engineering", McGraw Hill, International Edn.,
3. J. M. Coulson and J. F. Richardson, "Chemical Engineering", Vol 1, Butterworth Heinemann.
4. C. M. Narayanan & B. C Bhattacharya, 'Unit operations and Processes' Vol-I, CBS Publishers & Distributors.

PRACTICAL
Momentum Transfer Lab

SUBJECT CODE: 2014306	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	50	01
	L	T	P/S	ESE	:	50	
		-	02	Internal	:	15	
				External	:	35	

CONTENTS:

To conduct experiment to study

1. Different types of manometers
2. Major losses in pipe flow
3. Minor Losses (Globe Valve, Bends and Elbows)
4. Major losses in spiral coil flow
5. Major losses in helical coil flow
6. Flow Through Packed Bed
7. Flow Through Fluidized Bed
8. Calibration of orifice meter
9. Calibration of venturi meter
10. Calibration of pitot tube
11. Calibration of channel
12. Characteristics of reciprocating pump
13. Characteristics of centrifugal pump

REFERENCES:

1. Lab Manual
2. W. L. McCabe, J.C. Smith and P. Harriott, “Unit operations of Chemical Engineering”, McGraw Hill, International Edn.
3. G Chandrasekhar, Laboratory Experiments in Chemical and Allied Engineering, Pen ram International Publishing (India) Pvt. Ltd.

Mechanical Operation Lab

SUBJECT CODE: 2014307	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	50	01
	L	T	P/S	ESE	:	50	
		-	02	Internal	:	15	
				External	:	35	

CONTENTS:

1. Different types of density of particle (Bulk, Particle, Repose)
2. Angle of repose
3. Particle size distribution
4. Screen effectiveness
5. Jaw crusher
6. Ball mill
7. Drop weight crushes
8. Drag studies
9. Settling studies
10. Separation of solids using settling characteristics
11. Constant Pressure Filtration
12. Constant Volume Filtration
13. Elutriation
14. Agitated vessel
15. Storage of Solids

REFERENCES:

1. Lab Manual
2. W. L. McCabe, J.C. Smith and P. Harriott, “Unit operations of Chemical Engineering”, McGraw Hill, International Edn.,
3. G Chandrasekhar, Laboratory Experiments in Chemical and Allied Engineering, Penram International Publishing (India) Pvt. Lt

WEB TECHNOLOGY LAB

SUBJECT CODE: 2018308	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	25	01
	L	T	P/S	ESE	:	25	
		-	02	Internal	:	07	
				External	:	18	

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies'. Some of the things that should necessary be covered in lab.

Course outcomes:

Student will be able to program web applications using and will be able to do the following:

- Use LAMP Stack for web applications
- Write simple applications with Technologies like HTML, Java script, AJAX, PHP
- Connect to Database and get results
- Parse XML files Student will be able to develop/build a functional website with full features.

Content: Practical		Hrs.	Marks
Unit – 1	Home page Development static pages (using Only HTML) of an online Book store.		
Unit – 2	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.		
Unit – 3	Write a PHP program to display a digital clock which displays the current time of the server.		
Unit – 4	Write an HTML code to display your CV on a web page.		
Unit – 5	Write an XML program to display products.		
Unit – 6	Create a web page with all types of Cascading style sheets.		
Unit – 7	Write a PHP program to display a digital clock which displays the current time of the server.		
Unit – 8	Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.		

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson
2. "Internet & World Wide Web How to Program", Deitel, Deitel, Goldberg, Pearson Education
3. "Web programming- Building Internet Application", Chris Bales
4. Web Applications: Concepts and Real-World Design, Knuckles

Development of Life Skills-II(TW)

SUBJECT CODE: 2014309	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	50	02
	L	T	P/S		:		
		-	04	Internal	:	15	
				External	:	35	

Unit-1	Society, social structure, develop sympathy and empathy.
Unit-2	Swot Analysis – Concept, how to make use of SWOT
Unit-3	Sources of conflict, Resolution of conflict, Ways to enhance interpersonal relations.
Unit-4	1) Steps in Problem Solving. 2) Identify and Clarify the Problem, 3) Information Gathering Related to Problem, 4) Evaluate the Evidence, 5) Consider Alternative Solutions and their Implications. 6) Choose and Implement the Best Alternative, 7) Review 8) Problem solving technique. (Any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking
Unit-5	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
Unit-6	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

Unit-7	Understand and work within the dynamics of a Groups. Tips to work effectively in terms, establish good rapport, interest with others and work effectively with them to meet common Objectives, tips provide and accept feedback in a constructive and considerate way, leadership in term, handling frustration in group.
Unit-8	Introduction, Task Identification, Task planning, Organizing and Execution, Closing the Task.

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

Professional Practices-III (TW)

SUBJECT CODE: 2014310	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	50	02
	L	T	P/S				
		-	04	Internal	:	15	
				External	:	35	

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)
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
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
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

Python (TW)

SUBJECT CODE: 2018311	Term Work			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	25	01
	L	T	P/S				
		-	02	Internal	:	07	
				External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

References Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III[rd] SEMESTER DIPLOMA IN CIVIL ENGINEERING / CIVIL (RURAL) ENGINEERING

(Effective from Session 2020-21 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.	Building Construction and Construction Materials	2015301	05	03	10	20	70	100	28	40	05
2.	Basic Surveying	2015302	04	03	10	20	70	100	28	40	03
3.	Mechanics of Materials	2015303	04	03	10	20	70	100	28	40	03
4.	Concrete Technology	2015304	03	03	10	20	70	100	28	40	03
5.	Geo Technical Engineering	2015305	03	03	10	20	70	100	28	40	03
		Total :-	**19**				**350**	**500**			**17**

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.	Basic Surveying Lab	2015306	02 50% Physical 50% Virtual	04	15	35	50	20	01
7.	Building Construction and Construction materials Lab	2015307	02 50% Physical 50% Virtual	04	15	35	50	20	01
8.	Web Technology Lab	2018308	02 50% Physical 50% Virtual	03	07	18	25	10	01
Total :-			**06**				**125**		**03**

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.	Mechanics of Materials Lab (TW)	2015309	02	07	18	25	10	01
10.	Concrete Technology Lab (TW)	2015310	02	07	18	25	10	01
11.	Python	2018311	02	07	18	25	10	01
12.	Geo Technical Eng. Lab (TW)	2015312	02	15	35	50	20	01
Total :-			**08**			**125**		**04**
Total Periods per week Each of duration One Hour 33				Total Marks = **750**				**24**

Building Construction and Construction Materials

Subject Code	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	05
2015301	L	T	P/S	ESE	:	70	
	05	—		TA	:	10	
	—	—	—	CT	:	20	

Course Objective:

1. To identify different components of building.
2. To understand different types of foundation and their significance.
3. To know different types of masonry and their construction.
4. To highlight the importance of communications in building planning.
5. To learn about various construction materials.
6. To be able to identify suitability of various materials for different construction purposes.

COURSE OUTCOMES (COs):

1. Identify relevant construction materials.
2. Identify relevant natural construction materials.
3. Select relevant special type of construction materials.
4. Identify components of building structures.
5. Propose suitable type of foundation for building structures.
6. Select suitable type of masonry for building structures.
7. Propose relevant means of communications for different types of buildings.

Contents: Theory		Hrs
Unit -1	**Overview of Building Components** 1.1 Classification of Buildings as per National Building Code Group A to I, as per Types of Constructions- Load Bearing Structure, Framed Structure, Composite Structure. 1.2 Building Components - Functions of Building Components, Foundation, Plinth and Super structure.	08
Unit -2	**Natural And Artificial Construction Materials** 2.1 Requirements of good building stone; general characteristics of stone; quarrying and dressing methods and tools for stone. 2.2 Structure of timber, general properties and uses of good timber, different methods of seasoning for preservation of timber, defects in timber. 2.3 Asphalt, bitumen and tar used in construction, properties and uses. 2.4 Properties of sand and uses. 2.5 Classification of coarse aggregate according to size. 2.6 Constituents of brick earth, Conventional / Traditional bricks, Modular and Standard bricks, Special bricks –fly ash bricks, 2.7 Characteristics of good brick	12

Unit – 3	**Special and Processed Construction Materials** 3.1 Types of material and suitability in construction works of following materials: Water proofing, Termite proofing; Thermal and sound insulating materials. 3.2 Paints- whitewash, cement paint, Distempers, Oil Paints and Varnishes.	04
Unit – 4	**Construction of Substructure and Superstructure** **4.1** Job Layout: Site Clearance, Layout for Load Bearing Structure and Framed Structure by Center Line and Face Line Method, Precautions. **4.2.** Foundation: Functions of foundation, Types of foundation – Shallow Foundation, Stepped Footing, Wall Footing, Column Footing, Isolated and Combined Column Footing, Raft Foundation. **4.3. Stone Masonry:** Terms used in stone masonry- facing, backing, hearting, through stone, corner stone, cornice. Types of stone masonry: Rubble masonry, Ashlar Masonry and their types. **4.4. Brick masonry:** Terms used in brick masonry, header, stretcher, closer, quoins, course, face, back, hearting, bat bond, joints, lap, frog. Bonds in brick masonry- header bond, stretcher bond, English bond and Flemish bond. **4.5. Scaffolding and Shoring:** Purpose, Types of Scaffolding, Process of Erection and Dismantling. Purpose and Types of Shoring, Underpinning.	10
Unit-5	**5.1 Building Communication and Ventilation** Doors –Components of Doors, Full Paneled Doors, Partly Paneled and Glazed Doors, Flush Doors, Collapsible Doors, Rolling Shutters, Revolving Doors, Glazed Doors. Sizes of Door recommended by BIS. **5.2 Windows:** Component of windows, Types of Windows - Full Paneled, Partly Paneled and Glazed, wooden, Steel, Aluminum windows, Sliding Windows, Louvered Window, Bay window, Sizes of Windows recommended by BIS. Ventilators. **5.3Vertical Communication:** Means of Vertical Communication- Stair Case, Ramps, Lift, Elevators and Escalators. Terms used in staircase-steps, tread, riser, nosing, soffit, waist slab, balustrade, scotia, hand rails, newel post, landing, headroom, winder. Types of staircases (On the basis of shape): Straight, dog-legged, open well, Spiral, quarter turn, bifurcated, three quarter turn and Half turn, **5.4 Wall Finishes:** Plastering – Necessity of Plastering, Procedure of Plastering, Single Coat Plaster, Double Coat Plaster, Rough finish. Precautions to be taken in plastering, defects in plastering. Pointing – Necessity, Types of pointing and procedure of Pointing, Painting. .	**14**
	Total	48

Suggested Text Book:

1) Ghose, D. N., Construction Materials, Tata McGraw Hill, New Delhi.

2) S.K. Sharma, Civil Engineering Construction Materials, Khanna Publishing House, Delhi

3) Varghese, P.C., Building Materials, PHI learning, New Delhi.

4) Rang Wala, S.C., Engineering Materials, Charoter publishing, House, Anand.

5) Somayaji, Shan, Civil Engineering Materials, Pearson education, New Delhi.

6) Rajput, R.K, Engineering Materials, S. Chand and Co., New Delhi.

7) Sood H., Laboratory Manual on Testing of Engineering Materials, New Age Publishers, New Delhi.

8) Sharma C. P., Engineering Materials, PHI Learning, New Delhi.

9) Duggal, S. K, Building Materials, New International, New Delhi

10) S. P. Arora and Bindra., Building Construction, Dhanpat Rai Publication, Delhi.

11) Sushil Kumar., Building Construction, Standard Publication.

12) Ranga Wala, S. C., Building Construction, publishing, House, Anand.

13) Punmia B. C., and Jain A. K., Building Construction.

14) Sharma S. K., Building Construction, S. Chand and Co. Pvt. Ltd., New Delhi.

15) Janardan Jha, Building Construction, Khanna Publication.

16	Building Construction	SNP Srivastava	FPH
17	Adhunik Bhawan Nirman	SNP Srivastava	FPH
18	Building Construction and Construction Materials	SNP Srivastava	FPH

BASIC SURVEYING

Subject Code 2015302	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course Objective:

1. To understand types of surveying works required.
2. To know the types of method and equipment's to be used for different surveys.
3. To know the use and operational details of various surveying equipment's**.**

COURSE OUTCOMES (COs):

1. Select the type of survey required for given situation.
2. Compute area of open field using chain, tape and cross staff.
3. Conduct traversing in the field using chain and compass.
4. Use levelling instruments to determine reduced level for preparation of contour maps
5. Use digital planimeter to calculate the areas

Contents: Theory		Hrs
Unit -1	**Overview and classification of survey** **1.1** Survey- Purpose and Use. **1.2** Types of surveying- Primary and Secondary, Classification: Plane, Geodetic, Cadastral, Hydrographic and Aerial. **1.3** Principles of Surveying **1.4** Scales: Engineer's scale, Representative Fraction (RF) and diagonal scale.	04
Unit -2	**Chain survey** 2.1 Instruments used in chain survey: Metric Chain, Tapes, Arrow, ranging rod, Line ranger, Offset rod, Open cross staff, Optical square. 2.2 Chain survey Station, Base line, Check line, Tie line, Offset, Tie station. 2.3 Ranging- Direct and Indirect Ranging, Methods of Chaining, obstacles in chaining. **2.4** Errors in length: Instrumental error, personal error, error due to natural cause, random error, Principles of triangulation. **2.5** Types of offsets: Perpendicular and Oblique, Conventional Signs, Recording of measurements in a field book.	12

Unit – 3	**Compass traverse survey** 3.1 Compass Traversing- open, closed. 3.2 Technical Terms: Geographic/True, Magnetic Meridians and Bearings, Whole Circle Bearing system and Reduced Bearing system and examples on conversion of given bearing to another bearing (from one form to another), Fore Bearing and Back Bearing, Calculation of internal and external angles from bearings at a station, Dip of Magnetic needle, Magnetic Declination. 3.3 Components of Prismatic Compass and their Functions, Methods of using Prismatic Compass- Temporary adjustments and observing bearings. 3.4 Local attraction, Methods of correction of observed bearings - Correction at station and correction to included angles 3.5 Methods of plotting a traverse and closing error, Graphical adjustment of closing error.	12
Unit – 4	**Levelling and contouring** 4.1 Basic terminologies: Level surfaces, Horizontal and vertical surfaces, Datum, Bench Marks, Permanent, Arbitrary and Temporary, Reduced Level, Rise, Fall, Line of collimation, Station, Back sight, Fore sight, Intermediate sight, Change point, Height of instruments. 4.2 Types of levels: Dumpy, Tilting and Auto level, Temporary adjustments of Level. 4.3 Types of Levelling Staff: Self-reading staff and Target staff, Reduction of level by Height of Instrument Method and Rise and Fall Method. 4.4 Levelling Types: Simple, Differential, Fly, Profile and Reciprocal Levelling. 4.5 Contour, contour intervals, horizontal equivalent, Uses of contour maps, Characteristics of contours, Methods of Contouring- Direct and indirect.	16
Unit – 5	**Measurement of Area and Volume** 5.1 Components and use of Digital planimeter. 5.2 Measurement of area using digital planimeter. 5.3 Measurement of volume of reservoir from contour map.	04
	TOTAL-	**48**

Suggested Text Book/ **Reference Book:**

1. Punmia, B.C; Jain, Ashok Kumar; Jain, Arun Kumar, Surveying I, Laxmi Publications, New Delhi.
2. Basak, N. N., Surveying and Levelling, McGraw Hill Education, New Delhi.
3. Kanetkar, T. P.; Kulkarni, S. V., Surveying and Levelling volume I, Pune Vidyarthi Gruh Prakashan.
4. Duggal, S. K., Survey I, McGraw Hill Education, New Delhi.
5. Saikia, M D.; Das. B.M.; Das. M.M., Surveying, PHI Learning, New Delhi.
6. Subramanian, R., Fundamentals of Surveying and Levelling, Oxford University Press. New Delhi.
7. Text Book of Surveying and Measurement — Vinod Kumar — FPH
8. Surveying — Sweta Kumari — FPH
9. Basic Surveying — Gopal krishnan — FPH

Mechanics of Materials

Subject Code 2015303	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course Objective:

1. To learn properties of area and structural material properties.
2. To understand the concept of stress and strain.
3. To calculate shear force, bending moment for different shapes of structural elements and corresponding stresses.
4. To understand the concept of buckling loads for short and long columns.

COURSE OUTCOMES (COs):

1. Articulate practical applications of moment of inertia of symmetrical and unsymmetrical structural sections.
2. Analyze structural behavior of materials under various loading conditions.
3. Interpret shear force and bending moment diagrams for various types of beams and loading conditions.
4. Determine the bending and shear stresses in beams under different loading conditions.
5. Analyze the column for various loading and end conditions.

CONTENTS: THEORY		Hrs
Unit -1	**Moment of Inertia** **1.1** Moment of inertia (M.I.): Definition, M.I. of plane lamina, Radius of gyration, section modulus, Parallel and Perpendicular axes theorems (without derivations), M.I. of rectangle, square, circle, semi-circle, quarter circle and triangle section (without derivations). **1.2** M.I. of symmetrical and unsymmetrical I-section, Channel section, T-section, Angle section, Hollow sections and built-up sections about centroidal axes and any other reference axis. **1.3** Polar Moment of Inertia of solid circular sections.	10
Unit -2	**Simple stresses and strains** 2.1 Definition of rigid, elastic and plastic bodies, deformation of elastic body under various forces, Definition of stress, strain, elasticity, Hook's law, Elastic limit, Modulus of elasticity. 2.2 Type of Stresses-Normal, Direct, Bending and Shear and nature of stresses i.e., Tensile and Compressive stresses. 2.3 Standard stress strain curve for tor steel bar under tension, Yield stress, Proof stress, Ultimate stress, Strain at various critical points, Percentage elongation and Factor of safety. 2.4 Deformation of body due to axial force, forces applied at intermediate sections, Maximum and minimum stress induced, Composite section under axial loading. 2.5 Concept of temperature stresses and strain, Stress and strain developed due to tempera- true variation in homogeneous simple bar (no composite section) 2.6 Longitudinal and lateral strain, Modulus of Rigidity, Poisson's ratio, Biaxial and tri-axial stresses, volumetric strain, change in volume, Bulk modulus (Introduction only). Relation between modulus of elasticity, modulus of rigidity and bulk modulus (without derivation).	10

Unit -3	**Shear force and Bending moment** 3.1 Types of supports, beams and loads 3.2 Concept and definition of shear force and bending moment, Relation between load, shear force and bending moment (without derivation). 3.3 Shear force and bending moment diagram for cantilever and simply supported beams subjected to point loads, uniformly distributed loads and couple (combination of any two types of loading), point of contraflexure.	10
Unit -4	**Bending and Shear stresses in beams** 4.1 Concept and theory of pure bending, assumptions, flexural equation (without derivation), bending stresses and their nature, bending stress distribution diagram. 4.2 Concept of moment of resistance and simple numerical problems using flexural equation. 4.3 Shear stress equation (without derivation), relation between maximum and average shear stress for rectangular and circular section, shear stress distribution diagram. 4.4 Shear stress distribution for square, rectangular, circular, angle sections, channel section, I-section, T section. Simple numerical problems based on shear equation.	10
Unit -5	**Columns** 5.1 Concept of compression member, short and long column, Effective length, Radius of gyration, Slenderness ratio, Types of end condition for columns, Buckling of axially loaded columns. 5.2 Euler's theory, assumptions made in Euler's theory and its limitations, Application of Euler's equation to calculate buckling load. 5.3 Rankine's formula and its application to calculate crippling load. 5.4 Concept of working load/safe load, design load and factor of safety.	08
	TOTAL	48

Suggested Text Book/ Reference Book:

1. Bedi D.S. Strength of Materials, Khanna Publishing House, Delhi, Ed. 2018
2. Timoshenko, S., Strength of Materials, Vol. I, CBS, New Delhi.
3. Khurmi, R.S., Strength of Materials, S Chand and Co. Ltd. New Delhi.
4. Ramamrutham, S, Strength of Materials, Dhanpat Rai and sons, New Delhi.
5. Punmia B C, Strength of Materials, Laxmi Publications (p) Ltd. New Delhi.
6. Rattan S.S., Strength of Materials, McGraw Hill Education; New Delhi.
7. Bansal R K, Strength of Materials, Laxmi Publications.
8. Subramaniam R, Strength of Materials, Oxford University Press.
9. Mechanics of Structure — Roshan Sinha — FPH
10. Mechanics of Materials — A.K.Ghosh — FPH

CONCRETE TECHNOLOGY

Subject Code 2015304	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course Objective:

1. To know properties of cement and aggregate used in concrete.
2. To understand different characteristics of concrete.
3. To learn about role of admixtures in concrete.

COURSE OUTCOMES (COs):

1. Use different types of cement and aggregates in concrete
2. Prepare concrete of desired compressive strength.
3. Prepare concrete of required specification.
4. Maintain quality of concrete under different conditions.
5. Apply relevant admixtures for concreting

CONTENTS: THEORY		Hrs
Unit -1	**Cement** 1.1 Physical Properties of OPC- fineness, standard consistency, setting time, compressive strength & soundness. 1.2 Testing of cement - fineness test, consistency test, setting time test, compressive strength test & soundness test, Storage of Cement and its effects on the properties of cement. 1.3 Types of Cements and their properties as per IS Specifications and their field applications- Ordinary Portland Cement (33, 43 and 53 grades), Portland Pozzolana Cement, Rapid Hardening Cement, Low Heat Cement, High Alumina Cement, Sulphate Resisting Cement, White Cement.	o6
Unit -2	**Aggregates** 2.1 Aggregates: Source, Requirements of good aggregate, Classification according to size and shape. 2.2 Fine aggregates: Properties, size, specific gravity, bulk density, water absorption and bulking, fineness modulus and grading zone of sand, 2.3 Coarse aggregates: Properties, size, shape, surface texture, water absorption, soundness, specific gravity and bulk density, fineness modulus of coarse aggregate, grading of coarse aggregates, crushing value, impact value and abrasion value of coarse aggregates with specifications.	o8

Unit – 3	**Concrete** 3.1 Definition of concrete, 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, Duff Abraham water cement (w/c) ratio law, significance of w/c ratio, selection of w/c ratio for different grades, maximum w/c ratio for different grades of concrete for different exposure conditions as per IS 456. 3.3 Properties of fresh concrete: - Workability,Factors affecting workability of concrete, Determination of workability of concrete by slump cone, compaction factor, Vee-Bee Consistometer. Value of workability requirement for different types of concrete works. Segregation, bleeding and preventive measures. 3.4 Properties of hardened concrete: - Compressive strength, durability, impermeability.	10
Unit – 4	**Concrete mix design and testing of Concrete** 4.1 Concrete mix design, objectives, methods of mix design, study of mix design procedure by IS method as per IS 10262, (only procedural steps). 4.2 Testing of hardened concrete: Significance of testing, determination of compressive strength of concrete cubes at different ages, interpretation & co relation of test results. 4.3 Non- Destructive Tests 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.	10
Unit-5	**Quality control of concrete** 5.1 Concreting Operations: Batching, Mixing, Transportation, Placing, Compaction, Curing and finishing of concrete**.** **5.2** Forms for concreting: Different types of form works for beams, slabs, columns, materials used for form work, requirement of good form work. Stripping time for removal of form works per IS 456 5.3 Waterproofing: Importance and need of waterproofing, methods of waterproofing and materials used for waterproofing. 5.4 Joints in concrete construction: Types of joints, methods for joining old and new concrete, materials used for filling joints.	06

Unit-6	**Chemical Admixture, Special concrete and Extreme weather concreting** 6.1 Admixtures in concrete: Purpose, properties and application of different types of admixtures such as accelerating admixtures, retarding admixtures, water reducing admixtures, air entraining admixtures and super plasticizers. 6.2 Special Concrete: Properties, advantages and limitation of following types of Special concrete: Ready mix Concrete, Fiber Reinforced Concrete, High performance Concrete and light weight concrete. 6.3 Cold weather concreting: effect of cold weather on concrete, precautions to be taken while concreting in cold weather condition. 6.4 Hot weather concreting: effect of hot weather on concrete, precautions to be taken while concreting in hot weather condition.	08
	Total	48

Suggested Text Book/ **Reference Book:**

1. Gambhir, M.L., Concrete Technology, Tata McGraw Hill Publishing Co. Ltd., Delhi.
2. Shetty, M.S., Concrete Technology, S. Chand and Co. Pvt. Ltd., Ram Nagar, Delhi.
3. Santhakumar, A. R., Concrete Technology, Oxford University Press, New Delhi.
4. Neville, A. M. and Brooks, J.J., Concrete Technology, Pearson Education Pvt. Ltd.
5. Sood, H., Kulkarni P. D., Mittal L. N., Laboratory Manual in Concrete Technology, CBS Publishers, New Delhi.
6. Concrete Technology — Gopal krishnan — FPH
7. Concrete Technology — S.S.Ahuja — FPH

GEO TECHNICAL ENGINEERING

Subject Code 2015305	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course Objective:

1. To Understand and determine physical and index properties of soil.
2. To estimate permeability and shear strain of soil.

COURSE OUTCOMES (COs):

1. Analyze and classify soils.
2. Identify shear strength parameters for field conditions.
3. Understand the principles of compaction and its control.
4. Understand various stresses and their distribution in soil and other engineering properties of soil.

	CONTENTS: THEORY	Hrs.
Unit -1	**Overview of Geotechnical Engineering** 1.1 Definition of soil. 1.2 Importance of soil in Civil Engineering as construction material. 1.3 Field application of geotechnical engineering for foundation design, pavement design, design of earth retaining structures, design of earthen dams (brief ideas only).	04
Unit -2	**Physical and Index Properties of Soil** 2.1 Soil as a three phase system. 2.2 Water content, Determination of water content by oven drying method as per IS code. 2.3 Void ratio, porosity ,degree of saturation and density index. 2.4 Unit weight of soil mass – bulk unit weight, dry unit weight, unit weight of soil solids, saturated unit weight, submerged unit weight. 2.5 Determination of bulk unit weight and dry unit weight by core cutter method and sand replacement method as per IS code. 2.6 Specific gravity, determination of specific gravity by pycnometer. 2.7 Consistency of soil, Atterberg's limits of consistency: Liquid limit, plastic limit and shrinkage limit, plasticity index. 2.8 Determination of liquid limit, plastic limit and shrinkage limit as per IS code. 2.9 Particle size distribution, mechanical sieve analysis as per IS code, particle size distribution curve, effective diameter of soil, Uniformity coefficient and coefficient of curvature, well graded and uniformly graded soils.	10

Unit – 3	**Permeability of Soil** 3.1 Definition of permeability 3.2 Darcy's law of permeability, coefficient of permeability, typical values of coefficient of permeability for different soil. 3.3 Factors affecting permeability 3.4 Determination of coefficient of permeability by constant head and falling head permeability tests, simple problems to determine coefficient of permeability. 3.5 Seepage through earthen structures, seepage velocity, seepage pressure, phreatic line, flow lines and equipotential lines. 3.6 Flow net, characteristics of flow net, application of flow net (no numerical problems).	10
Unit – 4	**Shear strength of Soil** 4.1 Shear failure of soil, field situation of shear failure 4.2 Concept of shear strength of soil. 4.3 Components of shearing resistance of soil– cohesion, internal friction. 4.4 Mohr-coulomb failure theory, Strength envelope, strength equation for purely. cohesive and cohesion less soils. 4.5 Laboratory determination of shear strength of soil – Direct shear test, Unconfined compression test & vane shear test, plotting strength envelope, determining shear strength parameters of soil.	10
Unit – 5	**Bearing capacity of Soil** 5.1 Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure. 5.2 Terzaghi's analysis and assumptions . 5.3 Effect of water table on bearing capacity. 5.4 Field methods for determination of bearing capacity – Plate load test and standard penetration test. Test procedures as Per IS:1888 & IS:2131. 5.5 Definition of active earth pressure and passive earth pressure, structures subjected to earth pressure in the field.	06
Unit – 6	**Compaction and stabilization of soil** 6.1 Concept of compaction, purpose of compaction, field situations where compaction is required. 6.2 Standard proctor test – test procedure as per IS code, Compaction curve, optimum moisture content, maximum dry density, Zero air voids line. 6.3 Modified proctor test. 6.4 Factors affecting compaction. 6.5 Field methods of compaction – rolling, ramming & vibration. 6.6 California bearing ratio, CBR test, significance of CBR value. 6.7 Concept of soil stabilization, necessity of soil stabilization.	08

	6.8 Different methods of soil stabilization – Mechanical soil stabilization, lime stabilization, cement stabilization, bitumen stabilization, fly-ash stabilization.	
	Total	48

Suggested Text book / Reference book:

1. Punmia, B.C., Soil Mechanics and Foundation Engineering, Laxmi Publication, Delhi.
2. Murthy, V.N.S., A text book of soil mechanics and foundation Engineering, CBS Publishers.
3. Ramamurthy, T.N. & SitharamT.G, Geotechnical Engineering (Soil Mechanics), S Chand and Company LTD., New Delhi.
4. Raj, P. Purushothama, Soil Mechanics and Foundation Engineering, Pearson India, New Delhi.
5. Kasamalkar, B. J., Geotechnical Engineering, Pune Vidyarthi Griha Prakashan, Pune.
6. Arora K R, Soil Mechanics and Foundation Engineering, Standard Publisher.

7. Geo-Technical Engineering	Kuldep Singh	FPH
8. Geo-Technical Engineering	K.N. Prasad	FPH
9. Geo-Technical Engineering	Ashok Jain	FPH

BASIC SURVEYING LAB

Subject Code 2015306	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

Course Objective:

1. To understand types of surveying works required.
2. To know the type of method and equipment to be used for different surveys.
3. To know the use and operational details of various surveying equipment.

Practical Outcomes:

1. Select the type of survey required for given situation.
2. Compute area of open field using chain, tape and cross staff.
3. Conduct traversing in the field using chain and compass.
4. Use levelling instruments to determine reduced level to prepare contour maps.
5. Use digital planimeter to calculate the areas.

CONTENTS: PRACTICAL

Preform any eight Experiments

1. Measure distance between two survey stations using chain, tape and ranging rods when two stations are inter visible.
2. Perform reciprocal ranging and measure the distance between two stations.
3. Determine area of open field using chain and cross staff survey.
4. Measure Fore Bearing and Back Bearing of survey lines of open traverse using Prismatic Compass.
5. Measure Fore Bearing and Back Bearing of a closed traverse of 5 or 6 sides and correct the bearings and included angles for the local attraction.
6. Undertake Survey Project with chain and compass for closed traverse for minimum 5 sides around a building**.**
7. Plot the traverse on A1 size imperial drawing sheet for data collected in Survey Project mentioned at practical **No.6.**
8. Undertake simple levelling using dumpy level/ Auto level and levelling staff.
9. Undertake differential levelling and determine Reduced Levels by Height of instrument method and Rise and fall method using dumpy level/Auto Level and levelling staff.
10. Undertake fly levelling with double check using dumpy level/ Auto level and levelling staff.

11. Undertake Survey Project for plotting contour map using block contouring method for a block of 150m x 150m with grid of 10m x10m.
12. Measure area of irregular figure using Digital planimeter

Reference Book:

1. Punmia, B.C, Jain, Ashok Kumar; Jain, Arun, Surveying Volume I, Laxmi Publications, New Delhi.
2. Basak, N. N., Surveying and Levelling, McGraw Hill Education, New Delhi.
3. Kanetkar, T. P.; Kulkarni, S. V., Surveying and Levelling volume I, Pune Vidyarthi Gruh Prakashan.
4. Duggal, S. K., Survey I, McGraw Hill Education, New Delhi.
5. Saikia, M D.; Das. B.M.; Das. M.M., Surveying, PHI Learning, New Delhi.
6. Subramanian, R., Fundamentals of Surveying and Levelling, Oxford University Press. New Delhi.

BUILDING CONSTRUCTION AND CONSTRUCTION MATERIALS LAB

Subject Code 2015307	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	01
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

Course Objective:

1. To learn about various construction materials and understand their relevant characteristics.
2. To be able to identify suitability of various materials for different construction purposes.
3. To know about natural, artificial, and processed materials available for various purposes of construction activities.

Practical Outcomes:

1. Identify relevant construction materials.
2. Identify relevant natural construction materials.
3. Select relevant artificial construction materials.

CONTENTS: PRACTICAL

Perform any eight experiments:

1. Identify various sizes of available coarse aggregates from sample of 10 kg in laboratory and prepare report.
2. Prepare the lime putty by mixing lime (1 kg) with water in appropriate proportion and prepare report on slaking of lime.
3. Select first class, second class and third-class bricks from the stake of bricks and prepare report on the basis of its properties
4. Measure dimensions of 10 bricks and find average dimension and weight. Perform field tests- dropping, striking and scratching by nail and correlate the results obtained.
5. Identify different types of flooring tiles such as vitrified tiles, ceramic tiles, glazed tiles, mosaic tiles, anti- skid tiles and prepare report about the specifications.
6. Identify the type of glasses from the given samples.
7. Prepare the cement mortar of proportion 1:3 or 1:6 using cement and sand.
8. Preparing foundation plan and marking on ground layout of load bearing structure by face line method from the given plan of the building
9. Preparing foundation plan and marking on ground layout of framed structure by face line method from the given Plan of the building
10. Observing and writing report of the process of plastering.

Reference Book:

1. Ghose, D. N., Construction Materials, Tata McGraw Hill, New Delhi.
2. S.K. Sharma, Civil Engineering Construction Materials, Khanna Publishing House, New Delhi
3. Varghese, P.C., Building Materials, PHI learning, New Delhi.
4. Rang Wala, S.C., Engineering Materials, Cha rotor publisher, Ahmedabad.
5. Rajput, R.K, Engineering Materials, S. Chand and Co., New Delhi.
6. Sood H., Laboratory Manual on Testing of Engineering Materials, New Age Publishers, New Delhi.
7. Sharma C. P., Engineering Materials, PHI Learning, New Delhi.
8. Duggal, S. K, Building Materials, New International, New Delhi

WEB TECHNOLOGY LAB

Subject Code	Practical						Credits
2018308	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	02	External	:	18	

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies'. Some of the things that should necessary be covered in lab.

Course outcomes:

Student will be able to program web applications using and will be able to do the following:

- Use LAMP Stack for web applications
- Write simple applications with Technologies like HTML, Java script, AJAX, PHP
- Connect to Database and get results
- Parse XML files Student will be able to develop/build a functional website with full features.

Content: Practical		Hrs.	Marks
Unit – 1	Home page Development static pages (using Only HTML) of an online Book store.	04	
Unit – 2	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.	06	
Unit – 3	Write a PHP program to display a digital clock which displays the current time of the server.	06	
Unit – 4	Write an HTML code to display your CV on a web page.	04	
Unit – 5	Write an XML program to display products.	05	
Unit – 6	Create a web page with all types of Cascading style sheets.	06	
Unit – 7	Write a PHP program to display a digital clock which displays the current time of the server.	05	
Unit – 8	Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.	04	

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson
2. "Internet & World Wide Web How to Program", Deitel, Goldberg, Pearson Education
3. "Web programming- Building Internet Application", Chris Bales
4. Web Applications: Concepts and Real-World Design, Knuckles

Mechanics of Materials Lab (TW)

Subject Code 2015309	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	02	External	:	18	

Course Objective:

1. To know the procedure for the conduct of tensile and compressive strength.
2. To understand the concept of stress and strain through testing of different materials.
3. To calculate shear force, bending moment and their corresponding stresses.
4. To understand flexural strength of floor tiles.

Term Work Outcomes:

1. Test different Civil engineering materials on Universal Testing Machine.
2. Analyze structural behavior of materials under various loading conditions.
3. Interpret shear force and bending moment diagrams for various types of beam sections and different loading conditions.
4. Determine bending and shear stresses in beams under different loading conditions.
5. Calculate flexural strength of different types of floor tiles

CONTENTS: -TERM WORK

Preform any eight Experiments

1. Study different components of Universal Testing Machine (UTM).
2. Perform Tension test on mild steel as per IS:432(1).
3. Perform tension test on Tor steel as per IS:1608, IS:1139.
4. Conduct compression test on sample test piece using Compression Testing Machine.
5. Conduct Izod Impact test on three metals. e.g., mild steel/ brass/aluminum/ copper /cast iron as per IS:1598.
6. Conduct Charpy Impact test on three metals. e.g., mild steel/ brass/aluminum/ copper /cast iron as per IS:1757.
7. Determine Water Absorption on bricks as per IS:1077
8. Determine Compressive strength of dry and wet bricks as per IS:3495(part I), IS:1077
9. Conduct Abrasion Test on flooring tiles (any one) e.g., Mosaic tiles, Ceramic Tiles Cement Tile.
10. Perform Single Shear and double shear test on any two metals e.g., Mild steel/ brass/aluminum/copper / cast iron as per IS:5242.
11. Plot Shear force and Bending Moment diagrams for cantilever, simply supported beams for different types of loads.
12. Plot Shear force and Bending Moment diagrams for overhanging beams for different types of loads including moment loading.
13. Conduct Flexural test on timber beam on rectangular section in both orientations as per IS:1708, IS:2408.
14. Conduct Flexure test on floor tiles IS:1237 or roofing tiles as per IS:654.

Reference Book:

1. Bedi D.S., Strength of Materials, Khanna Publishing House, New Delhi (Edition 2018)
2. Timoshenko, S., Strength of Materials, Vol. I, CBS, New Delhi.
3. Khurmi, R.S., Strength of Materials, S Chand and Co. Ltd. New Delhi.
4. Ramamrutham, S, Strength of Materials, Dhanpat Rai and sons, New Delhi.
5. Punmia B C, Strength of Materials, Laxmi Publications (p) Ltd. New Delhi.
6. Rattan S.S., Strength of Materials, McGraw Hill Education; New Delhi.
7. Bansal R K, Strength of Materials, Laxmi Publications.
8. Subramaniam R, Strength of Materials, Oxford University Press.

Concrete Technology Lab (TW)

Subject Code 2015310	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	02	External	:	18	

Course Objective:

1. To know properties of cement and aggregate used in concrete.
2. To understand different characteristics of concrete.
3. To learn about preparation of Concrete.

Term Work Outcomes:

1. Identify different types of cement by performing laboratory tests.
2. Know the physical properties of fine and coarse aggregates.
3. Prepare concrete of required grade.

Contents: - Term Work

Preform any eight Experiments

1. Determine fineness of cement by Blaine's air permeability apparatus or by sieving.
2. Determine specific gravity, standard consistency, initial and final setting times of cement.
3. Determine compressive strength of cement.
4. Determine silt content in sand.
5. Determine bulking of sand.
6. Determine bulk density of fine and coarse aggregates.
7. Determine water absorption of fine and coarse aggregates.
8. Determine Fineness modulus of fine aggregate by sieve analysis.
9. Determine impact value of aggregate.
10. Determine crushing value of aggregate.
11. Determine abrasion value of aggregate.
12. Determine elongation and flakiness index of coarse aggregates.
13. Determine workability of concrete by slump cone test.
14. Determine workability of concrete by compaction factor test.
15. To prepare concrete mix of a particular grade and determine compressive strength of concrete for 7 and 28 days.
16. Demonstration of NDT equipment.

Reference Book:

1. Gambhir, M.L., Concrete Technology, Tata McGraw Hill Publishing Co. Ltd., Delhi.
2. Shetty, M.S., Concrete Technology, S. Chand and Co. Pvt. Ltd., Ram Nagar, Delhi.

TERM WORK

PYTHON (TW)

Subject Code	Theory						Credits
	No. of Periods per Week			Full Marks	:	25	01
2018311	L	T	P/S	Internal	:	07	
	-	—	02	External	:	18	
	—	—	—		:		

CONTENTS: Practical		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

References Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Gut tag, MIT Press.

Geo Technical Eng. Lab (TW)

Subject Code 2015312	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	Internal	:	15	
	—	—	02	External	:	35	

Course Objectives:

To understand

1. To understand and determine physical properties of soil.
2. To estimate the permeability and shear strength of soil.
3. To know the procedure for performing C.B.R test.

Term Work outcomes:

Course outcomes

- Interpret the physical properties of soil.
- Use the results of permeability and shear strength test for foundation analysis.
- Compute optimum moisture content values for maximum dry density of soil through various tests.

Contents: - Term Work

Preform any eight Experiments

1. Determination of water content of given soil sample by oven drying method as per IS Code.
2. Determination of bulk unit weight, dry unit weight of soil in field by core cutter method as per IS Code.
3. Determination of specific gravity of soil by Pycnometer method.
4. Determination of bulk unit weight, dry unit weight of soil in field by sand replacement method as per IS Code.
5. Determination of Liquid limit & Plastic limit of given soil sample as per IS Code.
6. Determination of grain size distribution of given soil sample by mechanical sieve analysis as per IS Code.
7. Determination of coefficient of permeability by constant head test.
8. Determination of coefficient of permeability by falling head test.
9. Determination of shear strength of soil using direct shear test.
10. Determination of shear strength of soil using Laboratory Vane shear test.
11. Determination of MDD & OMC by standard proctor test on given soil sample as per IS Code.
12. Determination of CBR value of given soil sample.

Suggested Text Books: -

1. Soil Mechanics and Foundation Engineering – B.C. Punmia, Laxmi Publications (P) Ltd.
2. Textbook of Soil Mechanics and Foundation Engineering – V.N.S. Murthy, CBS Publishers & Distributors Pvt. Ltd

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examination for

III[rd] Semester Diploma in Computer Science & Engineering

(Effective from Session 2020-2021 Batch)

THEORY

Sl. No	SUBJECTS	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.	Discrete Mathematics	2018301	03	03	10	20	70	100	28	40	02
2.	Computer programming through C	2000302	03	03	10	20	70	100	28	40	03
3.	Computer Organization & Architecture	2018303	03	03	10	20	70	100	28	40	03
4.	Digital Electronic & Microprocessor	2018304	03	03	10	20	70	100	28	40	02
5.	Web Technology	2018305	03	03	10	20	70	100	28	40	03
Total			**15**				**350**	**500**			**13**

PRACTICAL

Sl. No	SUBJECTS	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.	Computer programming through C (LAB)	2000306	06 50% Physical 50% Virtual	03	15	35	50	20	03
7.	Digital Electronic & Microprocessor (LAB)	2018307	04 50% Physical 50% Virtual	03	15	35	50	20	02
8.	Web Technology (LAB)	2018308	02 50% Physical 50% Virtual	03	07	18	25	10	01
Total			**12**				**125**		**06**

TERM WORK

Sl. No	SUBJECTS	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.	Computer Organization & Architecture (T.W)	2018309	04	15	35	50	20	02
10.	Summer Internship I (4 weeks) after II Semester	2018310	-	15	35	50	20	02
11.	Python	2018311	02	07	18	25	10	01
Total			**06**			**125**		**05**
Total Periods per week of each of duration One Hour 33						**Total Marks 750**		**24**

DISCRETE MATHEMATHICS

SUBJECT CODE: 2018301	Theory			No. of period in one session: 50			Credits
	No. of Periods per Week			Full Marks :	:	100	02
	L	T	P/S	ESE	:	70	
	03	-	-	T.A	:	20	
				C.T	:	10	

Course Learning Objective:

The main objectives of the course are to:

- Introduce concepts of mathematical logic for analysing propositions and proving theorems.
- Use sets for solving applied problems, and use the properties of set operations algebraically.
- Work with relations and investigate their properties.
- Investigate functions as relations and their properties.
- Introduce basic concepts of graphs, digraphs and trees.

Learning Outcomes:

After completion of the course students are expected to be able to:

- Analyse logical propositions via truth tables.
- Prove mathematical theorems using mathematical induction.
- Understand sets and perform operations and algebra on sets.
- Determine properties of relations, identify equivalence and partial order relations, sketch relations.
- Identify functions and determine their properties.
- Define graphs, digraphs and trees, and identify their main properties.
- Evaluate combinations and permutations on sets.

Contents: Theory		Hrs	Marks
Unit – 1	**The Foundations- Logic and Proofs:** Propositional logic, propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Interference, Introduction to proofs, Normal forms, proof methods and strategy.	[9]	
Unit – 2	**Introduction to SET THEORY:** Concept of sets: Notation – subset, superset, Empty set, Universal set. Examples – Operation on sets: Union – Intersection – Complementation – Difference – Symmetric difference – problems relating simple set identities, Definition of power set, Cartesian product of finite number of sets, simple problems – cardinality of a set, Finite and Infinite sets.	[8]	
Unit – 3	**Relation Between two sets:** Binary relation as a subset of Cartesian product, Reflexive, Symmetric & transitive relations – Examples, Equivalence relation – Examples.	[6]	
Unit – 4	**Functions:** Definition of function – Domain, Co-domain & Range of a function – Related problems.	[6]	

Unit – 5	**Recurrence Relation:** Definition – Examples (Fibonacci, Factorial etc.), Linear recurrence relations with constants coefficients – Homogenous solutions – Particular solutions – Total solutions – Problems.	[6]	
Unit – 6	**Graph Theory:** Introduction – Definition of a graph – sub graph – Isomorphism-walk, Paths and circuits – connectedness and components – Euler graphs.	[5]	
Unit – 7	**Counting:** Introduction – Basic counting principles, Factorial Notation, Binomial coefficients, Permutations, Combinations, The pigeonhole principle, Generation of Permutation and Combinations.	[5]	
Unit – 8	**Probability Theory:** Introduction, Sample space and Events, Finite probability spaces, Conditional probability, Independent Events, Independent Repeated Trials, Binomial Distribution, Random variables.	[5]	

Text/Reference Books-

1. Foundation of Discrete Mathematics – K.D. Joshi
2. Discrete Mathematics with Algorithms – Albertson & Hutchinson / John Wiley
3. Discrete Mathematics / Iyengar, Venkatesh, Chandrasekaran & Arunachalam / Vikash Publishing House
4. Discrete Structure and Graph Theory / S.K.S. Rathore and H. Chaudhuri / Everest Publishing House
5. Discrete Mathematics & Its Applications with combinatorics and Graph Theory, Seventh Edition – Kenneth H Rosen / Tata McGraw-Hill Education Pvt. Ltd New Delhi
6. Discrete Mathematics, Third Edition – Seymour Lipschutz, Marc Lars Lipson, Varsha H Patil / Tata McGraw-Hill Education Pvt. Ltd New Delhi

COMPUTER PROGRAMMING THROUGH C

SUBJECT CODE: 2000302	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	-	-	T. A	:	20	
				C.T	:	10	

Course Learning Objective:

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 array, stacks and linked list solving problems.
- Handling File in "C".

Contents: Theory		Hrs.	Marks
Unit -1	**Introduction to computer software:** ➢ Classification of computer software. • System software. • Application software. ➢ Programming languages. • Machine languages. • Assembly languages. • High level programming languages. ➢ Algorithms and flowchart.	[05]	
Unit -2	**Fundamental of C languages.** ➢ Introduction. • Background. • Characteristics of C. • Uses of C. ➢ Structure of a C program. ➢ Writing the first C program. ➢ Files used in a C program. • Source code files. • Header files.	[08]	

	• Object files. • Binary executable files. ➢ Compiling and Executing C programs. ➢ Using comments. ➢ Characters used in C. ➢ Identifier. ➢ Keyword or Reserved words. ➢ Tokens. ➢ Constants. • Numeric constant. • String Character constant. ➢ Variables. ➢ Variable Declaration. ➢ Basic Data Types. ➢ Additional Data types. ➢ Operators and Expressions. ➢ Operator Precedence and Associativity. ➢ Type conversion and Type casting. ➢ Input/ Output statements in C.		
Unit -3	**Decision Control and Looping Statements:** ➢ Introduction to Decision control statements. ➢ Conditional Branching statements. • If statement. • If-else statement. • If-else-if statement. • Switch case. ➢ Iterative statements. • While loop. • Do-while loop. • For loop. ➢ Nested loops. ➢ Break and continue statements. • Break statement. • Continue statement. ➢ Goto statement.	[8]	

Unit -4	**Functions in 'C'.** ➢ Uses of functions. ➢ User defined functions. ➢ Function Declaration. ➢ Calling a function. ➢ Actual and formal Arguments. ➢ Rules to call a function. ➢ Function propotype. ➢ Recursion. • Use of Recursive function. ➢ Local or Internal variables. ➢ Global or External variables. ➢ Void function. ➢ Storage classes in C. • Auto or Automatic Storage class. • Static Storage class. • Extern Storage class. • Register Storage class.	[8]	
Unit -5	**Arrays.** ➢ Introduction. ➢ Declaration of Arrays. ➢ Accessing the Elements of an Array. • Calculating the address of Array elements. • Calculating the length of an Array. ➢ Storing values in Arrays. • Initializing Arrays during Declaration. • Inputting values from the keyboard. • Assigning values to Individual Elements. ➢ Operations on Arrays. • Traversing an Array. • Inserting an Element in an Array. • Deleting an Element from an Array. • Merging Two Arrays. • Searching for a value in an Array. ➢ Passing Arrays to functions. ➢ Two dimensional Arrays. • Declaring Two-dimensional Arrays.	[10]	

	• Initializing Two-dimensional Arrays. • Accessing the Elements of two dimensional Arrays. ➢ Operations on Two-dimensional Arrays.		
Unit -6	**Pointers.** ➢ Understanding the Computer's Memory. ➢ Introduction to pointers. ➢ Declaring pointer variables. ➢ Pointer Expressions and pointer Arithmetic. ➢ Null pointers. ➢ Passing Arguments to function using pointer. ➢ Pointers and Arrays. ➢ Passing an Array to a Function. ➢ Dynamic Memory Allocation. • Malloc ( ) function. • Calloc ( ) function. • Realloc ( ) function. • Free ( ) function.	[6]	
Unit -7	**Structures and Unions.** ➢ Structures. ➢ Structure variables and Arrays. • Initialization of structure variable and Array. • Dot (•) Operator. • Assigning value of a structure to Another structure. ➢ Structure within structures. ➢ Site of ( ) of a structure. ➢ Unions. ➢ Site of ( ) unions. ➢ Difference between a structure and a union. ➢ Enum Data Type. ➢ Typedef Declaration.	[5]	

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 R.G. Dromey of India.
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw E. Balaguruswami hill.
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 - B. W. Kernighan & D.M. Ritchie Hall of India.

7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, R. Subburaj New Delhi.

8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami

9. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, - Kris A. Jamsa New Delhi.

10. The Art of C Programming, Narosa Publishing House, New -Jones, Robin & Stewart Delhi.

11. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth

12. C made easy, McGraw Hill Book Company, 1987. - H. Schildt

13. Software Engineering, McGraw Hill, 1992. - R.S. Pressman

14. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetka

COMPUTER ORGANISATION & ARCHITECTURE

SUBJECT CODE: 2018303	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	-	-	T. A	:	20	
				C.T	:	10	

Course Learning Objective:

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:

1. Building blocks of the computer.
2. Computer Design.
3. Assembly Language Programming.

Contents: Theory		Hrs	Marks
Unit – 1	**Basic structure of computers:** Structure of a computer system, Arithmetic Logic Unit, Control Unit, Bus Structure, Von Neumann Architecture.	[8]	
Unit – 2	**Computer Arithmetic Operations:** Introduction to logic gates, Boolean algebra, Data Representation-Number system, Fixed and floating-point numbers, (IEEE standard) Floating point representation, signed numbers, 1's and 2's Complements Arithmetic, 2's complement method for multiplication. ➢ Adders: • Half Adder • Full Adder ➢ Sub tractors: • Half sub tractor • Full sub tractor ➢ Addition and Subtraction Algorithm: • Addition and Subtraction with Signed Magnitude Data.	[12]	

	➢ Multiplication Algorithms: • Hardware Implementation for multiplication. • Flowchart for Multiplying Binary Numbers. • Booth's Multiplication Algorithm.		
Unit – 3	**Central Processing Unit and Instruction:** ➢ Micro operations: • Arithmetic micro-operations • Logic micro-operations • Shift micro-operations ➢ Control Unit: • Performing an Arithmetic or Logic operation. • Fetching a word from memory, storing a word in a memory, Execution of a complete Instruction. • Hardwired Control Unit. • Micro programmed Control Unit. ➢ Components of CPU: • Buses • Registers • Flags • Stacks • I/O Ports ➢ General Register Organization, Types of Instructions, Instruction formats, Addressing modes, Data transfer and manipulation, Program control, Instruction cycle.	[12]	
Unit – 4	**Memory Organization:** Characteristics of Memory system, Types of memories, Main memory, Static & Dynamic memories, Secondary memory, Performance considerations, Cache memory with mapping, Virtual memory, Address memory used pages, Page replacement, Introduction to RAID.	[10]	
Unit – 5	**I/O Organization:** Peripheral Devices, Input-output Interface, Asynchronous Data Transfer Modes, Modes of Data Transfer from I/O to memory, Interrupt Handling, Types of Interrupts, Priority Interrupt, Direct Memory Access, Input-output Processor (IOP), Synchronous and Asynchronous Data Transfer.	[8]	

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 M. Mano Delhi

3 Computer Architecture and Organization, McGraw Hill Company, New Delhi J.P. Hayes

4 Computer Organization and Architecture, Prentice Hall of India Ltd., NewW. Stallings Delhi

5 Computer System Architecture, Third Edition, 1998, Prentice Hall of India M. Morris Mano

6 Microprocessor Architecture, Programming and Application, Wiley Eastern Gaonkar Limited

Reference Books:

1 Computer Architecture & Organization, Third Edition, 1988, McGraw-Hill. - J.P. Hayes New York

2 Computer Design and Architecture, Second Edition, 1991, Harper Collins S.G. Siva Publishers

3 Computer Organization and Design, Prentice Hill of India Ltd., 1994 P. Pal Choudhary

DIGITAL ELECTRONICS & MICROPROCESSOR

SUBJECT CODE: 2018304	Theory			No. of period in one session: 50			Credits
	No. of Periods per Week			Full Marks:	:	100	02
	L	T	P/S	ESE	:	70	
	03	-	-	T. A	:	20	
				C.T	:	10	

Course Learning Objective:

The subject will help the students to learn facts, concepts, principle and procedure of digital electronics. These techniques can be used for designing sequential and combinational circuits which forms the basis of any electronic device. Also, this subject is designed to give clear idea about working principles of 8085 microprocessor.

Objective:

The objective of this subject is to enable the students to know basic concepts of digital electronics and familiarity with available chips. After undergoing this course, the students will have the awareness of various arithmetic circuits, counter design, registers, A/D and D/A converters, semi-conductor memories, multiplexers and de-multiplexers etc.

Contents: Theory		Hrs	Marks
Unit – 1	**NUMBER SYSTEM:** Decimal, binary, octal and hexadecimal, hexa-decimal number systems, Conversion from one system to another,1's,2's and 9's,10's complements signed numbers Codes: BCD, Excess-3, Gray codes weighted and non-weighted codes, binary arithmetic,	[6]	
Unit – 2	**LOGIC GATES AND FLIP FLOPS:** Definitions, symbols and truth table of NOT, OR, AND, NAND, NOR, XOR, XNOR gates, basic gates, universal gates, De Morgan's Theorems; Karnaugh-Map ,Sum of Product, Product of Sum, Min term , Max term, Logical diagram, truth table, Flip -Flops- RS, T, D, JK, Master/ Slave JK and timing diagram.	[8]	
Unit – 3	**REGISTERS:** Shift Registers Serial in Serial out Serial in Parallel out Parallel in Parallel out Parallel in Serial out Bidirectional Shift Register	[5]	
Unit – 4	**COUNTERS:** Asynchronous counters Synchronous Counter Decade counter and its application Cascade Counter, Encoder & Decoder	[6]	

Unit – 5	**LOGIC FAMILY & CIRCUITS:** Digital integrated circuits Half adder and full adder circuit, Half Subtractor and full subtractor circuit, design and implementation, Multiplexer, Demultiplexer.	[6]	
Unit – 6	**A/D AND D/A CONVERTERS:** Analog to digital convertor, Digital to Analog Convertor, ADC comparator, Dual Slope ADC, Successive ADC.	[8]	
Unit – 7	**MEMORIES AND DISPLAY DEVICES:** Memory Unit Concept of memories using registers Primary Memory Secondary Memory Static and Dynamic Memory LCD, LED, Seven Segment Display Basic operation and Applications, Dot Matrix display.	[6]	
Unit – 8	**MICROPROCESSORS:** Evaluation of microprocessors, microcomputer organization,8085 architecture,8085 pin diagram 8085 flag register & timing diagram, instruction sets, addressing modes, 8086 architectures, 8086 pin diagram, 8086 Flag register instruction sets and addressing modes	[5]	

Text Books: -

1. Digital Electronics and Applications, McGraw Hills Publishers. - Malvino Leach
2. Digital Logic and Computer Design, Prentice Hall of India Ltd., New Delhi. - Morries Marrow
3. Digital Integrated Electronics, Prentice Hall of India Ltd., New Delhi - Herbert Raub and Donal Sachilling
4. Digital Electronics, Prentice Hall of India Ltd., New Delhi – Rajaraman
5. Microelectronics, McGraw Hill, 1987 - J. Millman and A. Grabel
6. Linear Integrated Circuits, Wiley Eastern, 1991 - D. Roychaudhuri and S.B. Jani

Reference Books:

1. Digital Principles, Latest Edition, 2000, Tata McGraw Hill Publishing Company Ltd., New Delhi - Malvin& Leach
2. Modern Digital Electronics, Second Edition, 2000, Tata McGraw Hill Publishing Company Ltd., New Delhi - R.P. Jain
3. Digital Electronics, First Edition, 2000, Tata McGraw Hill Publishing Company Ltd., New Delhi - V.K. Puri
4. Electronics Circuits and Systems, 1992, Tata McGraw Hill Publishing Company - Y.N. Bapat
5. Modern Digital Electronics, 1983, Tata McGraw Hill Publishing Company - R.P. Jain
6. Digital Computer Fundamentals, T.M.H. - Malvino
7. Digital Computer, Dhanpat Roy & Sons. - B. Ram
8. Introduction to Microprocessors, Dhanpat Roy & Sons. - Dr. B. Ram

WEB TECHNOLOGY

SUBJECT CODE: 2018305	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	-	-	T. A	:	20	
				C.T	:	10	

Course Learning Objective

Internet is the easiest and fastest way of communication. The use of Internet can be easily seen in our day-to-day life, be it sending a mail or looking for same information, its importance can't be overruled. This subject exposes the diploma students to basic networking technology and the Internet technology. IT will teach the students, the Internet technology and different features available on the Internet.

Contents: Theory		Hrs	Marks
Unit – 1	**Introduction to Web Design** Introduction to internet, www, website, working of website, webpages, front end, back end, client & server scripting language, responsive web designing, type of websites (static & dynamic websites)	[6]	
Unit – 2	**Editors** Downloading free editors like notepad++, subline text editor, making use of editors, file creation & editing, saving.	[6]	
Unit – 3	**HTML Basics** HTML: Introduction, Basic structure of HTML, Head section and element of head section, Formatting tags: Bold, Italic, underline, strike through, Div, pre tag anchor links & named anchors image tags, paragraphs, comments, tables: attributes – (Border, cell padding, cell spacing, height, width), TR, TH, Row span. Col span list: ordered list, unordered list, definition list, forms, form elements, Input types, Input attributes, Text Input Area, Dropdown, Radio buttons, Check-boxes, submit and Reset Buttons Frames: Frameset, nested frames. HTML5 Introduction, HTML5 New Elements: Section, Nav, Article, Aside, Audio Tag, Video Tag, HTML5 form validations. Require attribute, Pattern Attribute, Autofocus Attribute, Email, number type, datatype, Range type, HTML embed multimedia, HTML Layout, HTML Iframe.	[12]	
Unit – 4	**Introduction to cascading style sheets (CSS):** Concept of CSS, creating style sheet, CSS properties, CSS styling. Working with block elements and objects. Working with Lists and Tables. **CSS ID and class Box Model:** Border properties, padding properties, Merging properties. **CSS Advanced:** Grouping, Dimension, Display, Positioning, Align, Navigation Bar, Attribute Sectors, CSS Color	[10]	

Unit – 5	**Introduction to XML** Introduction to XML. Use of XML, Simple XML, XML key components, DID and Schemes. Using XML with application, Transforming XML using XSL and X SLT.	[8]	
Unit – 6	**Java Script and Angular JS** Introduction to Client-side scripting language, variables in Java script, operations in JS, Conditions statements, JS Popup Boxes, JS Events, Basic Form validation in Java script. Introduction to Angular. JS: Expressions, Modules and Directives.	[8]	

Text/Reference Books-

1. HTML-4 for world wide web, Wesley (Singapore) Pvt., New Delhi. - Castro Addison
2. HTML 4.0 Unlashed, Tech Media Publication - Rick Dranell
3. Teach yourself HTML 4.0 with XML, DHTML and Java Script, IDG Books India Pvt. Ltd.,
4. New Delhi - Stephanie, Cottrell, Bryant

COMPUTER PROGRAMMING THROUGH 'C' LAB

SUBJECT CODE: 2000306	Lab			No. of period in one session: 50			Credits
	No. of Periods per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	-	-	06	Internal	:	15	
				External	:	35	

Course Learning Objectives:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

Course outcomes:

Student should be able to write code snippets, and then compile, debug and execute them.

Content: Practical		Hrs.	Marks
Unit – 1	Familiarization with programming environment (Editor, Compiler, etc.)	04	
Unit – 2	Programs using, I/O statements and various operators	04	
Unit – 3	Programs using expression evaluation and precedence	04	
Unit – 4	Programs using decision making statements and branching statements	04	
Unit – 5	Programs using loop statements	04	
Unit – 6	Programs to demonstrate applications of n dimensional arrays	04	
Unit – 7	Programs to demonstrate use of string manipulation functions	04	
Unit – 8	Programs to demonstrate parameter passing mechanism	04	
Unit – 9	Programs to demonstrate recursion	04	
Unit – 10	Programs to demonstrate use of pointers	04	
Unit – 11	Programs to demonstrate command line arguments	03	
Unit – 12	Programs to demonstrate dynamic memory allocation	03	
Unit – 13	Programs to demonstrate file operations	04	

The language of choice will be C. This is a skill course. More you practice, better it will be.

Reference Books:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

DIGITAL ELECTRONICS & MICROPROCESSOR LAB

SUBJECT CODE: 2018307	Theory			No. of period in one session: 40			Credits
	No. of Periods per Week			Full Marks:	:	50	02
	L	T	P/S	ESE	:	50	
	-	-	04	Internal	:	35	
				External	:	15	

Course Learning Objective:

The subject will help the students to learn facts, concepts, principle and procedure of digital electronics. These techniques can be used for designing sequential and combinational circuits which forms the basis of any electronic device. Also, this subject is designed to give clear idea about working principles of 8085 microprocessor.

Objective:

The objective of this subject is to enable the students to know basic concepts of digital electronics and familiarity with available chips. After undergoing this course, the students will have the awareness of various arithmetic circuits, counter design, registers, A/D and D/A converters, semi-conductor memories, multiplexers and de-multiplexers etc.

Content - Practical		Hrs.	Marks
Unit – 1	Study of logic Gates and verify Truth Table.	03	
Unit – 2	Study of S-R, J-K, T and D Flip Flop.	03	
Unit – 3	Study of Serial and Parallel Registers.	03	
Unit – 4	Study of 4-bit UP/DOWN asynchronous Counter.	03	
Unit – 5	Study of 4-bit UP/DOWN synchronous Counter.	03	
Unit – 6	Study of Encoder & Decoder.	04	
Unit – 7	Study of Half Adder and Full Adder	04	
Unit – 8	Study of Full Adder and Subtractor.	04	
Unit – 9	Study of Multiplexer & Demultiplexer.	04	
Unit – 10	Study A/D AND D/A Convertor	03	
Unit – 11	Study of Seven Segment Display	03	
Unit – 12	Study of 8080 Microprocessor programming, Addition, Subtraction etc..	03	

Text Books: -

1. Digital Electronics and Applications, McGraw Hills Publishers. - Malvino Leach
2. Digital Logic and Computer Design, Prentice Hall of India Ltd., New Delhi. - Morries Marrow
3. Digital Integrated Electronics, Prentice Hall of India Ltd., New Delhi - Herbert Raub and Donal Sachilling
4. Digital Electronics, Prentice Hall of India Ltd., New Delhi – Rajaraman
5. Microelectronics, McGraw Hill, 1987 - J. Millman and A. Grabel
6. Linear Integrated Circuits, Wiley Eastern, 1991 - D. Roychaudhuri and S.B. Jani

WEB TECHNOLOGY LAB

SUBJECT CODE: 2018308	Term Work			No. of period in one session: 40			Credits
	No. of Periods per Week			Full Marks:	:	25	01
	L	T	P/S	ESE	:	25	
		-	02	Internal	:	07	
				External	:	18	

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies'. Some of the things that should necessary be covered in lab.

Course outcomes:

Student will be able to program web applications using and will be able to do the following:

- Use LAMP Stack for web applications
- Write simple applications with Technologies like HTML, Java script, AJAX, PHP
- Connect to Database and get results
- Parse XML files Student will be able to develop/build a functional website with full features.

Content - Practical		Hrs.	Marks
Unit – 1	Home page Development static pages (using Only HTML) of an online Book store.	04	
Unit – 2	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.	06	
Unit – 3	Write a PHP program to display a digital clock which displays the current time of the server.	06	
Unit – 4	Write an HTML code to display your CV on a web page.	04	
Unit – 5	Write an XML program to display products.	05	
Unit – 6	Create a web page with all types of Cascading style sheets.	06	
Unit – 7	Write a PHP program to display a digital clock which displays the current time of the server.	05	
Unit – 8	Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.	04	

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson
2. "Internet & World Wide Web How to Program", Deitel, Deitel, Goldberg, Pearson Education
3. "Web programming- Building Internet Application", Chris Bales
4. Web Applications: Concepts and Real-World Design, Knuckles

COMPUTER ORGANISATION & ARCHITECTURE (T.W)

SUBJECT CODE: 2018309	Term Work			No. of period in one session: 50			Credits
	No. of Periods per Week			Full Marks:	:	50	02
	L	T	P/S				
		-	04	Internal	:	15	
				External	:	35	

Course Objective:

1. Understanding the behaviour of Logic Gates, Adders, Decoders, Multiplexers and Flip-Flops.
2. Understanding the behaviour of ALU, RAM, STACK and PROCESSOR from working modules and the modules designed by the student as part of the experiment.

Practical Outcomes: After completing the course, the students will understand

(1) Analyse the behaviour of logic gates

(2) Design combinational circuits for basic components of computer system and applications.

(3) Analyse the operational behaviour and applications of various flip-flop.

(4) Design Arithmetic logic units and different types of memory blocks.

Contents: Term Work		Hrs.	Marks
Unit -1	Introduction to Verilog HDL/VHDL	[3]	
Unit -2	Verify the behaviour of logic gates using truth tables (AND, OR, NOT, XOR, NAND, NOR)	[5]	
Unit -3	Implementing HALF ADDER, FULL ADDER using basic logic gates	[6]	
Unit -4	Implementing Binary -to -Gray, Gray -to -Binary code conversions	[5]	
Unit -5	Implementing 3-8line DECODER	[5]	
Unit -6	Implementing 4x1 and 8x1 MULTIPLEXERS.	[6]	
Unit -7	Verify the excitation tables of various FLIP-FLOPS	[8]	
Unit -8	Design of an 8-bit Input/Output system with four 8-bit Internal Registers.	[6]	
Unit -9	Design of an 8-bit ARITHMETIC LOGIC UNIT. Design of 24x8 (16 byte) RAM. Design of 24x8 (16 byte) STACK. Implementation of a 4-bit PROCESSOR.	[6]	

Reference Book:

1. A Verilog HDL Primer by J. Bhasker Bk & Hardcover; Published by Star Galaxy Press. ISBN: 0-9656277-4-8
2. Verilog HDL: A Guide to Digital Design and Synthesis by Samir Palikir Published by Prentice Hall Publication date: March 1996

3. Patterson, D.A., and Hennessy, J.L., "Computer Organization and Design: The Hardware/Software Interface" Morgan Kaufmann Publishers, 4th Edition, Inc.2005

SUMMER INTERNSHIP I (4 WEEKS) AFTER II SEMESTER (T.W)

SUBJECT CODE: 2018310	Term Work			No. of period in one session: 50			Credits
	No. of Periods per Week			Full Marks:	:	50	02
	L	T	P/S				
		-	-	Internal	:	15	
				External	:	35	

PYTHON

SUBJECT CODE 2018311	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	25	01
	L	T	P/S				
	-	-	02	Internal	:	07	
				External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

References Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

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

(Effective from Session 2020- 21 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.	Introduction to Electric Power Generation Systems	2020301	03	03	10	20	70	100	28	40	03
2.	Electrical Circuits	2020302	03	03	10	20	70	100	28	40	03
3.	Electrical and Electronic Measurements	2020303	04	03	10	20	70	100	28	40	04
4.	Electric Motors and Transformers	2020304	04	03	10	20	70	100	28	40	04
5.	Fundamentals of Basic electronics &Digital Electronics	2020305	03	03	10	20	70	100	28	40	03
		Total: -	**17**				**350**	**500**			17

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.	Introduction to electric power generation laboratory	2020306	02 50% physical 50% Virtual	03	15	35	50	20	01
7.	Electrical Circuits Laboratory	2020307	02 50% physical 50% Virtual	03	15	35	50	20	01
8.	Web Technology Lab	2018308	02 50% physical 50% Virtual	03	07	18	25	10	01
9.	Electrical and Electronic Measurements Laboratory	2020309	02 50% physical 50% Virtual	03	07	18	25	10	01
10.	Electric Motors and Transformers Laboratory	2020310	02 50%physical 50% Virtual	03	15	35	50	20	01
		Total: -	**10**				**200**		05

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
11.	Python	2018311	02	07	18	25	10	01
12.	Fundamentals of Basic electronics &Digital Electronics	2020312	04	07	18	25	10	01
		Total: -	**06**			**50**		**02**
Total Periods per week Each of duration One Hour			**33**	Total Marks = **750**				**24**

INTRODUCTION TO ELECTRIC POWER GENERATION SYSTEMS
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
2020301	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	00	—	TA	:	10	
	—	—	—	CT	:	20	

Course Objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- An understanding of basic abstractions of electrical power generations from conventional and nonconventional sources of energy.
- The capability to use abstractions to comprehend and analyze the impact of various system on environments and economics aspects of energy generation.
- Maintain the efficient operation of various electric power generating plants.
- The capability to incorporate the knowledge of electrical power generation in other field of science, engineering and economics.

CONTENTS: THEORY

	Name of the Topic	Hrs./Unit
Unit -I	**Thermal Power Plants: Coal, Gas/ Diesel and Nuclear-based** Lay out and working of a typical thermal power plant with steam turbines and electric generators. Properties of conventional fuels used in the energy conversion equipment used in thermal powerplants: Coal, Gas/diesel. Nuclear fuels–fusion and fission action safe practices and working of various thermal power plants: coal-based, gas-based, diesel-based, and nuclear-based. Functions of the following types of thermal power plants and their major auxiliaries: Coal fired boilers: fire tube and water tube. Gas / diesel base combustion engines Types of nuclear reactors: Disposal of nuclear waste and nuclear shielding. Thermal power plants in Bihar.	10
Unit -II	**Large and Micro-Hydro Power Plants** Energy conversion process of hydro power plant. Classification of hydro power plant: High, medium and low head. Construction and working of hydro turbines used in different types of hydro power plant: . High head – Pelton turbine, medium head – Francis turbine, Low head – Kaplan turbine. Safe Practices for hydro power plants. Different types of micro-hydro turbines for different heads Pelton Francis and Kaplan turbines Locations of these different types of large and micro-hydro power plants in Bihar Potential locations of micro-hydro power plants in Bihar	8
Unit - III	**Solar and Biomass based Power Plants** Solar Map of India: Global solar power radiation. Solar Power Technology a. Concentrated Solar Power (CSP) plants, construction and working of Power Tower, Parabolic Trough, Parabolic Dish, Fresnel Reflectors b. Solar Photovoltaic (PV) power plant: layout, construction, working. C. Biomass-based Power Plants. Layout of a Bio-chemical based (e.g. biogas) power plant: a. Layout of a Thermo-chemical based (e.g. Municipal waste) power plant b. Layout of an Agrochemical based (e.g. bio-diesel) power plant Features of the solid, liquid and gas biomasses as fuel for biomass power plant.	10

Unit - IV	**Wind Power Plants** Wind Map of India**:** Wind power density in watts per square meter, Lift and drag principle; long path theory. Layout of Horizontal axis large wind power plant: Geared wind power plant. Direct-drive wind power plant. Salient Features of electric generators used in large wind power plants: Constant Speed Electric Generators: Squirrel Cage Induction Generators (SCIG), Wound Rotor Induction Generator (WRIG) Variable Speed Electric Generators: Doubly-fed induction generator (DFIG)wound rotor synchronous generator (WRSG), permanent magnet synchronous generator (PMSG)	8
Unit - V	**Small Wind Turbines** Horizontal axis small wind turbine: direct drive type, components and working Horizontal axis small wind turbine: geared type, components and working Vertical axis small wind turbine: direct drive and geared, components and working Type of towers and installation of small wind turbines on roof tops and open fields. Electric generators used in small wind power plants	4
Unit - VI	**Economics of Power Generation and Interconnected Power System** Related terms: connected load, firm power, cold reserve, hot reserve, spinning reserve. Base load and peak load plants; Load curve, load duration curve, integrated duration curve, Cost of generation: Average demand, maximum demand, demand factor, plant capacity factor, plant use factor, diversity factor, load factor and plant load factor. Choice of size and number of generator units, combined operation of power station. Causes and Impact and reasons of Grid system fault: State grid, national grid, brownout and black out; sample blackouts at national and international level	8
	Total	48

References:

1. Power Plant Engineering, by P K Nag. McGraw Hill, New Delhi, ISBN:978-9339204044
2. Electrical Power Generation, by Tanmoy Deb, Khanna Publishing House Delhi (Ed.2018)
3. Generation of Electrical Energy by B.R. Gupta, Chand &Co New Delhi,
4. Electrical Power generation by Dr. S. L. Uppal Khanna Publishers.
5. Solar Photovoltaics Fundamentals Technologies and Applications by Solanki, Chetan Singh PHI learning, New Delhi ISBN:9788120351110
6. Wind Power Plants and Project Development by T Wizelius Earnest Joshua–PHI
7. A Course in Electrical Power by JB Gupta S K Katarina and Sons, New Delhi.2014,
8. A Course in Electrical Power by Sony Gupta Bhatnagar Dhanpat Rai and Sons

9.	Electrical Power Generation	Kamal Singh	FPH
10.	Electrical Power Generation	Ashirwad Kumar	FPH
11.	Introduction to Electric Generation Systems	Deepak Garg	FPH

Course Outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and so that the student demonstrates the following industry-oriented Cos associated with the above-mentioned competency:

a) Maintain the optimized working of the thermal power plant.

b) Maintain the optimized working of large and micro hydro power plants.

c) Maintain the optimized working of solar and biomass-based power plants.

d) Maintain the optimized working of wind power plants.

e) Select the adequate mix of power generation based on economic operation.

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ELECTRICAL CIRCUITS
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
2020302	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course Objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- Provide working knowledge for the analysis of basic DC and AC circuits used in electrical and electronic devices.
- Maintain electrical systems applying AC and DC circuit fundamentals

CONTENTS: THEORY

	Name of the Topic	Hrs./Unit
Unit -I	**Single Phase A.C Series Circuits** Generation of alternating voltage, Phasor representation of sinusoidal quantities R, L, C circuit elements its voltage and current response R-L, R-C, R-L-C combination of A.C series circuit, impedance, reactance, impedance triangle, Power factor, active power, reactive power, apparent power, power triangle and vector diagram Resonance, Bandwidth, Quality factor and voltage magnification in series R-L, R-C, R-L-C circuit	10
Unit -II	**Single Phase A.C Parallel Circuits** R-L, R-C and R-L-C parallel combination of A.C. circuits. Impedance reactance phasor diagram, impedance triangle R-L, R-C, R-L-C parallel A.C. circuits power factor active power apparent power reactive power, power triangle Resonance in parallel R-L, R-C, R-L-C circuit, Bandwidth, Quality factor and voltage magnification	10
Unit -III	**Three Phase Circuits** Phasor and complex representation of three phase supply Phase sequence and polarity Types of three-phase connections, Phase and line quantities in three phase star and delta system Balanced and unbalanced load, neutral shift in unbalanced load Three phase power, active, reactive and apparent power in star and delta system.	10
Unit - IV	**Network Reduction and Principles of Circuit Analysis** Source transformation Star/delta and delta/star transformation, Mesh Analysis Node Analysis	08

Unit - V	**Network Theorems** Superposition theorem. Thevenin's theorem. Norton's theorem Maximum power transfer theorem, Reciprocity theorem Tellegen's Theorem Duality in electric circuits	10
	Total	48

References:

1. Networks & Systems, by Ashfaq Husain, Khanna Book Publishing, New Delhi.
2. Fundamentals of Electrical Network by B. R Gupta Singhal Vandana S. Chand and Co. New Delhi ISBN:978-81-219-2318- 7
3. Fundamentals of Electrical Engineering by Saxena, S.B Lal, K .Dasgupta
4. A Text Book of Electrical Technology Vol-I by A K Theraja, B.L:Theraja; S.Chand & Co Ram Nagar New Delhi ISBN: 9788121924405
5. Circuit and network by A. Sudhakar A.S. Shyamalan, S. Palli;, McGraw Hill Education, New Delhi,ISBN:978-93-3921- 960-4
6. Electric Circuits by Bell, David A. Oxford University Press New Delhi, ISBN:978-01-954-2524-6
7. Introductory circuit Analysis by R.L Boylested, Wheeler, New Delhi, ISBN:978-00-231-3161-5
8. Basic Electrical Engineering by V.N. Mittel Arvind Mittel, McGraw Hill Education, Noida, ISBN:978-00-705-9357-2
9. Electric Circuit Analysis, by A.K. CHAKRAVARTI Dhan pat rai publication.
10. Circuit theory by S Saliva Hanan, S. Pravin Kumar, Vikas Publishing House Pvt. Ltd, Noida; ISBN:978-93259- 7418-0
11. Electrical Circuits & Network — Umesh Kumar — FPH
12. Electrical Circuits — O.P.Sharma — FPH

Course Outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented Cos associated with the above-mentioned competency:

a) Trouble shoot problems related to single phase A.C series circuits.
b) Trouble shoot problems related to single phase A.C parallel circuits.
c) Trouble shoot problems related to three phase circuits.
d) Use principles of circuit analysis to trouble shoot electric circuits.
e) Apply network theorems to troubleshoot electric circuits.

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ELECTRICAL AND ELECTRONIC MEASUREMENTS
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
2020303	No. of Periods Per Week			Full Marks	:	100	04
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course Objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

Identify the various parameters that are measurable in electronic instrumentation.

- Employ appropriate instruments to measure given sets of parameters.
- Practice the construction of testing and measuring set up for electronic systems.
- To have a deep understanding about instrumentation concepts which can be applied to Control systems.
- Use relevant measuring instrument in different electrical applications.

CONTENTS: THEORY

Chapter	Name of the Topic	Hrs./Unit
Unit -I	**Fundamentals of Measurements** Measurement: Significance, units, fundamental quantities and standards Classification of Instrument Systems: Null and deflection type instruments Absolute and secondary instruments Analog and digital instruments Static and dynamic characteristics, types of errors Calibration: need and procedure Classification of measuring instruments: indicating, recording and integrating instruments. Essential requirements of an indicating instruments	08
Unit – II	**Measurement of voltage and current** DC Ammeter: Basic, Multi range, Universal shunt, DC Voltmeter: Basic, Multi-range, concept of loading effect and sensitivity. AC voltmeter: Rectifier type (half wave and full wave) CT and PT: construction, working and applications. Clamp-on meter.	10
Unit -III	**Measurement of Electric Power** Analog meters: Permanent magnet moving coil (PMMC) and Permanent magnet moving iron (PMMI) meter, their construction, working, salient features, merits and demerits Dynamometer type wattmeter: Construction and working Range: Multiplying factor and extension of range using CT and PT Errors and compensations. Active and reactive power measurement: One, two and three wattmeter method. Effect of Power factor on wattmeter reading in two wattmeter method. Maximum Demand indicator	16

Unit -IV	**Measurement of Electric Energy** Single and three phase electronic energy meter: Constructional features and working principle. Errors and their compensations. Calibration of single-phase electronic energy meter using direct loading.	04
Unit -V	**Circuit Parameter Measurement, CRO and Other Meters** Measurement of resistance: Low resistance: Kelvin's double bridge, Medium Resistance: Voltmeter and ammeter method	08
Unit -VI	High resistance: Megger and Ohm meter: Series and shunt Measurement of inductance using Anderson bridge (no derivation and phasor diagram) Measurement of capacitance using Schering bridge (no derivation and phasor diagram) Single beam/single trace CRO, Digital storage Oscilloscope**:** Basic block diagram, working, Cathode ray tube, electrostatic deflection, vertical amplifier, time base generator, horizontal amplifier, measurement of voltage/ amplitude/ time period/ frequency/ phase angle delay line, specifications. Other meters: Earth tester, Digital Multimeter; L-C-R meter, Frequency meter (ferromagnetic and Weston type), Phase sequence indicator, power factor meter (single phase and three phase dynamometer type), Synchroscope, Tri-vector meter. Signal generator: need, working and basic block diagram. Function generator: need, working and basic block diagram, function of symmetry.	18
	Total	64

References:

1. A Text Book of Electrical Technology Vol-I (Basic Electrical Engg.) by A.K., Theraja B. L,Theraja S.Chand and Co. New Delhi, ISBN:9788121924405
2. Basic Electrical Engineering Mittle by V.N. McGraw-Hill New Delhi, ISBN:978-0-07-0088572-5,
3. Edward Hughes, Electrical Technology, Pearson Education, New Delhi, ISBN-13: 978-0582405196
4. Electrical and Electronic Measurement and Instrumentation, R.K Rajput, S.Chand and Co. New Delhi, ISBN :9789385676017
5. Electrical and Electronics Measurement sand Instrumentation. By A.K. Sawhney Dhanpat Rai and Sons, New Delhi, ISBN :9780000279744
6. Electrical Measurements and Measuring Instruments by N.V. Suryanarayana S. Chand and Co. New Delhi, ISBN:8121920116
7. Electrical Measurements — S.N. Bhargava — FPH
8. Electrical Measurements — Aashirvad Kumar — FPH
9. Electrical and Electronic Measurements — Deepak Kumar — FPH

Course outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented Cos associated with the above-mentioned competency:

a) Check the working of the electrical measuring instrument.
b) Use different types of measuring instruments for measuring voltage and current.
c) Use different types of measuring instruments for measuring electric power
d) Use different types of measuring instruments for measuring electric energy.
e) Use different types of electrical instruments for measuring various ranges of electrical parameters.

ELECTRIC MOTORS AND TRANSFORMERS
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Theory						Credits
2020304	No. of Periods Per Week			Full Marks	:	100	04
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course Objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Provide the basic concept of DC machines and Transformers.
- Develop the skills of the students in the areas of machines and transformers by identifying the current problem in the industries and bring solutions through research.
- Diagnose the condition of DC machines and Transformers.
- Maintain electric motors and transformers.

CONTENTS: THEORY

Chapter	Name of the topic	Hrs./Unit
Unit -I	**DC Generators** DC generator: construction, parts, materials and their functions. Principle of operation of DC generator: Fleming's right hand rule, schematic diagrams, E.M.F. equation of generator, armature reaction, commutation. Applications of DC generators. Classification of measuring instruments: indicating, recording and integrating instruments.	12
Unit - II	**D.C. Motors** DC motor: Types of DC motors. Fleming's left-hand rule, Principle of operation of, Back E.M.F and its significance, Voltage equation of DC motor. Torque and Speed; Armature torque, Shaft torque, BHP, Brake test, losses, efficiency. DC motor starters: Necessity, two point and three-point starters. Speed control of DC shunt and series motor: Flux and Armature control. Brushless DC Motor: Construction and working.	14
Unit -III	**Single Phase Transformers** Types of transformers: Shell type and core type; Construction: Parts and functions, materials used for different parts: CRGO, CRNGO, HRGO, amorphous cores, Transformer: Principle of operation, EMF equation of transformer: Derivation, Voltage transformation ratio, Significance of transformer ratings Transformer No-load and on-load phasor diagram, Leakage reactance, Equivalent circuit of transformer: Equivalent resistance and reactance. Voltage regulation and Efficiency: Direct loading OC/SC method, All day efficiency.	14
Unit -IV	**Three Phase Transformers** Bank of three single phase transformers, Single unit of three phase transformer Distribution and Power transformers. Construction, cooling, three phase transformers connections as per IS:2026 (part IV)-1977, Three phase to two phase conversion (Scott Connection), Selection of transformer as per IS: 10028 (Part I)-1985, Criteria for selection of distribution transformer, and power transformer, Amorphous Core type Distribution Transformer, Specifications of three- phase distribution transformers as per IS:1180 (part I)-1989 Need of parallel operation of three phase transformer, Conditions for parallel operation. Polarity tests on mutually inductive coils and single-phase transformers; Polarity test, Phasing out test on Three-phase transformer	16

Unit -V	**Special Purpose Transformers** Single phase and three phase auto transformers: Construction, working and applications. Instrument Transformers: Construction, working and applications of Current transformer and Potential transformer. Isolation transformer: Constructional Features and applications. Single phase welding transformer: constructional features and applications. Pulse transformer: constructional features and applications. 'K' factor of transformers: overheating due to non-linear loads and harmonics.	08
	Total	64

References:

1. Electrical Machines, Vol- I,II by G.C. Garg & P.S. Bimbhra, Khanna Book Publishing House(ISBN:978- 9386173-447, 978-93-86173-607), New Delhi
2. Mittle,V.N.andMittle,Arvind.,BasicElectricalEngineering,McGrawHillEducation,New Delhi,ISBN: 9780070593572
3. Electrical Machines by D.P Kothari .and Nagrath, I.J.McGraw Hill Education. New Delhi, ISBN: 9780070699670
4. Electrical Machines by J.B. Gupta McGraw Hill Education, New Delhi,ISBN:9789332902855
5. Principle so Electrical Machines by Rohit Mehta, and V.K.Mehta,S.ChandandCo.Ltd.,NewDelhi,ISBN: 9788121930888
6. Electrical Technology Vol-II (A C and DC machines) by B.L. Theraja, S.Chand and Co. Ltd., New Delhi, ISBN: 9788121924375
7. Electrical Machines Theory and Practice, M.N. Bandyopadhyay, PHI Learning Pvt.Ltd.,New Delhi, ISBN: 9788120329973Vi
8. DC Machines and Transformers by K.Murugesh Kumar,ISBN:9788125916055
9. Electric Motors and Transformers Deepak Kumar FPH

Course outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented Co associated with the above-mentioned competency:

a) Maintain different types of DC generators

b) Maintain different types of DC motors.

c) Maintain single phase transformer.

d) Maintain three phase transformers.

e) Maintain different types of special purpose transformers used in different applications.

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Fundamental of Basic Electronics & Digital Electronics
(ELECTRICAL ENGINEERING GROUP)

Subject Code 2020305	Theory						Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	00	—	TA	:	10	
	—	—	—	CT	:	20	

Course Learning Objectives:

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
- To prepare students to perform the analysis and design of various digital electronic circuits.

CONTENTS: THEORY

	Name of the topic	Hrs./Unit
Unit -I	**Boolean Algebra & Logic Gates** Introduction to different Number systems: Binary, Octal, Decimal & Hexadecimal & their Conversion from one another Rules and Laws of Boolean Algebra – DE Morgan's Law Logic Gates: AND, OR, NOT, NAND, NOR, XOR, XNOR, Symbolic representation & Truth Table Karnaugh Maps (K-Maps) & its use for simplification of simple Boolean expressions	8
Unit -II	**Combinational Logic Circuit** Arithmetic Circuits: Addition, Subtraction, 1's Compliment, 2's compliment, Half Adder, Full Adder, Half subtractor, full subtractor Encoder, Decoder Multiplexer, Demultiplexer	6
Unit - III	**Sequential Logic Circuit & Data Converter** Flip Flops: SR, JK, T & D Flip flops (Truth Table & Excitation table only) Counters: Introduction to Up/Down Counter, Ripple Counter, Ring Counter Registers: Definition and Types Data Converter: Digital to Analog and Analog to Digital Converters	10
Unit - IV	**Semiconductor diode**: 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. Forward biased & reversed biased junction Diode symbol, circuit diagram for V/S characteristics (forward & reversed) Characteristics of PN junction diode Specifications: - Forward voltage drop, Reversed saturation current, maximum forward current, power dissipation, Package view of diodes of different power ratings	12
Unit - V	**Bipolar Junction Transistor (BJT):** NPN and PNP Transistor – Operation and characteristics CB, CE, CC Configuration – characteristics and working **Biasing of BJT:** Introduction, need of biasing, concept of dc load line, selection of operating point (Q point), need of stabilization of Q point, (thermal run away concept) Types of biasing circuits: Fixed biased circuit, Base biased with emitter feedback, Base biased with collector feedback, Voltage divider, Emitter biased	**6**
Unit - VI	**Field Effect Transistor (FET):** FET – Working Principle, Classification, MOSFET Small Signal model, N-Channel/ P-Channel MOSFETs – characteristics, enhancement and depletion mode, MOFET as a Switch, Common Source Amplifiers Uni-Junction Transistor – equivalent circuit and operation	**6**
	Total	**48**

Reference Books:

1. Digital principles & Applications, Albert Paul Malvino & Donald P. Leach, McGraw Hill Education; Eighth edition ISBN: 978-9339203405
2. Digital Electronics, RogerL.Tokheim Macmillian, McGraw-Hill Education (ISE Editions); International 2 Revised edition ISBN: 978-0071167963
3. Digital Electronics – an introduction to theory and practice, William H. Gothmann, Prentice Hall India Learning Private Limited; 2 editions, ISBN: 978-8120303485
4. Electronics Devices and circuit theory, Boyestad & Nashel sky, Pearson Education India; 11 edition (2015), ISBN: 978-9332542600
5. Electronic Devices and Circuits, S. Salivahanan and N. Suresh Kumar, McGraw Hill Education; Fourth edition (1 July2017) ISBN: 978-9339219505
6. Electronics Devices & Circuits,Jacob Millman, McGraw Hill Education; 4 edition (2015), ISBN: 978-9339219543
7. Bell Electronics Devices & Circuits by J. David Prentice Hall of India
8. Basic Electronics Amit kumar FPH
9. Fundamentals of Basic Electronics Umesh Kumar FPH

Course Outcomes

After studying this course, the students would gain enough knowledge

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
2. To understand and examine the structure of various number systems and its application in digital design.
3. The ability to understand, analyze and design various combinational and sequential circuits.
4. Ability to identify basic requirements for a design application and propose a cost-effective solution.
5. The ability to identify and prevent various hazards and timing problems in a digital design.
6. To develop skill for building and troubleshooting digital circuits.

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INTRODUCTION TO ELECTRIC POWER GENERATION SYSTEMS LABORATORY
(ELECTRICAL ENGINEERING GROUP)

Subject Code 2020306	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS: PRACTICAL

Course Objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Maintain the efficient operation of various electric power generating plants.
- The capability to incorporate the knowledge of electrical power generation in other field of science, engineering and economics.

Practical's:

1. Identify the routine maintenance part of the coal fired thermal power plant and gas fired thermal power plant after watching a video programme.
2. Assemble and dismantle a small diesel generator power plant.
3. Identify the routine maintenance part soft he nuclear fired thermal power plant after watching a video programme.
4. Identify the routine maintenance part soft he large hydro power plant after watching a video programme
5. Identify the routine maintenance parts of the micro hydro power plant after watching a video programme.
6. Assemble a micro hydro power plant and then dismantle it.
7. Assemble and dismantle of the parabolic trough or parabolic dish Concentrated Solar Power (CSP)plant.
8. Assemble the solar PV plant to produce electric power and then dismantle it.
9. Assemble and dismantle a small biogas plant to generate electric power
10. Identify the routine maintenance parts of the large wind power plant after watching a video programme.
11. Assemble a horizontal axis small wind turbine to produce electric power
12. Dismantle a horizontal axis small wind turbine.
13. Assemble a vertical axis small wind turbine o produce electric power and then dismantle it.
14. Identify the routine maintenance part soft he horizontal axis small wind turbine after watching a video programme.
15. Identify the routine maintenance parts of the vertical axis small wind turbine after watching a video programme.

Course Outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented Cos associated with the above-mentioned competency:

a) Maintain the optimized working of the thermal power plant.

b) Maintain the optimized working of large and micro hydro power plants.

c) Maintain the optimized working of solar and biomass-based power plants.

d) Maintain the optimized working of wind power plants.

e) Select the adequate mix of power generation based on economic operation.

ELECTRIC CIRCUITS LABORATORY
(ELECTRICAL ENGINEERING GROUP)

Subject Code	Practical						Credits
2020307	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS: PRACTICAL

Course objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Maintain electrical systems by applying AC and DC circuit fundamentals. Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- Provide working knowledge for the analysis of basic DC and AC circuits used in electrical and electronic devices.

practical's

1. Use dual trace oscilloscope to determine A.C voltage and current response in given R L,C circuit.
2. Use voltmeter, ammeter, wattmeter to determine active, reactive and apparent power consumed in given R-L series circuit. Draw phase or diagram.
3. Use voltmeter, ammeter to determine active, reactive and apparent power consumed in given R-C series circuit. Draw phasor diagram.
4. Use voltmeter, ammeter, wattmeter to determine active, reactive and apparent power consumed in given R-L-C series circuit. Draw phase or diagram.
5. Use variable frequency supply to creature sonance in given series R-L-C circuit or by using variable inductor or variable capacitor.
6. Use voltmeter, ammeter, and wattmeter to determine current, power factor active, reactive and apparent power in R-C parallel A.C. circuit.
7. Use voltmeter, ammeter, wattmeter, power factor meter to determine current, p.f., active, reactive and apparent power for given R-L-C parallel circuit with series connection of resistor and inductor in parallel with capacitor.
8. Use variable frequency supply create resonance in given parallel R-L-C circuit or by using variable inductor or capacitor.
9. Use voltmeter, ammeter, wattmeter, pf meter to determine line and phase quantities of voltage and current for balanced three phases tar and delta connected load and calculate active, reactive, and apparent power. Draw phasor diagram.
10. Use voltmeter, ammeter, watt meter, pf meter to determine line and phase quantities of voltage and current for unbalanced three phases tar and delta connected load and calculate active, reactive, and apparent power. Draw phase or diagram.
11. Use voltmeter, ammeter to determine current through the given branch of electric network by applying mesh analysis.
12. Use voltmeter, ammeter to determine current through the given branch of electric network by applying node analysis.
13. Use voltmeter, ammeter to determine current through the given branch and voltage across the given element of circuit by applying superposition theorem.
14. Use voltmeter, ammeter to determine equivalent circuit parameter in a given circuit by applying Thevenin's theorem

15. Use voltmeter, ammeter to determine equivalent circuit parameter in a given circuit by applying Norton's theorem
16. Use voltmeter, ammeter to determine load resistance for maximum power transfer for a given circuit by applying maximum power transfer theorem.

Course outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented project associated with the above-mentioned competency:

- Trouble shoot problems related to single phase A.C series circuits.
- Trouble shoot problems related to single phase A.C parallel circuits.
- Troubleshoot problems related to three phase circuits.
- Use principles of circuit analysis to trouble shoot electric circuits.
- Apply network theorems to troubleshoot electric circuits.

*****

WEB TECHNOLOGY LAB

SUBJECT CODE: 2018308	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	25	01
	L	T	P/S	ESE	:	25	
		-	02	Internal	:	07	
				External	:	18	

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies'. Some of the things that should necessary be covered in lab.

Course outcomes:

Student will be able to program web applications using and will be able to do the following:

- Use LAMP Stack for web applications
- Write simple applications with Technologies like HTML, Java script, AJAX, PHP
- Connect to Database and get results
- Parse XML files Student will be able to develop/build a functional website with full features.

Content: Practical		Hrs.	Marks
Unit – 1	Home page Development static pages (using Only HTML) of an online Book store.	04	
Unit – 2	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.	06	
Unit – 3	Write a PHP program to display a digital clock which displays the current time of the server.	06	
Unit – 4	Write an HTML code to display your CV on a web page.	04	
Unit – 5	Write an XML program to display products.	05	
Unit – 6	Create a web page with all types of Cascading style sheets.	06	
Unit – 7	Write a PHP program to display a digital clock which displays the current time of the server.	05	
Unit – 8	Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.	04	

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. "Web Technologies--A Computer Science Perspective", Jeffrey Jackson
2. "Internet & World Wide Web How to Program", Deitel, Deitel, Goldberg, Pearson Education
3. "Web programming- Building Internet Application", Chris Bales
4. Web Applications: Concepts and Real-World Design, Knuckles

ELECTRICAL AND ELECTRONIC MEASUREMENTS LABORATORY
(ELECTRICAL ENGINEERING GROUP)

Subject Code 2020309	Practical						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P	ESE	:	25	
	—	—	02	Internal	:	07	
	—	—	—	External	:	18	

CONTENTS: PRACTICAL

Course objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Use relevant measuring instrument in different electrical applications.
- Identify the various parameters that are measurable in electronic instrumentation.
- Employ appropriate instruments to measure given sets of parameters.
- Practice the construction of testing and measuring set up for electronic systems.
- To have a deep understanding about instrumentation concepts which can be applied to Control systems.

Practical's:

1. Identify measuring instruments on the basis of symbol son dial, type, accuracy, class position and scale.
2. Identify the components of PMMC and MI instruments.
3. Troubleshoot PMMC and MI instruments.
4. Measure AC and DC quantities in a working circuit.
5. Extend range of ammeter and volt meter by using (i) shunt and multiplier (ii) CT and PT.
6. Use Clamp-on meter for measurement of AC/DC current, AC/DC voltage.
7. Use electro-dynamic watt-meter for measurement of power in a single-phase circuit
8. Troubleshoot electro dynamic watt-meter for measurement of power in a single-phase circuit
9. Use single watt meter for measurement of active and reactive power of three phase balanced load.
10. Use two watt-meters for measuring active power of three-phase balanced load.
11. Calibrate single phase electronic energy meter by direct loading.
12. Troubleshoot single phase electronic energy meter.
13. Use digital multi-meter for measurement of AC/DC current, AC/DC voltage.
14. Use Kelvin's double bridge for measurement of low resistance.
15. Use voltmeter and ammeter method for measurement of medium resistance.
16. Use Megger for insulation resistance measurements.
17. Use earth tester for measurement of earth resistance.
18. Use CRO for the Measurement of supply frequency in single-phase circuit.
19. Use Tri-vector meter for measuring kW, and kVA of a power line.

COURSE OUTCOMES:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented Cos associated with the above-mentioned competency:

a) Check the working of the electrical measuring instrument.

b) Usedifferenttypesofmeasuringinstrumentsformeasuringvoltageandcurrent.

c) Usedifferenttypesofmeasuringinstrumentsformeasuringelectricpower

ELECTRIC MOTORS AND TRANSFORMERS LABORATORY
(ELECTRICAL ENGINEERING GROUP)

Subject Code 2020310	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS: PRACTICAL

Course objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Provide the basic concept of DC machines and Transformers.
- Develop the skills of the students in the areas of machines and transformers by identifying the current problem in the industries and bring solutions through research.
- Diagnose the condition of DC machines and Transformers.
- Maintain electric motors and transformers.

Practical's:

1. Dismantle a DC machine.
2. Reverse the direction of rotation of the DC shunt motor.
3. Perform brake test on DC shunt motor.
4. Control the speed of DC shunt motor by different methods.
5. Control the speed of DC series motor by different methods.
6. Perform the brake test on DC series motor.
7. Check the functioning of single-phase transformer.
8. Determine regulation and efficiency of single-phase transformer by direct loading.
9. Perform open circuit and short circuit test on single phase transformer to determine equivalent circuit constants, voltage regulation and efficiency.
10. Perform parallel operation of two single phase transformers to determine the load current sharing.
11. Performparalleloperationoftwosinglephasetransformersanddeterminetheapparentandrealpower load sharing.
12. Performpolaritytestonasingle-phasetransformerwhosepolaritymarkingsaremasked.
13. Performphasingouttestonathree-phasetransformerwhosephasemarkingsaremasked.
14. Connecttheauto-transformerinstep-upandstep-downmodesnotingtheinput/outputreadings.
15. Check the functioning of the CT, PT and isolation transformer.
16. Test the pulse transformer.

Course outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented Cos associated with the above-mentioned competency:

a) Maintain different types of DC generators.

b) Maintain different types of DC motors.

c) Maintain single phase transformer.

d) Maintain three phase transformers.

e) Maintain different types of special purpose transformers used in different applications.

PYTHON (Term Work)

(ELECTRICAL ENGINEERING GROUP)

Subject Code 2018311	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/TW				
	—	—	02	Internal	:	07	
	—	—	—	External	:	18	

CONTENTS: Practical		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

References Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.

Fundamentals of Basic electronics &Digital Electronics Term Work

(ELECTRICAL ENGINEERING GROUP)

Subject Code 2020312	Practical						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/TW				
	—	—	04	Internal	:	07	
	—	—	—	External	:	18	

CONTENTS: PRACTICAL

Course objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
- To prepare students to perform the analysis and design of various digital electronic circuits.

Term Work:

1. To verify the truth tables for all logic fates – NOT OR AND NAND NOR XOR XNOR using CMOS Logic gates and TTL Logic Gates
2. Implement and realize Boolean Expressions with Logic Gates
3. Implement Half Adder, Full Adder, Half Subtractor, Full Subtractor using ICs.
4. Design and development of Multiplexer and De-multiplexer using multiplexer ICs.
5. Verification of the function of SR, D, JK and T Flip Flops.
6. To plot Forward & Reverse biased characteristics of diode.
7. To Plot Input & output characteristics of transistor in CE mode.
8. To Plot Input & output characteristics of transistor in CB mode.
9. To Plot Characteristics of FET.

Course outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented Cos associated with the above-mentioned competency:

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.

2. To understand and examine the structure of various number systems and its application in digital design.

3. The ability to understand, analyze and design various combinational and sequential circuits.

4. Ability to identify basic requirements for a design application and propose a cost-effective solution.

5. The ability to identify and prevent various hazards and timing problems in a digital design.

6. To develop skill to build, and troubleshoot digital circuits.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR
Scheme of Teaching and Examination for
III[rd] SEMESTER DIPLOMA IN ELECTRONICS ENGINEERING
(Effective form Session 2020-2021 Batch)

THEORY

S.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.	Principles of Electronic Communication	2021301	04	03	10	20	70	100	28	40	03
2.	Electronic Devices and Circuits	2021302	04	03	10	20	70	100	28	40	04
3.	Digital Electronics	2021303	03	03	10	20	70	100	28	40	02
4.	Electronic Measurements and Instrumentation	2021304	04	03	10	20	70	100	28	40	03
5.	Electric circuits and network	2021305	04	03	10	20	70	100	28	40	03
Total: 19							350	500			15

PRACTICAL

S.No	SUBJECTS	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.	Principles of Electronic Communication Lab	2021306	02 50% Physical 50% Virtual	03	15	35	50	20	01
7.	Electronic Devices and Circuits Lab	2021307	02 50% Physical 50% Virtual	03	07	18	25	10	01
8.	Web Technology LAB	2018308	02 50% Physical 50% Virtual	03	07	18	25	10	01
9.	Electronic Measurements and Instrumentation Lab	2021309	04 50% Physical 50% Virtual	03	15	35	50	20	02
10.	Digital Electronics Lab	2021310	02 50% Physical 50% Virtual	03	07	18	25	10	01
Total: 12							175		06

TERM WORK

S.No	SUBJECTS	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
11.	Python	2018311	2	07	18	25	10	01
12.	Summer Internship-I (4 weeks) after II Semester	2021312	-	15	35	50	20	02
						75		03
Total Periods per week of each duration One Hour = 33						Total Marks: 750		24

Principles of Electronic Communication

(Electronics Engineering Group)

Subject Code 2021301	Theory			No of Periods 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	

Course Content:

	Contents (Theory)	Hrs.
UNIT 1	***ANALOG MODULATION:*** Concept of frequency translation. Amplitude Modulation: Description of full AM, DSBSC, SSB and VSB in time and frequency domains, methods of generation & demodulation, descriptions of FM signal in time and frequency domains.	12
UNIT 2	***PULSE ANALOG MODULATION*:** Ideal sampling, Sampling theorem, aliasing, interpolation, natural and flat top sampling in time and frequency domains.	10
UNIT 3	***PCM & DELTAMODULATION SYSTEMS***: Uniform and Non-uniform quantization. PCM and delta modulation, Signal to quantization noise ratio in PCM and delta modulation.	12
UNIT 4	***DIGITALMODULATION*:** Baseband transmission: Line coding (RZ, NRZ), inter symbol interference (ISI), pulse shaping, Nyquist criterion for distortion free base band transmission, raised cosine spectrum. Pass band transmission. Geometric interpretation of signals, orthogonalization	12
UNIT 5	***SPREAD-SPECTRUM MODULATION*:** Introduction, Pseudo-Noise sequences, direct sequence spread spectrum (DSSS) with coherent BPSK, processing gain, probability of error, frequency-hop spread spectrum (FHSS). Application of spread spectrum: CDMA.	14
	Total	**60**

LEARNING RESOURCES:

1. Principles of communication systems By Taub Schilling, T.M.H.
2. Fundamentals of communication systems By Proakis & Salehi, Pearson education
3. Communication Systems by Simon Hay kin, John Wiley
4. Communication Systems (Analog and Digital) By R.P. Singh, S.D. Sapre, T.M.H.
5. Modern Digital & Analog Communication by B.P. Lathi, Oxford Publications
6. Digital & Analog Communication Systems by K.S. Shanmugam, John Wiley
7. Principles of Electronic Communication Arun Majeswari FPH

Course outcomes: After the completion of the course, student will be able to

1. Apply different modulation and demodulation techniques used in analog communication.
2. Identify and solve basic communication problems.
3. Analyze different transmitter and receiver circuits.
4. Compare and contrast design issues, advantages, disadvantages and limitations of analog communication systems.

Electronic Devices and Circuits
(Electronics Engineering Group)

Subject Code 2021302	Theory			No of Periods in One Session :60			Credits
	No. of Periods Per Week			Full Marks	:	100	04
	L	T	P/S	ESE	:	70	
	04	-	-	TA	:	10	
	-	-	-	CT	:	20	

Course Content:

	Contents (Theory)	Hrs
UNIT 1	***Semiconductor and Diodes*** Definition, Extrinsic/Intrinsic, N-type & p-type PN Junction Diode – Forward and Reverse Bias Characteristics Zener Diode – Principle, characteristics, construction, working Diode Rectifiers – Half Wave and Full Wave. Filters – C, LC and PI Filters.	14
UNIT 2	***Bipolar Junction Transistor (BJT)*** NPN and PNP Transistor – Operation and characteristics Common Base Configuration – characteristics and working Common Emitter next line Configuration – characteristics and working Common Base Configuration – characteristics and working, High frequency model of BJT. Classification of amplifiers, negative feedback	14
UNIT 3	***Field Effect Transistors*** FET – Working Principle, Classification MOSFET Small Signal model N-Channel/ P-Channel MOSFETs – characteristics, enhancement and depletion mode, MOS- FET as a Switch Common Source Amplifiers Uni-Junction Transistor – equivalent circuit and operation	12
UNIT 4	***SCR, DIAC & TRIAC*** SCR – Construction, operation, working, characteristics, DIAC - Construction, operation, working, characteristics, TRIAC - Construction, operation, working, characteristics, SCR and MOSFET as a Switch, DIAC as bidirectional switch Comparison of SCR, DIAC, TRIAC, MOSFET	10
UNIT 5	***Amplifiers and Oscillators*** Feedback Amplifiers – Properties of negative Feedback, impact of feedback on different parameters Basic Feedback Amplifier Topologies: Voltage Series, Voltage Shunt, Current Series, Current Shunt Oscillator – Basic Principles, Crystal Oscillator, Non-linear/ Pulse Oscillator	10
	Total	**60**

LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1.	Analog Circuits	A.K. Maini	Khanna Publishing House Ed. 2018 (ISBN: 978-93-86173-584)
2.	Electronic Devices and Circuits	S. Saliva Hanan and N. Suresh Kumar	McGraw Hill Education; Fourth edition (1 July 2017) ISBN: 978-9339219505
3.	Electronics Devices and circuit theory	Boylested & Nash- Elsy	Pearson Education India; 11 edition (2015) ISBN: 978-9332542600

4.	Electronic Principles	Albert Melvino & David Bates	Tata McGraw Hill Publication 2010 ISBN: 978-0070634244
5.	Electronics Devices & Circuits	Jacob Millman	McGraw Hill Education; 4 edition (2015) ISBN: 978-9339219543

Course Outcomes: After the completion of the course, student will be able to

1. Understand the working principle of PN junction diode and rectifiers.
2. Use transistor as low power amplifier.
3. Use MOSFET as switch and high-power applications.
4. Understand the working principle and characteristics of SCR, DIAC and TRIAC.
5. Use BJT as feedback amplifier and waveform generator.
6. Electronic Devices and Circuits Manish Sabharwal FPH

Digital Electronics
(Electronics Engineering Group)

Subject Code 2021303	Theory			No of Periods in One Session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	02
	L	T	P/S	ESE	:	70	
	03	-	-	TA	:	10	
	-	-	-	CT	:	20	

Course Content:

	Contents (Theory)	Hrs
UNIT 1	***Number Systems & Boolean Algebra*** Introduction to different number systems – Binary, Octal, Decimal, Hexadecimal Conversion from one number system to another. Boolean variables – Rules and laws of Boolean Algebra, De-Morgan's Theorem Karnaugh Maps and their use for simplification of Boolean expressions	08
UNIT 2	***Logic Gates*** Logic Gates – AND, OR, NOT, NAND, NOR, XOR, XNOR: Symbolic representation and truth table Implementation of Boolean expressions and Logic Functions using gates Simplification of expressions	08
UNIT 3	***Combinational Logic Circuits*** Arithmetic Circuits – Addition, Subtraction, 1's 2's Complement, Half Adder, Full Adder, Half Subtractor, Full Subtractor, Parallel and Series Adders, Encoder, Decoder Multiplexer – 2 to 1 MUX, 4 to 1 MUX, 8 to 1 MUX. Applications Demultiplexer – 1 to 2 DEMUX, 1- 4 DEMUX, 1- 8 DEMUX	12
UNIT 4	***Sequential Logic Circuits*** Flip Flops – SR, JK, T, D, FF, JK-MS, Triggering Counters – 4 bit Up – Down Counters, Asynchronous/ Ripple Counter, Decade Counter-Mod 3, Mod 7 Counter, Johnson Counter, Ring Counter Registers – 4bit Shift Register: Serial In Serial Out, Serial in Parallel Out, Parallel In Serial Out, Parallel In Parallel Out	12
UNIT 5	***Memory Devices*** Classification of Memories – RAM Organization, Address Lines and Memory Sixe, Static RAM, Bipolar RAM, cell Dynamic RAM, D RAM, DDR RAM Read Only memory – ROM organization, Expanding memory, PROM, EPROM, EEPROM, Flash memory Data Converters – Digital to Analog converters, Analog to Digital Converters	10
	Total	**50**

LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1.	Digital principles & Applications	Albert Paul Melvino & Donald P. Leach	McGraw Hill Education; Eighth edition ISBN: 978-9339203405
2.	Digital Electronics	Roger L. Tok Heim Macmillan	McGraw-Hill Education (ISE Editions); International 2 Revised ed edition ISBN: 978-0071167963

3.	Digital Electronics – an introduction to theory and practice	William H. Goth-Mann	Prentice Hall India Learning Private Limited; 2 edition ISBN: 978-8120303485
4.	Fundamentals of Logic Design	Charles H. Roth Jr.	Jaco Publishing House; First edition ISBN: 978-8172247744
5.	Digital Electronics	R. Anand	Khanna Publications, New Delhi (Edition 2018) ISBN: 978-93-82609445

Course Outcomes: After the completion of the course, student will be able to

1. Use number system and codes for interpreting working of digital system.
2. Use Boolean expressions to realize logic circuits.
3. Build simple combinational circuits.
4. Build simple sequential circuits.
5. Test data converters and PLDs in digital electronic systems.
6. Digital Electronics P.Mahapatra FPH
7. Digital Electronics Deepak rathi FPH

Electronic Measurements and Instrumentation

(Electronics Engineering Group)

Subject Code 2021304	Theory			No of Periods 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	

Course Content:

	Contents (Theory)	Hrs
UNIT 1	***Basics of Measurements and Bridges*** Accuracy & precision, Resolution Types of Errors DC Bridges – Wheatstone and Kelvin Double Bridge AC Bridges - Maxwell's Bridge, Hay's Bridge, Anderson Bridge, De- Sauty's Bridge	12
UNIT 2	***Potentiometer*** Basic DC slide wire Potentiometer Crompton's DC Potentiometer Applications of DC Potentiometer AC Potentiometers Applications of AC Potentiometers	10
UNIT 3	***Measuring Instruments*** Permanent Magnet Moving Coil Instruments (PMMC) Moving Iron type Instruments (MI) Electro Dynamo Type Instruments Single Phase Energy Meter	08
UNIT 4	***Electronic Instruments*** Electronic Voltmeter and Digital Voltmeter Electronic Multimeters Q – Meter Vector Impedance Mete	08
UNIT 5	***Oscilloscopes*** Cathode ray tube: construction, operation, screens, graticules Vertical deflection system, Horizontal deflection system, Delay line, Measurement of frequency, time delay, phase angle and modulation index (trapezoidal method) Oscilloscope probe: Structure of 1:1 and 10:1 probe Multiple Trace CRO	10
UNIT 6	***Transducers*** Classification, Selection Criteria, Characteristics, Construction, Working Principles and Application of following Transducers: RTD, Thermocouple, Thermistor LVDT, Strain Gauge Load Cell Piezoelectric Transducers	12
	Total	**60**

LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1.	Electrical & Electronic Measurement & Instruments	A.K. Sawhney	Dhanpat Rai & Sons, India

2.	Electronic Instrument and Measurement Technique	W.D. Cooper	Prentice Hall International, India.
3.	Electronic Measurement & Instrumentation	J.G. Joshi	Khanna Publishing House, Delhi
4.	Measurement systems application and design	E.O. Develin and D. N. Manic	The McGraw-Hill
5.	Electronic Measurements and Instrumentation	Oliver and Cage	The McGraw-Hill
6.	Basic Electrical Measurement	M.B. Stout	Prentice hall of India, India
7.	Electronic Instrumentation	H. S. Kalsi	The McGraw-Hill
8.	Electrical and Electronics Measurement and Instrumentation	Prithwiraj Pukrait, Bud- haditya Biswas, Santana Das, Chiranjib Coley	The McGraw-Hill

Course Outcomes: After the completion of the course, student will be able to

1. Understand the working of various types of AC and DC bridges.
2. Use the relevant instrument to measure specified parameters.
3. Calibrate different electronic instrument.
4. Interpret working of various types of sensors and transducers.
5. Use various types of transducers and sensors to measure quantities.
6. Electronic Measurements and Instrumentation Neeraj Bhargava FPH

Electric Circuits and Network
(Electronics Engineering Group)

Subject Code 2021305	Theory			No of Periods in One Session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	1	-	TA	:	10	
	-	-	-	CT	:	20	

Course Content:

Contents (Theory)		Hrs.
UNIT 1	***Basics of Network and Network Theorem*** Node and Mesh Analysis Superposition Theorem Thevenin Theorem Norton Theorem Maximum Power transfer theorem Reciprocity Theorem	12
UNIT 2	***Graph Theory*** Graph of network, tree, incidence matrix F Tie-Set Analysis F Cut-Set Analysis Analysis of resistive network using tie-set and cut-set Duality	06
UNIT 3	***Time Domain and Frequency Domain Analysis*** Solution of first and second order differential equations for Series and parallel R-L, R-C, R-L-C circuits Initial and Final conditions in network elements Forced and Free response, time constants Steady State and Transient State Response Analysis of electrical circuits using Laplace Transform for standard inputs (unit, Ramp, Step)	12
UNIT 4	***Trigonometric and exponential Fourier series*** Discrete spectra and symmetry of waveform Steady state response of a network to non-sinusoidal periodic inputs, power factor, effective values Fourier transform and continuous spectra	10
UNIT 5	***Two Port Network*** Two Port Network Open Circuit Impedance Parameters Short Circuit Admittance Parameters Transmission Parameters Hybrid Parameters Interrelationship of Two Port Network Inter Connection of Two Port Network	10
	Total	**50**

LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1.	Networks and Systems	Ashfaq Husain	Khanna Publishing House
2.	Network Analysis	M. E. Van Valkenburg	Prentice Hall of India
3.	Engineering Circuit Analysis	W. H. Hayat, J. E. Kemery and S. M. Durbin	McGraw Hill
4.	Electrical Circuits	Joseph Ed minister	Schumm's Outline, Tata McGraw Hill
5.	Basic Circuit Theory	Lawrence P. Huelsman	Prentice Hall of India
6.	Network & Systems	D. Roy Choudhury	Wiley Eastern Ltd
7.	Linear Circuit Analysis	De Carlo and Lin	Oxford Press

Course Outcomes: After the completion of the course, student will be able to

1. Use network theorems to determine the various parameters in circuits.
2. Obtain circuit matrices of linear graphs and analyze networks using graph theory.
3. Analyze circuits in time and frequency domain.
4. Write given functions in terms of Fourier series.
5. Use two port networks to determine the circuit parameters.
6. Electric Circuits and Networks — Umesh Kumar — FPH
7. Electric Circuits and Networks — Kamal Mishra — FPH
8. Network Theory — Umesh Kumar — FPH

Principles of Electronic Communication Lab
(Electronics Engineering Group)

	Theory			No of Periods in One Session: 24			Credits
	No. of Periods Per Week			Full Marks	:	50	
Subject Code 2021306	L	T	P/S	Internal	:	15	01
	-	-	02	External	:	35	
	-	-	-		:		

PRACTICALS/ EXERCISES

S. No	Practical Outcomes (Pros)	Hrs.
1	Harmonic analysis of a square wave of modulated waveform: measures modulation index	04
2	To modulate a high frequency carrier with sinusoidal signal to obtain FM signal	02
3	To study and observe the operation of a super heterodyne receiver	02
4	To modulate a pulse carrier with sinusoidal signal to obtain PWM signal and demodulate it	04
5	To modulate a pulse carrier with sinusoidal signal to obtain PPM signal and demodulate it	04
6	To observe pulse amplitude modulated waveform and its demodulation.	04
7	To observe the operation of a PCM encoder and decoder. To consider reason for using digital signal x-missions of analog signals	02
8	To study & observe the amplitude response of automatic gain controller (AGC)	02
	Total=	**24**

Electronic Devices and Circuits Lab
(Electronics Engineering Group)

Subject Code 2021307	Theory			No of Periods in One Session: 26			Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	-	-	02	External	:	18	
	-	-	-		:		

PRACTICALS/ EXERCISES

S. No.	Practical Outcomes (Pros)	Hrs.
1.	Construct the circuit and plot the VI characteristics of the PN Junction Diode, find the cut in voltage	02
2.	Construct the circuit and plot the characteristics of a Zener Diode. Find the breakdown voltage	02
3.	Construct a Half Wave Rectifier and obtain regulation characteristics – Without Filters and with Filters. Compare the results	02
4.	Construct a Full Wave Rectifier and obtain regulation characteristics – Without Filters and with Filters. Compare the results	02
5.	Construct a Bridge Rectifier and obtain regulation characteristics – Without Filters and with Filters	02
6.	Obtain the characteristics of DIAC and TRIAC	02
7.	Simulate half wave, full wave and bridge rectifier using simulation tool like PSpice/ Orcad/ Multisim.	02
8.	Develop a simulation model for Voltage Series and Voltage Shunt Feedback Amplifiers	02
9.	Develop circuits for Voltage Series and Voltage Shunt Feedback Amplifiers and obtain output plots. Compare the results with the simulation model.	02
10.	Develop a simulation model for Current Series and Current Shunt Feedback Amplifiers	04
11.	Develop circuits for Current Series and Current Shunt Feedback Amplifiers and obtain output plots. Compare the results with the simulation model.	04
	Total=	26

WEB TECHNOLOGY LAB

SUBJECT CODE: 2018308	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	25	01
	L	T	P/S	ESE	:	**25**	
		-	02	Internal	:	**07**	
				External	:	**18**	

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies'. Some of the things that should necessary be covered in lab.

Course outcomes:

Student will be able to program web applications using and will be able to do the following:

- Use LAMP Stack for web applications
- Write simple applications with Technologies like HTML, Java script, AJAX, PHP
- Connect to Database and get results
- Parse XML files Student will be able to develop/build a functional website with full features.

Content: Practical		Hrs.	Marks
Unit – 1	Home page Development static pages (using Only HTML) of an online Book store.	04	
Unit – 2	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.	06	
Unit – 3	Write a PHP program to display a digital clock which displays the current time of the server.	06	
Unit – 4	Write an HTML code to display your CV on a web page.	04	
Unit – 5	Write an XML program to display products.	05	
Unit – 6	Create a web page with all types of Cascading style sheets.	06	
Unit – 7	Write a PHP program to display a digital clock which displays the current time of the server.	05	
Unit – 8	Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.	04	

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson
2. "Internet & World Wide Web How to Program", Deitel, Deitel, Goldberg, Pearson Education
3. "Web programming- Building Internet Application", Chris Bales
4. Web Applications: Concepts and Real-World Design, Knuckles

Electronic Measurements and Instrumentation Lab

(Electronics Engineering Group)

Subject Code 2021309	Theory			No of Periods in One Session: 26			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	Internal	:	15	
	-	-	04	External	:	35	
	-	-	-		:		

PRACTICALS/ EXERCISES

Sl. No.	Practical Outcomes (Pros)	Hrs
1.	Measure unknown inductance using following bridges (a) Anderson Bridge (b) Maxwell Bridge	04
2.	Measure Low resistance by Kelvin's Double Bridge	02
3.	Calibrate an ammeter using DC slide wire potentiometer	02
4.	Calibrate a voltmeter using Crompton potentiometer	02
5.	Measure low resistance by Crompton potentiometer	02
6.	Calibrate a single-phase energy meter by phantom loading	02
7.	Study the working of Q-meter and measure Q of coils	02
8	Study working and applications of (i) C.R.O. (ii) Digital Storage C.R.O. & (ii) C.R.O. Probes	02
9	Measurement of displacement with the help of LVDT	02
10	Draw the characteristics of the following temperature transducers (a) RTD (Pt-100) (b) Thermistor	04
11	Measurement of strain/force with the help of strain gauge load cell	02
	Total=	26

Digital Electronics Lab
(Electronics Engineering Group)

Subject Code 2021310	Theory			No of Periods in One Session : 30			Credits
	No. of Periods Per Week			Full Marks	:	25	
	L	T	P/S	Internal	:	07	
	-	-	02	External	:	18	01
	-	-	-		:		

PRACTICALS/ EXERCISES

S. No.	Practical Outcomes (PrOs)	Hrs.
1.	To verify the truth tables for all logic fates – NOT OR AND NAND NOR XOR XNOR using CMOS Logic gates and TTL Logic Gates	02
2.	Implement and realize Boolean Expressions with Logic Gates	02
3.	Implement Half Adder, Full Adder, Half Subtractor, Full Subtractor using ICs	02
4.	Implement parallel and serial full-adder using ICs	02
5.	Design and development of Multiplexer and De-multiplexer using multiplexer ICs	02
6.	Verification of the function of SR,D, JK and T Flip Flops	02
7.	Design controlled shift registers	02
8.	Construct a Single digit Decade Counter (0-9) with 7 segment display	03
9.	To design a programmable Up-Down Counter with a 7-segment display.	03
10.	Study of different memory ICs	02
11	Study Digital- to – Analog and Analog to Digital Converters	02
12	Simulate in Software (such as PSpice) an Analog to Digital Converter	03
13	Simulate in Software (such as PSpice) an Analog to Digital Converter	03
	Total=	30

PYTHON (Term Work)

Subject Code 2018311	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/TW				
	—	—	02	Internal	:	07	
	—	—	—	External	:	18	

CONTENTS: Practical		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

References Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Gut tag, MIT Press.

Summer Internship-I (4 weeks) after II Semester

(Electronics Engineering Group)

Subject Code 2021312	Theory			No of Periods in One Session: 30			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	Internal	:	15	
	-	-	-	External	:	35	
	-	-	-		:		

STATE BOARD OF TECHNICAL EDUCATION BIHAR

Scheme of Teaching and Examinations for

III[rd] SEMESTER DIPLOMA IN MECHANICAL ENGINEERING

(Effective from Session 2020· 21Batch)

THEORY

Sr. No.	SUBJECT	SUBJECT C ODE	TEACHING SCHEME	EXAMINATI ON- 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 Mark s ESE	Pass Marks in the Subject	Credits
1.	Basic Mechanical Engineering	2025301	03	03	10	20	70	100	28	40	03
2.	Material Science & Engineering	2025302	04	03	10	20	70	100	28	40	03
3.	Fluid Mechanics & Hydraulic Machinery	2025303	04	03	10	20	70	100	28	40	03
4.	Manufacturing Engineering- I	2025304	04	03	10	20	70	100	28	40	03
5.	Thermal Engineering - I	2025305	04	03	10	20	70	100	28	40	03
		Total: ·	19				350	500			15

PRACTICAL

Sr. No.	SUBJECT	SUB.JECT CODE	TEACHING	EXAMINATION-SCHEME					
			Periods per	Hours of Exam.	Practical (ESE)		Total	Pass	Credits
					Internal(A)	External (B)			
6.	Manufacturing Engineering Lab	2025306	02 50% Physical 50% Virtual	03	15	35	50	20	01
7.	Fluid Mechanics & Hydraulic Machinery Lab	2025307	02 50% Physical 50% Virtual	03	07	18	25	10	01
8.	Web Technology Lab	2018308	02 50% Physical 50% Virtual	03	07	18	25	10	01
9.	Thermal Engineering Lab-I	2025309	02 50% Physical 50% Virtual	03	07	18	25	10	01
	Total: – 08						125		04

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.	Essence of Indian Knowledge and Tradition	2025310	4	15	35	50	20	02
11.	Python	2018311	2	07	18	25	10	01
12.	Summer Intern ship-I (4 weeks)	2025312	-	15	35	50	20	02
	Total: - **06**					125		**05**
Total Periods per week Each of duration One Hour		33		Total Marks = 750				24

BASIC MECHANICAL ENGINEERING

Subject Code	Theory						Credits
2025301	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course objectives:

- To understand General Principles of Mechanical Engineering.
- To understand laws of thermodynamics, thermal and thermodynamic Processes.
- To understand working principles of power developing and power absorbing devices.
- To understand basic materials and manufacturing processes.

CONTENTS: THEORY

Unit	Name of Topics	Hrs.
Unit-I	**1.1** Introduction to Thermodynamics - Role of Thermodynamics in Engineering and Science, Types of Systems, Thermodynamic Equilibrium, Properties, State, Process and Cycle, **1.2** Elementary introduction to Zeroth, First and Second laws of thermodynamics, Heat and Work Interactions for various non-flow and flow processes; **1.3** Concept of Heat Engine, Heat Pump & Refrigerator, Efficiency/ COP; Kelvin- Planck and Clausius Statements, Carnot Cycle, Carnot Efficiency, T-S and P-V Diagrams, Concept of Entropy (Definition and simple problems only).	**12**
Unit-II	**2.1** Heat transfer & Thermal Power Plant - Modes of Heat Transfer; Conduction: Composite Walls and Cylinders, Combined Conduction and Convection: **2.2** Overall Heat Transfer Co- efficient, Simple Numerical Problems: Thermal Power Plant Layout; Rankine Cycle; **2.3** Fire Tube and Water Tube boilers, Babcock & Wilcox, Cochran Boilers; (Related simple problems only).	**12**
Unit-III	**3.1** Steam Turbines - Impulse and Reaction Turbines; Condensers: Jet & Surface Condensers, Cooling Towers; **3.2** Internal Combustion Engines and Refrigeration: Otto, Diesel and Dual cycles; P-V and T-S Diagrams; IC Engines: 2 – Stroke and 4– Stroke I.C. Engines, S.I. and C.I. Engines	**14**
Unit-IV	**4.1** Materials and Manufacturing Processes - Engineering Materials, Classification and their Properties; Metal Casting, Moulding, Patterns, **4.2** Metal Working: Hot Working and Cold Working, Metal Forming: Extrusion, Forging, Rolling, Drawing, **4.3** Gas Welding, Arc Welding, Soldering, and Brazing.	**14**
Unit-V	**5.1** Machine Tools and Machining Processes - Machine Tools: Lathe Machine and types, Lathe Operations, **5.2** Milling Machine and types, Milling Operations, Shaper and Planer Machines: Differences, **5.3** Quick-Return Motion Mechanism, Drilling Machine: Operations, Grinding Machine: Operations	**8**

References:

1. Basic Mechanical Engineering – M.P. Poonia & S.C. Sharma, Khanna Publishing House, Delhi
2. Elements of Mechanical Engineering – M. L. Mathur, F. S. Mehta and R. P. Tiwari, Jain Brothers, New Delhi
3. Engineering Heat Transfer – Gupta & Prakash, Nem Chand & Brothers, New Delhi
4. Workshop Technology (Vol. 1 and 2) – B. S. Raghuvanshi, Dhanpath Rai and Sons, New Delhi.
5. Basic Mechanical Engineering – J Benjamin
6. Elements of Mechanical Engineering – Roy and Choudhary
7. Engineering Thermodynamics – Spalding and Cole
8. Basic Mechanical Engineering — Dinesh Agarwal, Naweed — FPH

Course outcomes:

At the end of the course, the student will be able to:

CO1	**Understand basics of thermodynamics and components of a thermal power plant**
CO2	**Understand basics of heat transfer, refrigeration and internal combustion engines**
CO3	**Understand mechanism of thermal power plant and boiler operation**
CO4	**Identify engineering materials, their properties, manufacturing methods encountered in engineering practice**
CO5	**Understand functions and operations of machine tools including milling, shaping, grinding and lathe machines**

MATERIAL SCIENCE & ENGINEERING

Subject Code	Theory						Credits
2025302	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course objectives:

- To understand crystal structures and atomic bonds.
- To understand the properties of different types of ferrous metals and alloys.
- To understand the properties of different types of non-ferrous metals and alloys.
- To understand various metallic failures and acquire the knowledge of testing of materials.
- To understand the concept of corrosion and its prevention.

CONTENTS: THEORY

Unit	Name of Topics	Hrs.
Unit-I	**1.1** Crystal structures and Bonds **-** Unit cell and space lattice: Crystal system: The seven basic crystal systems; Crystal structure for metallic elements: BCC, FCC and HCP; Coordination number for Simple Cubic, BCC and FCC; Atomic radius: definition, atomic radius for Simple Cubic, BCC and FCC; Atomic Packing Factor for Simple Cubic, BCC, FCC and HCP; Simple problems on finding number of atoms for a unit cell. **1.2** Bonds in solids – Classification of primary or chemical bond, secondary or molecular bond; Types of primary bonds: Ionic, Covalent and Metallic Bonds; Types of secondary bonds: Dispersion bond, Dipole bond and Hydrogen bond.	**12**
Unit-II	**2.1** Phase diagrams, Ferrous metals and its Alloys **-** Isomorphs, eutectic and eutectoid systems; Iron-Carbon binary diagram; Iron and Carbon Steels; flow sheet for production of iron and steel; **2.2** Iron ores – Pig iron: classification, composition and effects of impurities on iron; Cast Iron: classification, composition, properties and uses; Wrought Iron: properties, uses/applications of wrought Iron; comparison of cast iron, wrought iron and mild steel and high carbon steel; **2.3** standard commercial grades of steel as per BIS and AISI; Alloy Steels – purpose of alloying; effects of alloying elements – Important alloy steels: Silicon steel, High Speed Steel (HSS), heat resisting steel, spring steel, Stainless Steel (SS): types of SS, applications of SS – magnet steel –composition, properties and uses	**12**
Unit-III	**3.1** Non-ferrous metals and its Alloys **-** Properties and uses of aluminium, copper, tin, lead, zinc, magnesium and nickel; Copper alloys: Brasses, bronzes – composition, properties and uses; Aluminium alloys: Duralumin, hindalium, magnalium -composition, properties and uses; Nickel alloys: Inconel, monel, nichrome – composition, properties and uses. **3.2** Anti-friction/Bearing alloys: Various types of bearing bronzes - Standard commercial grades as per BIS/ASME.	**12**

Unit-IV	**4.1** Failure analysis & Testing of Materials **-** Introduction to failure analysis; Fracture: ductile fracture, brittle fracture; cleavage; notch sensitivity; fatigue; endurance limit; characteristics of fatigue fracture; variables affecting fatigue life; creep; creep curve; creep fracture; **4.2** Destructive testing: Tensile testing; compression testing; Hardness testing: Brinell, Rockwell; bend test; torsion test; fatigue test; creep test. **4.3** Non-destructive testing: Visual Inspection; magnetic particle inspection; liquid penetrant test; ultrasonic inspection; radiography.	**12**
Unit-V	**5.1** Corrosion & Surface Engineering **-** Nature of corrosion and its causes; Electrochemical reactions; Electrolytes; Factors affecting corrosion: Environment, Material properties and physical conditions; Types of corrosion; Corrosion control: Material selection, environment control and design; **5.2** Surface engineering processes: Coatings and surface treatments; Cleaning and mechanical finishing of surfaces; Organic coatings; Electroplating and Special metallic plating; Electro polishing and photo-etching; Conversion coatings: Oxide, phosphate and chromate coatings; Thin film coatings: PVD and CVD; **5.3** Surface analysis; Hard-facing, thermal spraying and high- energy processes; Process/material selection. Pollution norms for treating effluents as per standards.	**12**

Reference Books:

1. **A Text Book of Material Science & Metallurgy – O.P. Khanna, Dhanpath Rai and Sons, New Delhi. 2003.**
2. **Material Science & Engineering – R.K. Rajput, S.K. Kataria & Sons, New Delhi, 2004.**
3. **Material Science – R.S. Khurmi, S. Chand & Co. Ltd., New Delhi, 2005.**
4. **Material Science and Engineering Arun Jain, K.P.Singh FPH**

Course outcomes

At the end of the course, the student will be able to:

- **CO1 Explain about crystal structures and atomic bonds.**
- **CO2 Describe about classification of ferrous metals and their properties.**
- **CO3 Explain about non-ferrous metals, cutting tool materials and composites along with their properties.**
- **CO4 Describe about the various metallic failures and knowledge in testing of materials.**
- **CO5 Explain the principle of corrosion, their types and its prevention methods along with the various surface engineering processes.**

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FLUID MECHANICS & HYDRAULIC MACHINERY

Subject Code	Theory						Credits
2025303	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course objectives:

- To understand fluid flow & related machinery for power generation, water supply and irrigation.
- To Select and use appropriate flow measuring device.
- To Select and use appropriate pressure measuring device.
- To understand and analyze the performance of pumps and turbines.

CONTENTS: THEORY

Unit	Name of Topics	Hrs.
Unit-I	**1.1** Properties of fluid - Density, Specific gravity, Specific Weight, Specific Volume, Dynamic Viscosity, Kinematic Viscosity, Surface tension, Capillarity, Vapour Pressure, Compressibility. **1.2** Fluid Pressure & Pressure Measurement - Fluid pressure, Pressure head, Pressure intensity, Concept of vacuum and gauge pressures, atmospheric pressure, absolute pressure, Simple and differential manometers, Bourdon pressure gauge, **1.3** Concept of Total pressure on immersed bodies, center of pressure, Simple problems on Manometers.	**12**
Unit-II	**2.1** Fluid Flow - Types of fluid flows, Path line and Stream line, Continuity equation, Bernoulli's theorem, **2.2** Principle of operation of Venturimeter, Orifice meter and Pitot tube, Derivations for discharge, coefficient of discharge and numerical problems. **2.3** Flow Through Pipes- Laminar and turbulent flows; Darcy's equation and Chazy's equation for frictional losses, Minor losses in pipes, Hydraulic gradient and total gradient line, Numerical problems to estimate major and minor losses	**14**
Unit-III	**3.1** Impact of jets - Impact of jet on fixed vertical, moving vertical flat plates, Impact of jet on curved vanes with special reference to turbines & pumps, Simple Numerical on work done and efficiency.	**12**
Unit-IV	**4.1** Hydraulic Turbines – Layout of hydroelectric power plant, Features of Hydroelectric power plant, Classification of hydraulic turbines, Selection of turbine on the basis of head and discharge available, **4.2** Construction and working principle of Pelton wheel, Francis and Kaplan turbines, Draft tubes– types and construction, Concept of cavitation in turbines, **4.3** Calculation of Work done, Power, efficiency of turbines, Unit quantities and simple numerical.	**10**

Unit-V	**5.1** Centrifugal Pumps - Principle of working and applications, Types of casings and impellers, **5.2** Concept of multistage, Priming and its methods, Cavitation, Manometric head, Work done, Manometric efficiency, Overall efficiency. Numerical on calculations of overall efficiency and power required to drive pumps. **5.3** Reciprocating Pumps- Construction, working principle and applications of single and double acting reciprocating pumps, Concept of Slip, Negative slip, Cavitation and separation.	**12**

Reference Books:

1. **Fluid Mechanics & Hydraulic Machines, S.S. Rattan, Khanna Publishing House, New Delhi**
2. **Hydraulic, fluid mechanics & fluid machines – Ramamrutham S, Dhanpath Rai and Sons, New Delhi.**
3. **Hydraulics and fluid mechanics including Hydraulic machines – Modi P.N. and Seth S.M., Stan- dard Book House. New Delhi**
4. **One Thousand Solved Problems in Fluid Mechanics – K. Subramanya, Tata McGraw Hill. 5.Hydraulic, fluid mechanics & fluid machines – S. Ramamrutham, Dhanpat Rai and Sons, New Delhi**
6. **Fluid Mechanics and Hydraulic Machines – R. K. Bansal, Laxmi Publications, New Delhi**
7. **Fluid Mechanics and Hydraulic Machinery** **Manish Sinha** **FPH**

Course outcomes:

At the end of the course, the student will be able to:

i. **Measure various properties such as pressure, velocity, flow rate using various instruments.**
ii. **Calculate different parameters such as co-efficient of friction, power, efficiency etc. of various Systems.**
iii. **Describe the construction and working of turbines and pumps.**
iv. **Test the performance of turbines and pumps.**
v. **Plot characteristics curves of turbines and pumps.**

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MANUFACTURING ENGINEERING – I

Subject Code	Theory						Credits
2025304	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course objectives:

- To understand the importance of cutting fluids & lubricants in machining.
- To study various types of basic production processes. To select, operate and control the appropriate processes for specific applications.
- To understand the concept of gear making and list various gear materials.
- To understand the importance of press tools and understand various die operations.
- To understand Grinding and finishing processes.

CONTENTS: THEORY

Unit	Name of Topics	Hrs.
Unit-I	**1.1** Cutting Fluids & Lubricants -Introduction; Types of cutting fluids, Fluids and coolants required in turning, drilling, shaping, sawing & broaching; Selection of cutting fluids, methods of application of cutting fluid; Classification of lubricants (solid, liquid, gaseous), Properties and applications of lubricants. **1.2** Lathe Operations – Types of lathes – light duty, medium duty and heavy duty geared lathe, CNC lathe; Specifications; Basic parts and their functions; Operations and tools – Turning, parting off, Knurling, facing, Boring, drilling, threading, step turning, taper turning.	**12**
Unit-II	**2.1** Broaching Machines - Introduction to broaching; Types of broaching machines – Horizontal type (Single ram & duplex ram), Vertical type, pull up, pull down, and push down; Elements of broach tool; broach teeth details; Nomenclature; Tool materials. **2.2** Drilling – Classification; Basic parts and their functions; Radial drilling machine; Types of operations; Specifications of drilling machine; Types of drills and reamers.	**10**
Unit-III	**3.1** Welding - Classification; Gas welding techniques; Types of welding flames; Arc Welding – Principle, Equipment, Applications; Shielded metal arc welding; Submerged arc welding; TIG / MIG welding; Resistance welding - Spot welding, Seam welding, Projection welding; Welding defects. Welding defects; Brazing and soldering: Types, Principles, Applications. **3.2** Milling – Introduction; Types of milling machines: plain, Universal, vertical; constructional details, specifications; Milling operations: simple, compound and differential indexing; Milling cutters – types; Nomenclature of teeth; Teeth materials; Tool signature of milling cutter; Tool & work holding devices.	**10**

Unit-IV	**4.1** Gear Making **-** Manufacture of gears – by Casting, Moulding, Stamping, Coining Extruding, Rolling, Machining; Gear generating methods: Gear Shaping with pinion cutter & rack cutter; **4.2** Gear hobbing; Description of gear hob; Operation of gear hobbing machine; Gear finishing processes; Gear materials and specification; Heat treatment processes applied to gears. **4.3** Press working **–** Types of presses and Specifications, Press working operations – Cutting, bending, drawing, punching, blanking, notching, lancing; Die set components- punch and die shoe, guide pin, bolster plate, stripper, stock guide, feed stock, pilot; Punch and die clearances for blanking and piercing, effect of clearance.	**12**
Unit-V	**5.1** Grinding and finishing processes **-** Principles of metal removal by Grinding; Abrasives – Natural & Artificial; Bonds and binding processes: Vitrified, silicate, shellac, rubber, Bakelite. **5.2** Factors affecting the selection of grinding wheels: size and shape of wheel, kind of abrasive, grain size, grade and strength of bond, structure of grain, spacing, kinds of binding material; **5.3** Standard marking systems: Meaning of letters & numbers sequence of marking, Grades of letters; **5.4** Grinding machines classification: Cylindrical, Surface, Tool & Cutter grinding machines; Construction details; Principle of centerless grinding; Advantages & limitations of center less grinding; Finishing by grinding: Honing, Lapping, Super finishing; Electroplating: Basic principles, Plating metals, applications; **5.5** Hot dipping: Galvanizing, Tin coating, Parkerizing, Anodizing; Metal spraying: wire process, powder process and applications; **5.6** Organic coatings: Oil base Paint, Lacquer base, Enamels, Bituminous paints, rubber base coating; finishing specifications.	**16**

Reference Books:

1. **Manufacturing technology – P N Rao, Tata McGraw-Hill Publications**
2. **Elements of workshop Technology (Volume I & II) – S. K. Hajra Chaudary, Bose & Roy, Media Promoters and Publishers Limited.**
3. **Production Technology (Volume I & II) – O. P. Khanna & Lal, Dhanpat Rai Publications.**
4. **Fundamental of metal cutting and machine tools– B. L. Juneja, New age international limited.**
5. **Manufacturing Technology, Metal Cutting & Machine tools– P. N. Rao, Tata McGraw-Hill Publications**
6. **Production Technology – R.B. Gupta, Satya Prakashan, New Delhi**
7. **Production Processes — Ram manohar Pandey — FPH**
8. **Manufacturing Engineering -I — Rajendra Duggar — FPH**

Course outcomes:

At the end of the course, the student will be able to:

CO1 Know and identify basic manufacturing processes for manufacturing different compo- nents.

CO2 Operate & control different machines and equipment's.

CO3 Produce jobs as per specified dimensions and inspect the job for specified dimensions. CO4 Select the specific manufacturing process for getting the desired type of output.

CO5 Adopt safety practices while working on various machines.

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THERMAL ENGINEERING – I

Subject Code	Theory						Credits
2025305	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	—	—	TA	:	10	
	—	—	—	CT	:	20	

Course Learning Objectives:

- To give a good understanding of and thorough insight into all important aspects of thermal systems, energy control and the general issue of energy.
- To understand the principles & working of various power producing & power absorbing de- vices.
- To study, analyze and evaluate the operation and the performance of I.C. engines, compressors and refrigerators, to apply pinch technology and to critically analyze and describe the global behavior of integrated thermal systems.

CONTENTS: THEORY

Unit	Name of Topics	Hrs.
Unit-I	**1.1** Sources of Energy - Brief description of energy Sources: Classification of energy sources- Renewable, Non-Renewable; Fossil fuels, including CNG, LPG; **1.2** Solar Energy: Flat plate and concentrating collectors & its applications (Solar Water Heater, Photovoltaic Cell, Solar Distillation); **1.3** Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Bio-diesel; Hydraulic Energy, Nuclear Energy; Fuel cell.	**08**
Unit-II	**2.1** Internal Combustion Engines - Assumptions made in air standard cycle analysis; Brief description of Carnot, Otto and Diesel cycles with P-V and T-S diagrams; Internal and external combustion engines; advantages of I.C. engines over external combustion engines; **2.2** Classification of I.C. engines; neat sketch of I.C. engine indicating component parts; Function of each part and materials used for the component parts - Cylinder, crank case, crank pin, crank, crank shaft, connecting rod, wrist pin, piston, cooling pins cylinder heads, exhaust valve, inlet valve; **2.3** Working of four-stroke and two-stroke petrol and diesel engines; Comparison of two stroke and four stroke engines; Comparison of C.I. and S.I. engines; Valve timing and port timing diagrams for four stroke and two stroke engines. (Related simple problems only).	**12**
Unit-III	**3.1** I.C. Engine Systems - Fuel system of Petrol engines; Principle of operation of simple and Zenith carburetors; Fuel system of Diesel engines; Types of injectors and fuel pumps; **3.2** Cooling system-air-cooling, water-cooling system with thermosiphon method of circulation and water-cooling system with radiator and forced circulation (description with line diagram). Comparison of air cooling and water-cooling system; **3.3** Ignition systems – Battery coil ignition and magneto ignition (description and working). Comparison of two systems; **3.4** Types of lubricating systems used in I.C. engines with line diagram; Types of governing of I.C.	**12**

	engines – hit and miss method, quantitative method, qualitative method and combination methods of governing; their applications; Objective of super charging. (Related simple problems only).	
Unit-IV	**4.1** Performance of I.C. Engines - Brake power; Indicated power; Frictional power; Brake and Indicated mean effective pressures; Brake and Indicated thermal efficiencies; Mechanical efficiency; Relative efficiency; **4.2** Performance test; Morse test; Heat balance sheet; Methods of determination of B, P., I.P. and F.P.; Simple numerical problems on performance of I.C. engines.	**14**
Unit-V	**5.1** Air Compressors - Functions of air compressor; Uses of compressed air; Types of air compressors; Single stage reciprocating air compressor - its construction and working (with line diagram) using P-V diagram; Multi stage compressors – Advantages over single stage compressors; Rotary compressors: Centrifugal compressor, axial flow type compressor and vane type compressors. **5.2** Refrigeration & Air- conditioning Refrigeration; Refrigerant; COP; Air Refrigeration system: components, working & applications; Vapour Compression system: components, working & applications; Air conditioning; Classification of Air- conditioning systems; Comfort and Industrial Air-Conditioning; Window Air-Conditioner; Summer Air-Conditioning system, Winter Air-Conditioning system, Year-round Air- Conditioning system. (Related simple problems only).	**14**

Reference Books:

1. **Introduction to Renewable Energy – Vaughn Nelson, CRC Press**
2. **Thermal Engineering – P.L. Ballaney, Khanna Publishers, 2002**
3. **A Course in Thermal Engineering – S. Domkundwar & C.P. Kothandaraman, Dhanpat Rai.**
4. **Thermal Engineering – R.S. Khurmi and J.K. Gupta, 18th Edition, S. Chand & Co, NewDelhi.**
5. **Thermal Engineering – R. K. Rajput,8th Edition, Laxmi publications Pvt Ltd, New Delhi.**
6. **Thermal Engieering** **Rajeev Singh** **FPH**
7. **Thermal Engieering -I** **Sanjay Malhotra** **FPH**

Course outcomes:
At the end of the course, the student will be able to:

CO1 **Know various sources of Energy and their applications.**
CO2 **Classify I.C. engines and understand their working and constructional features.**
CO3 **Draw the energy flow diagram of an I.C. engine and evaluate its performance.**
CO4 **Describe the constructional features of air compressor and working of different air compressors.**
CO5 **Know the applications of refrigeration and Classify air-conditioning systems.**

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MANUFACTURING ENGINEERING LAB

Subject Code	Theory						Credits
2025306	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	Internal	:	15	
		—	02	External	:	35	
	—	—	—		:		

Course Objectives:

- To Practice the casting principles and operations in foundry.
- To Practice the operation of Lathe.
- To Practice the joining of metals using different Welding techniques.

Course Content:

S.No.	Topics for practice
I	Moulding & casting of (i) Connecting rod (ii) Solid bearing (iii) V-Pulley/Gear Pulley
II	Arc welding (i) Lap Joint (ii) Butt Joint (iii) T- Joint
III	Gas welding (i) Lap Joint (ii) Butt Joint
IV	Spot welding (i) Lap Joint
V	Turning Exercise (i) Facing, Step Turning & Chamfering (ii) Step Turning & Taper Turning (iii) Step Turning & Groove Cutting (iv) Step Turning & Knurling (v) Step Turning & Thread Cutting (vi) Turning and Drilling
VI	Grinding the Lathe Cutting tools to the required angles
VII	Study of Lathe, drilling machine, shaping machine and slotting machine
VIII	The dismantling some of the components of lathe and then assemble the same
IX	List the faults associated with lathe and its remedies
X	The routine and preventive maintenance procedure for lathe

Reference Books:

1. Elements of Workshop Technology (Volume I & II) – Hajra Chowdry & Bhattacharaya, Media Promoters, 11th Edition, 2007
2. Introduction of Basic Manufacturing Processes and Workshop Technology – Rajender singh, new age International (P) Ltd. New Delhi, 2006
3. Workshop Technology – Raghuwanshi, Khanna Publishers. Jain &Gupta, New Delhi, 2002
4. Production Technology – Jain & Gupta, Khanna Publishers, New Delhi, 2006.
5. Production Technology – HMT, 18th edition, Tata McGraw Hill, New Delhi
6. Manufacturing process – Myro N Begman, 5 th edition, Tata McGraw Hill, New Delhi

Course outcomes:

At the end of the course, the student will be able to:

CO1	Prepare a mould sand mix and molten metal and calculate the amount of metal to be poured in the mould
CO2	Centre the job and select the proper tool to perform the job on lathe machine. CO3 Calculate the taper angle and practice different taper turning methods on lathe.
CO4	Prepare the edges for welding and select the suitable electrode, voltage and current.
CO5	Operate the welding transformer and generator to perform various weld joint operations.

FLUID MECHANICS & HYDRAULIC MACHINERY LAB

Subject Code	Theory						Credits
2025307	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
		—	02	External	:	18	
	—	—	—		:		

Course Objectives:

- To calibrate the given flow measuring device.
- To apply the knowledge acquired in theory subject.
- To analyze the performance of turbines and pumps.

Course Content:

S. No.	Topics for practice
I	Verification of Bernoulli's theorem.
II	Determination of Coefficient of Discharge of Venturi meter.
III	Determination of Coefficient of Discharge, coefficient of contraction and coefficient of velocity of Orifice meter.
IV	Determination of coefficient of friction of flow through pipes.
V	Determination of force exerted by the jet of water on the given vane.
VI	Determination of minor losses of flow through pipes.
VII	Calibration of pressure gauge using dead weight pressure gauge tester.
VIII	Trial on centrifugal pump to determine overall efficiency.
IX	Trial on reciprocating pump to determine overall efficiency.
X	Trial on Pelton wheel to determine overall efficiency.
XI	Trial on Francis/Kaplan turbine to determine overall efficiency.

Reference Books:

N. Kumara Swamy, Fluid Mechanics and Machinery Laboratory Manual, Charotar Publishing House Pvt. Ltd., ANAND 388 001, Ed. 2008

Course outcomes:

At the end of the course, the student will be able to:

CO1 Measure various properties such as pressure, velocity, flow rate using various instruments.
CO2 Calculate different parameters such as co-efficient of friction, power, efficiency etc. of various systems.
CO3 Understand the need and importance of calibration of pressure gauges.
CO4 Describe the construction and working of turbines and pumps.
CO5 Test the performance of turbines and pumps and Plot characteristics curves.

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WEB TECHNOLOGY LAB

SUBJECT CODE: 2018308	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	25	
	L	T	P/S	ESE	:	25	**01**
		-	02	Internal	:	07	
				External	:	18	

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies'. Some of the things that should necessary be covered in lab.

Course outcomes:

Student will be able to program web applications using and will be able to do the following:

- Use LAMP Stack for web applications
- Write simple applications with Technologies like HTML, Java script, AJAX, PHP
- Connect to Database and get results
- Parse XML files Student will be able to develop/build a functional website with full features.

Content: Practical		Hrs.	Marks
Unit – 1	Home page Development static pages (using Only HTML) of an online Book store.	04	
Unit – 2	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.	06	
Unit – 3	Write a PHP program to display a digital clock which displays the current time of the server.	06	
Unit – 4	Write an HTML code to display your CV on a web page.	04	
Unit – 5	Write an XML program to display products.	05	
Unit – 6	Create a web page with all types of Cascading style sheets.	06	
Unit – 7	Write a PHP program to display a digital clock which displays the current time of the server.	05	
Unit – 8	Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.	04	

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson
2. "Internet & World Wide Web How to Program", Deitel, Deitel, Goldberg, Pearson Education
3. "Web programming- Building Internet Application", Chris Bales
4. Web Applications: Concepts and Real World Design, Knuckles

Thermal Engineering Lab – I

Subject Code	Theory						Credits
2025309	No. of Periods per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	-	—	02	External	:	18	
	—	—	—		:		

Course Objectives:

- To understand the importance of fuel properties and learn the methods of determination of various properties of fuels.
- To understand the working principles of various methods used in determination of properties of fuels.
- To observe different parts of I.C. engine and understand their working.
- To identify the physical differences between S.I. and C.I. engines and 2-S and 4-S engines.

Course Content:

S.No. Topics for practice

I Flash & Fire point tests using Abel's/Cleveland/Pensky Martin Apparatus

II Viscosity measurement using Say bolt viscometer

III Calorific value tests using Bomb Calorimeter (Solid and Liquid fuels) and Junkers Gas Calorimeter (Gaseous fuels)

IV Carbon residue test using Conradson's apparatus.

V Assembling and disassembling of I.C. Engines

VI Port timing diagram of Petrol engine

VII Port timing diagram of Diesel engine VIII Valve timing diagram of Petrol engine IX Valve timing diagram of Diesel engine

VIII Study of petrol and diesel engine components and Models Reference Books:

1. Thermal Engineering – P.L. Ballaney, Khanna Publishers, 2002
2. A Course in Thermal Engineering – S. Domkundwar & C.P. Kothandaraman, Dhanpat Rai & Publication New Delhi
3. Thermal Engineering – R.S. Khurmi and J.K. Gupta, 18th Edition, S. Chand & Co, New Delhi

Course outcomes:

At the end of the course, the student will be able to:

CO1 Understand the determination of flash and fire point of a given sample of fuel using given apparatus (Abels, Cleveland & Penesky martin)

CO2 Understand the determination of Viscosity of a given sample of oil using given apparatus.

CO3 Understand the determination of Calorific value of a given sample of fuel using given apparatus.

CO4 Understand the determination of amount of carbon residue of a given sample of petroleum product.

CO5 Draw VTD /PTD of given I.C. Engine and understand how the processes are controlled during its operation.

CO6 Understand the functions of various parts of IC engines and the working of IC engines.

TERM WORK

ESSENCE OF INDIAN KNOWLEDGE AND TRADITION

Subject Code	Theory						Credits
2025310	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	Internal	:	15	
		—	04	External	:	35	
	—	—	—		:		

Course Content:

Basic Structure of Indian Knowledge System:

- Basic Structure of Indian Knowledge System:

  (i) वेद, (ii) उन्नवेद (आयुवेद, धनुवेद, गन्धवेद, स्थान्नत्य आदद) (iii) वेदांग (शिक्षा, कल्न, ननरुत, व्याकरण, ज्योनतष छांद), (iv) उन्नाइग (धर्म सिि, रीरांसा, नुराण, तकमिास्न)

- Modern Science and Indian Knowledge System
- Yoga and Holistic Healthcare
- Case Studies.

SUGGESTED TEXT/REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1.	Cultural Heritage of In- dia-Course Material	V. Sivaramakrishna	Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2.	Modern Physics and Vedant	Swami Jitatmanand	Bhartiya Vidya Bhavan
3.	The wave of Life	Fritzof Capra	
4.	Tao of Physics	Fritzof Capra	
5.	Tarkasangraha of Annam Bhatta, Inernational	V N Jha	Chinmay Foundation, Velliarnad, Amaku,am
6.	Science of Consciousness Psychotherapy and Yoga Practices	RN Jha	Vidyanidhi Prakasham Delhi, 2016

PYTHON (Term Work)

Subject Code 2018311	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/TW				
	—	—	02	Internal	:	07	
	—	—	—	External	:	18	

CONTENTS: Practical		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

References Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.

TERM WORK

Summer Internship-I (4 weeks)

Subject Code	Theory						Credits
2025312	No. of Periods per Week			Full Marks	:	50	02
	L	T	P/S	Internal	:	15	
	-	—	-	External	:	35	
	—	—	—		:		

- How important is it really to do an internship before applying for a job?
- Do you need to get the hands-on experience that is talked about when discussing the importance of internships or is it a matter of just landing the right job?

During the Course duration year, students may feel overwhelmed with coursework, sports, or co-curricular activities that may keep them extremely busy while leaving no time to think of doing an internship or a job. Many students may also feel that they are caught in a bind since they need to make money to pay for their expenses but they can only find unpaid internships in their field.

Getting Your Feet Wet

Internships are a proven way to gain relevant knowledge, skills, and experience while establishing important connections in the field. Internships are also a way to get your feet wet and find out if a specific field is something you could see yourself doing full-time.

Internships may be completed during fall or spring semester or full time over the course of the summer. Unpaid internships may be easier to get but may also pose problems if making money is necessary, especially during the summer. There are many who cannot afford to work for no pay, so they are forced into doing menial jobs such as wait staff or bartending to work their way through college. It may preclude some from doing an internship which may be a detriment when hoping to get a full-time job.

Financial Considerations

Financial considerations when looking for an internship can make a big difference in the decision-making process. Sometimes, students will take a part-time or full-time job to supplement the time that they are spending at their internship. Whether an internship is paid or unpaid, there are many things that need to be taken into consideration to decide if an internship is worthwhile. It's important to decide if an internship will ultimately be in the best interest of the student to help meet the requirements needed when applying for a full-time job.

How to Get Funding for an Internship

Some colleges also offer funded internships for students. Check with your college to see if they offer a funded internship program that may help to meet the requirements of your college curriculum while offering experiences that employers seek when hiring new college graduates for entry-level jobs. Many foundations and organizations offer financing to college students so they may try writing to a number of them to see if they provide funding for college students seeking to do internships in their field.

Having an Internship and a Job

Students may elect to do a summer internship a couple of days per week while working a part-time job for the remainder of the time. For those who need to maximize the amount of money they make over the course of the summer, they may look into doing an internship during the academic year when they are less likely to expect to make money to help defray their college expenses.

In addition to internships, volunteer opportunities can also be an excellent way to gain experience and exposure to the workforce. Employers love to see volunteer experiences on a student's resume.

Volunteering shows commitment to causes and certain values that are intrinsic to the individuals who have participated in these types of experiences. Employers look for employees who are publicly engaged and who take an interest in community service and in doing good work.

What Employers Want

Internships and volunteer experiences make candidates more competitive in the job market. In addition to gaining exposure and experience in the field, they also provide an opportunity to see if the particular career field is the right one based on getting personal experience in the field. No matter what opportunities you engage in, it's important to maintain professionalism and take on the individual responsibility that is required.

The Benefits of Completing an internship

By doing a great job and completing more than what is required of you in your internship, you will be creating a great impression that can provide a great reference letter at the least, and may even potentially lead to a potential job offer. When you leave the organization at the end of the internship, you should ask for a recommendation letter that you can keep on file for future reference.

Internships Are a Learning Experience

Internships are a great way to learn the ropes so even if you find yourself filing or making coffee, as long as you're learning about the field take advantage of the opportunity and don't take the experience lightly. Asking questions is one key to learning in an internship and keeping yourself flexible throughout the internship can open many doors.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

IIIRD SEMESTER DIPLOMA IN MODERN OFFICE PRACTICE

(Effective from Session 2020-21 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)	2026301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C '	2000302	03	03	10	20	70	100	28	40	03
3.	Managerial Economics	2026303	03	03	10	20	70	100	28	40	03
4.	Management Information System	2026304	03	03	10	20	70	100	28	40	03
5.	E-Typing-I	2026305	03	03	10	20	70	100	28	40	03
		Total: - 16					**350**	**500**			**15**

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGS CHEME	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	2000306	06 50% Physical 50% Virtual	03	15	35	50	20	03
7.	Language and Communication Skill-II (English+ Hindi) Lab	2026307	04 50% Physical 50% Virtual	03	23	52	75	30	02
8.	E-Typing-I Lab	2026308	02 50% Physical 50% Virtual	03	15	35	50	20	01
Total:- 12							**175**		**06**

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) & GD Discussion (TW)	2026309	03	15	35	50	20	02
10.	**Python / Others** (TW)	2000310	02	07	18	25	10	01
Total: - 05						**75**		**03**
Total Periods per week Each of duration one Hours = 33						**Total Marks = 750**		**24**

LANGUAGE & COMMUNICATION SKILL – II (ENGLISH+ HINDI)

Subject Code 2026301	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

CONTENTS: (THEORY)		Hrs	Marks
UNIT – 1	भाषा के रूप I मौखिक भाषा एवं लिखित भाषा का प्रयोग। II स्वरूप एवं महत्व III सारांश	[02]	
UNIT – 2	वचन की निर्भीकता I वक्ता की निर्भीकता II भय को उत्साह में परिवर्तित करने की तकनीक III अभ्यास	[03]	
UNIT – 3	आवाज का महत्व एवं वाणी की विशिष्टता I दूरभाष वार्त्तालाप एवं शिष्टाचार II प्रभावशाली संप्रेषण में वाणी की भूमिका III विशिष्टतायुक्त वाणी	[03]	
UNIT – 4	शारीरिक भाषा I शारीरिक भाषा का परिचय एवं महत्व II भाव भंगिमा ,द्वारा संप्रेषण III नेत्र संचार	[03]	
UNIT – 5	प्रस्तुतीकरण I प्रस्तुतीकरण की योजना एवं रूप रेखा II प्रस्तुतीकरण की तैयारी III पूर्वाभ्यास	[03]	
UNIT – 6	हास्य एवं दृश्य प्रस्तुतीकरण I प्रभावकारी दृश्य की रचना एवं समावेश II पर्चा, पोस्टर आदि की रचना	[05]	

	III प्रस्तुतीकरण में हास्य का महत्व IV प्रस्तुतीकरण में हास्य का प्रयोग		
UNIT – 7	<u>मौखिक संप्रेषण एवं शिष्टाचार</u> I संप्रेषण में शिष्टाचार का महत्व II व्यक्तित्व परिचय एवं संतुष्टि III परिचय के तत्व एवं कार्य IV वक्ता का शिष्टाचार V परिचय कर्त्ता का शिष्टाचार	[05]	
UNIT – 8	<u>प्रस्तुति एवं प्रश्नोत्तर</u> I श्रोताओं से प्रश्न लेना II प्रश्नों के उत्तर देना III प्रश्नोत्तर काल	[03]	
UNIT – 9	<u>सक्रिय श्रवण</u> I सक्रिय श्रवण परिचय एवं महत्व II सक्रिय श्रवण की तकनीक III प्रभावकारी श्रवण एवं मोहित श्रोता	[03]	
UNIT – 10	<u>फीडबैक</u> I फीडबैक परिचय II फीडबैक प्राप्त करना एवं फीडबैक देना III फीडबैक का मूल्यांकन IV प्रभावकारी फीडबैक का महत्व V फीडबैक द्वारा प्रस्तुतीकरण कौशल में वृद्धि	[05]	
UNIT – 11	<u>सृजनात्मक लेखन</u> I परिचय एवं प्रकार II महत्व III विविध क्षेत्र	[05]	
UNIT – 12	<u>निबंध लेखन</u> I परिचय एवं स्वरूप II निबंध के प्रकार	[05]	

	III निबंध लेखन IV वैचारिक निबंध		
UNIT – 13	रिपोर्ताज लेखन I रिपोर्ताज लेखन II निबंध एवं रिपोर्ताज के अंतर III अभ्यास	[03]	
UNIT – 14	फीचर लेखन I फीचर लेखन का स्वरूप II शैली एवं अभ्यास	[02]	

पत्र– व्यावहारिक (Lab)

CONTENTS : (Practical)		Hrs	Marks
UNIT – 1	साक्षात्कार	[05]	
UNIT – 2	व्यक्तित्व विकास	[05]	
UNIT – 3	दूरभाष वार्तालाप	[05]	
UNIT – 4	समूहिक परिचर्चा, वाद विवाद	[05]	
UNIT – 5	शारीरिक भाषा एवं नेत्र संचार	[02]	
UNIT – 6	पूर्वाभ्यास	[03]	
UNIT – 7	भाषिक संप्रेषणः वाचन एवं श्रवण		
UNIT – 8	समूहिक परिचर्चा		
UNIT – 9	प्रस्तुतीकरण		
UNIT – 10	व्यवहार कौशल		

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 2000302	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	

Course Learning Objective:

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 array, stacks and linked list solving problems.
- Handling File in "C".

Contents: Theory		Hrs	Marks
Unit -1	**Introduction to computer software:** ➢ Classification of computer software. • System software. • Application software. ➢ Programming languages. • Machine languages. • Assembly languages. • High level programming languages. ➢ Algorithms and flowchart.	[03]	
Unit -2	**Fundamental of C languages.** ➢ Introduction. • Background. • Characteristics of C. • Uses of C. ➢ Structure of a C program. ➢ Writing the first C program. ➢ Files used in a C program. • Source code files. • Header files. • Object files. • Binary executable files. ➢ Compiling and Executing C programs. ➢ Using comments. ➢ Characters used in C. ➢ Identifier. ➢ Keyword or Reserved words. ➢ Tokens. ➢ Constants. • Numeric constant.	[08]	

	• String Character constant. ➢ Variables. ➢ Variable Declaration. ➢ Basic Data Types. ➢ Additional Data types. ➢ Operators and Expressions. ➢ Operator Precedence and Associativity. ➢ Type conversion and Type casting. ➢ Input/ Output statements in C.		
Unit -3	**Decision Control and Looping Statements:** ➢ Introduction to Decision control statements. ➢ Conditional Branching statements. • If statement. • If-else statement. • If-else-if statement. • Switch case. ➢ Iterative statements. • While loop. • Do-while loop. • For loop. ➢ Nested loops. ➢ Break and continue statements. • Break statement. • Continue statement. ➢ Goto statement.		
Unit -4	**Functions in 'C'.** ➢ Uses of functions. ➢ User defined functions. ➢ Function Declaration. ➢ Calling a function. ➢ Actual and formal Arguments. ➢ Rules to call a function. ➢ Function propotype. ➢ Recursion. • Use of Recursive function. ➢ Local or Internal variables. ➢ Global or External variables. ➢ Void function. ➢ Storage classes in C. • Auto or Automatic Storage class. • Static Storage class. • Extern Storage class. • Register Storage class.	[07]	

Unit -5	**Arrays.** ➢ Introduction. ➢ Declaration of Arrays. ➢ Accessing the Elements of an Array. • Calculating the address of Array elements. • Calculating the length of an Array. ➢ Storing values in Arrays. • Initializing Arrays during Declaration. • Inputting values from the keyboard. • Assigning values to Individual Elements. ➢ Operations on Arrays. • Traversing an Array. • Inserting an Element in an Array. • Deleting an Element from an Array. • Merging Two Arrays. • Searching for a value in an Array. ➢ Passing Arrays to functions. ➢ Two dimensional Arrays. • Declaring Two-dimensional Arrays. • Initializing Two-dimensional Arrays. • Accessing the Elements of two dimensional Arrays. ➢ Operations on Two-dimensional Arrays.	[07]	
Unit -6	**Pointers.** ➢ Understanding the Computer's Memory. ➢ Introduction to pointers. ➢ Declaring pointer variables. ➢ Pointer Expressions and pointer Arithmetic. ➢ Null pointers. ➢ Passing Arguments to function using pointer. ➢ Pointers and Arrays. ➢ Passing an Array to a Function. ➢ Dynamic Memory Allocation. • Malloc ( ) function. • Calloc ( ) function. • Realloc ( ) function. • Free ( ) function.	[07]	
Unit -7	**Structures and Unions.** ➢ Structures. ➢ Structure variables and Arrays. • Initialization of structure variable and Array. • Dot (•) Operator. • Assigning value of a structure to Another structure.	[04]	

	➢ Structure within structures. ➢ Site of ( ) of a structure. ➢ Unions. ➢ Site of ( ) unions. ➢ Difference between a structure and an union. ➢ Enum Data Type. ➢ Typedef Declaration.		

BookRecommended:

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.
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.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa
10.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
11.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth
12.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
13.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
14.	Pointers in C, BPB publication, New Delhi.	-	Yashwant Kanetkar

MANAGERIAL ECONOMICS

Subject Code 2026303	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 wellbeing of his concern

Contents: Theory		Hrs	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 Behavior (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	Theory 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	Theory			No of Periods in One Session : 50			Credits
	No. of Periods Per Week			Full Marks		100	
2026304	L	T	P/S	ESE		70	03
	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	Marks
UNIT – I	Understanding MIS :- - Introduction to Management Information System - Impact of MIS - Role and Importance - Managers Function - Types of computers used by Organization	[04]	
UNIT – 2	Conceptual Foundation: - - Introduction - The Decision-making Process - The Structure of Management Information System	[03]	
UNIT – 3	Kinds of Information System: - - Introduction - Types of management System - Concepts of Management Organization	[03]	
UNIT – 4	Planning and Control: - - Introduction - Differences between planning and control information	[03]	

UNIT – 5	MIS Planning and Development: - - Introduction - Planning - Development	[03]	
UNIT – 6	MIS Organization Structure :- - Introduction - MIS at Management levels - Strategic level planning - Operational level planning	[03]	
UNIT – 7	Concept and Process of Control: - - Introduction - Managerial control - Accounting and control - Major control System (traditional and modern) - Responsibility accounting	[04]	
UNIT – 8	Enterprise resources planning: - - Introduction - Basics of ERP - Benefits and challenges of Enterprise system	[03]	
UNIT – 9	Trends in MIS :- - Introduction - Decision support system (DSS) - Artificial intelligence (AI)	[03]	
UNIT – 10	Support models and knowledge management: - - Introduction - Market research methods - Ratio analysis for financial assessment - Management science models - Project planning and control models - Cost accounting system	[04]	

UNIT – 11	Organization and computer system :- - Introduction - Basics of computer system - Basics network terminology - Definition and application - The Intranet and Extranet	[04]	
UNIT – 12	Database management system :- - Introduction - Types of database users - DBMS - Designing of DBMS - The Intranet and Extranet	[03]	
UNIT – 13	Strategic management information system :- - Introduction - Background - Performance - Product differentiation and value chain - How it influences organization goals	[03]	
UNIT – 14	Security and ethical issues :- - Introduction - Control issues in Management Information System - Security hazards - Ethical issues	[03]	
	Total -	**[50]**	

Recommended Books :-

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 2026305	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 (सैद्वान्तिक)

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, कम्प्यूटर एवं लैप–टॉप का विकास।

2. कुजीपटल संचालक
टाइप करने की तैयारी – बैठने का ढंग।

टंकण विधियां – दृश्य एवं स्पर्श विधि।

आधार 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।

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 2000306	Practical			No. of Period in one session : 50			Credits
	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	00	
	—	—	06	Internal	:	15	
				External	:	35	

Course Learning Objectives:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

Course outcomes:

Student should be able to write code snippets, and then compile, debug and execute them.

Content : Practical		Hrs	Marks
Unit – 1	Familiarization with programming environment (Editor, Compiler, etc.)		
Unit – 2	Programs using I/O statements and various operators		
Unit – 3	Programs using expression evaluation and precedence		
Unit – 4	Programs using decision making statements and branching statements		
Unit – 5	Programs using loop statements		
Unit – 6	Programs to demonstrate applications of n dimensional arrays		
Unit – 7	Programs to demonstrate use of string manipulation functions		
Unit – 8	Programs to demonstrate parameter passing mechanism		
Unit – 9	Programs to demonstrate recursion		
Unit – 10	Programs to demonstrate use of pointers		
Unit – 11	Programs to demonstrate command line arguments		
Unit – 12	Programs to demonstrate dynamic memory allocation		
Unit – 13	Programs to demonstrate file operations		

The language of choice will be C. This is a skill course. More you practice, better it will be.

Reference Books:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

LANGUAGE AND COMMUNICATION SKILL LAB - II

(ENGLISH+ HINDI)

Subject Code 2026307	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	75	02
	L	T	P/S	ESE	:	75	
	—	—	04	Internal	:	23	
				External	:	52	

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 professional's 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 overall 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	Marks
Unit -1	Personal Interview		
Unit -2	Other forms of Collection or Communication		
Unit -3	Personality Development		
Unit -4	Debate Elocution and Extempore speech		
Unit -5	Practice through mock Interviews		
Unit -6	Creating Writing.		
	Total		

HINDI

वृहत् आधार एवं उद्देश्य :–

प्रस्तुत पाठ्यक्रम सैद्वान्तिक पाठ्यक्रम का व्यावहारिक पक्ष है जिसमें, अभ्यास को प्रमुखता प्रदान की गयी है। सैद्वान्तिक पाठ्यक्रम द्वारा प्राप्त की गयी जानकारी का मूल्यांकन इसका मुख्य उद्देश्य है जिससे छात्रों की अभ्यास क्षमता का परिचय मिल सकता है। इस पाठ्यक्रम से छात्रों को अपनी काल्पनिक और सृजनात्मक क्षमता का विकास करने में मदद मिलेगी। मौखिक संप्रेषण एवं सृजनात्मक लेखन के अभ्यास से छात्रों के व्यक्तित्व का विकास संभव हो सकेगा।

उद्देश्य

पाठ्यक्रम के अध्ययन के पश्चात छात्रा–

- मौखिक संप्रेषण के महत्व को समझा सकेंगे।
- मौखिक संप्रेषण के प्रभाव में वृद्धि कर सकेंगे।
- सृजनात्मक लेखन के क्षेत्रा एवं महत्व से परिचित होंगे।
- व्यक्तित्व के विभिन्न् 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

<u>उपयोगी पुस्तकें</u>

1. हिन्दी वांड्मय बीसवी शदी, पुस्तक मंदिर आगरा – डॉ० नागेन्द्र (संपादक)
2. जनसंचार विविध आयाम, राधाकृष्ण प्रकाशन, दिल्ली – बृजमोहन गुप्त
3. संचार और विकास, प्रकाशन विकास, सूचना एवं प्रसारण मंत्रालय, भारत सरकार, नई दिल्ली – श्यामाचरण दूबे
4. फीचर लेखन, प्रकाशन विकास सूचना एवं प्रसारण मंत्रालय, 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 pizaaz, S. Chand & Co. - Mary Ellen Droummonnd

E-TYPING LAB - I

Subject Code 2026308	Practical			No of Period in one session : 60			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	00	
	—	—	02	Internal	:	15	
				External	:	35	

Computer typing Practice of Passages from books magazines, Journal and newspaper for enhancing its speed and accuracy.

RATIONALE

E-TPEWRITING-I (ENGLISH/HINDI)

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 – थ्योरी (सैद्वान्तिक)

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, कम्प्यूटर एवं लैप–टॉप का विकास।

2. कुजीपटल संचालक

टाइप करने की तैयारी – बैठने का ढंग।

टंकण विधियां – दृश्य एवं स्पर्श विधि।

आधार 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 छोडना – समतल, बाएं, दाएं एवं ध्र्वमुखी हाशिये छोड़ना,

शीर्षक का केन्द्रण, उप–शीर्षक का केन्द्रण, पंक्ति अंतरण,

व्याकरणिक चिह्नों का प्रयोग एवं नियम, पैराग्रापक/ अनुच्छेद टाइप करना, पत्रा एवं नोट टाइप करना।

शब्दों का विभाजन, गति गणना,

सारणी टाइप करने की विधिया।

पार्ट–। टंकण विज्ञान (हिन्दी)–

1. बैठने की सही स्थिति सिखाना और टंकण के महत्व, गति एवं शुद्धता के बारे में समझाना। कुंजीपटल का संचालन स्पर्श विधि या टच मैथड से सिखाना। आधार पंक्ति एवं परी संख्या का सही अभ्यास कराना। निम्न पंक्ति एवं संख्या पंक्ति 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, पैराग्रापक 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/कम्प्यूटर पर टाइप करना होगा। 20
2. व्यक्तिगत या आवेदन–पत्रों को सही प्रारूप में 20 मिनट में कम्प्युटर पर टाइप करना होगा और उसे फ्लापी, सीडी या पैन ड्राइव पर सेव करके उसका प्रिंट लेना होगा। 20
3. प्हले से उपलब्ध फाइलों को ढूंढकर उनमें परिवर्त्तन या संशोधन करना होगा। 20
4. वर्षिक व्यावहारिक कार्य की फाइल रखनी होगी जिसे देखकर परीक्षक प्रदान करेगा। 10

LANGUAGE & COMMUNICATION SKILL – II (ENGLISH + HINDI) & GROUP DISCUSSION -TW

Subject Code 2026309	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
1	Writing Effective bio-data/C.V.	(03)
2	Writing good resume, post group discussion/Interview.	(02)
3	Exercise on describe ownself.	(02)
4	Communication Profile.	(02)
5	Exercise on overcoming fears and building personal power.	(05)
6	Assessment of Voice.	(05)
7	Appearance Check list presentation.	(05)
8	Exercise on organising group discussion.	(10)
9	Practice on Written communication	(10)
	(a) Letter Writing	

(b) Precis Writing

(c) Essay Writing

(d) Reportage Writing

(e) Feature Writing

Total : **(50)**

Hindi

वृहत् आधार एवं उद्देश्य :

प्रस्तुत पाठ्यक्रम 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 सं०	विषय	व्याख्यान
1.	व्यक्ति–परिचय	[02]
2.	शिष्टाचार	[03]
3.	शारीरिक भाषा	[05]
4.	समूहिक परिचर्चा, वाद–विवाद	[05]
5.	निबंध लेखन	[05]
6.	रिपोर्ताज	[03]
7.	फीचर	[02]
8.	पत्रा–पत्रिकाओं एवं विभिन्न पुस्तकों का अध्ययन	[25]

परीक्षा का आयोजन

सत्रिक 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 फीचर 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	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 आयोजित 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 समूचित प्रयोग एवं सही उच्चारण भी

अत्यंत महत्वपूर्ण है। वर्त्तमान समय में नियुक्तियों के लिए सामूहिक परिचर्चा अभ्यर्थी के व्रूक्तित्व के मूल्यांकन में विशिष्ट महत्व रखता है। छात्रों को इस विषय में जागरूक एवं प्रशिक्षित करने हेतु पाठ्यक्रम में सम्मिलित किया गया है :–

Hindi

CONTENTS : PRACTICAL		Hrs	Marks
Unit -1	परिचर्चा का लक्ष्य		
Unit -2	समूहिक दायित्व		
Unit -3	सकारात्मक दृष्टिकोण के साथ सहभागिता		
Unit -4	परिचर्चा के लिए आवश्यक नेतृ त्व 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, स्वस्थ्य प्रतियोगिता		
Unit -9	स्मूचित सहभागिता, एकजुटता, संबद्धता		
Unit -10	आम सहमति, सर्वसम्मति		

PYTHON / Others -TW

Subject Code 2000310	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	ESE	:	00	
	—	—	02	Internal	:	07	
				External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program tocheck if a string is palindrome or not.		
UNIT – 08	Write a Python program toExtract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

IIIRD SEMESTER DIPLOMA IN PRINTING TECHNOLOGY

(Effective from Session 2020-21 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	2000301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	2000302	03	03	10	20	70	100	28	40	03
3.	Basics of Printing Technology	2027303	03	03	10	20	70	100	28	40	03
4.	Printer's Science	2027304	03	03	10	20	70	100	28	40	03
5.	Press Work	2027305	03	03	10	20	70	100	28	40	03
		Total: -	**16**				**350**	**500**			15

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGSCHEME	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.	2000306	06 50% Physical 50% Virtual	03	15	35	50	20	03
7.	Basics of Printing Technology-Lab.	2027307	04 50% Physical 50% Virtual	03	15	35	50	20	02
8.	Printer's Science Lab.-I	2027308	02 50% Physical 50% Virtual	03	15	35	50	20	01
Total: - 12							**150**		**06**

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)	2027309	03	23	52	75	30	02
10.	**Python / Others** (TW)	2000310	02	07	18	25	10	01
Total: - 05						**100**		**03**
Total Periods per week Each of duration One Hours = **33**						**Total Marks = 750**		**24**

APPLIED MATHEMATICS

Subject Code 2000301	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	Marks
Unit -1	Integration: 1.1 Definition of integration as anti-derivative. Integration o f 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. Regula-falsi method. Newton – Raphson method. 5.2 Solution of simultaneous equations containing 2 and 3 unknowns Gauss elimination method. Iterative methods- Gauss seidel 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 2000302	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	

Course Learning Objective:

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 array, stacks and linked list solving problems.
- Handling File in "C".

Contents: Theory		Hrs	Marks
Unit -1	**Introduction to computer software:** Classification of computer software. System software. Application software. Programming languages. Machine languages. Assembly languages. High level programming languages. Algorithms and flowchart.	[03]	
Unit -2	**Fundamental of C languages.** Introduction. Background. Characteristics of C. Uses of C. Structure of a C program. Writing the first C program. Files used in a C program. Source code files. Header files. Object files. Binary executable files. Compiling and Executing C programs. Using comments. Characters used in C. Identifier. Keyword or Reserved words. Tokens. Constants.	[08]	

	Numeric constant. String Character constant. Variables. Variable Declaration. Basic Data Types. Additional Data types. Operators and Expressions. Operator Precedence and Associativity. Type conversion and Type casting. Input/ Output statements in C.		
Unit -3	**Decision Control and Looping Statements:** Introduction to Decision control statements. Conditional Branching statements. If statement. If-else statement. If-else-if statement. Switch case. Iterative statements. While loop. Do-while loop. For loop. Nested loops. Break and continue statements. Break statement. Continue statement. Goto statement.		
Unit -4	**Functions in 'C'.** Uses of functions. User defined functions. Function Declaration. Calling a function. Actual and formal Arguments. Rules to call a function. Function propotype. Recursion. Use of Recursive function. Local or Internal variables. Global or External variables. Void function. Storage classes in C. Auto or Automatic Storage class. Static Storage class. Extern Storage class. Register Storage class.	[07]	

Unit -5	**Arrays.** Introduction. Declaration of Arrays. Accessing the Elements of an Array. Calculating the address of Array elements. Calculating the length of an Array. Storing values in Arrays. Initializing Arrays during Declaration. Inputting values from the keyboard. Assigning values to Individual Elements. Operations on Arrays. Traversing an Array. Inserting an Element in an Array. Deleting an Element from an Array. Merging Two Arrays. Searching for a value in an Array. Passing Arrays to functions. Two dimensional Arrays. Declaring Two-dimensional Arrays. Initializing Two-dimensional Arrays. Accessing the Elements of two dimensional Arrays. Operations on Two-dimensional Arrays.	[07]	
Unit -6	**Pointers.** Understanding the Computer's Memory. Introduction to pointers. Declaring pointer variables. Pointer Expressions and pointer Arithmetic. Null pointers. Passing Arguments to function using pointer. Pointers and Arrays. Passing an Array to a Function. Dynamic Memory Allocation. Malloc ( ) function. Calloc ( ) function. Realloc ( ) function. Free ( ) function.	[07]	
Unit -7	**Structures and Unions.** Structures. Structure variables and Arrays. Initialization of structure variable and Array. Dot (•) Operator. Assigning value of a structure to Another structure. Structure within structures. Site of ( ) of a structure. Unions.	[04]	

	Site of ( ) unions. Difference between a structure and an union. Enum Data Type. Typedef Declaration.		

Text / Reference Books -

Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried

How to solve by Computer, Seventh Edition, 2001, Prentice hall R.G. Dromey of India.

Programming with ANSI-C, First Edition, 1996, Tata McGraw E. Balaguruswami hill.

Programming with ANSI & Turbo C. First Edition, Pearson A. Kamthane Education.

Programming with C. First Edition, 1997, Tara McGraw hill. Venugopla and Prasad

The C Programming Language, Second Edition, 2001, Prentice -B. W. Kernighan & D.M. Ritchie Hall of India.

Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, R. Subburaj New Delhi.

Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami

Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj,- Kris A. Jamsa New Delhi.

The Art of C Programming, Narosa Publishing House, New-Jones, Robin & Stewart Delhi.

Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth

C made easy, McGraw Hill Book Company, 1987. - H. Schildt

Software Engineering, McGraw Hill, 1992. - R.S. Pressman

Pointers in C, BPB publication, New Delhi. - Yashwant Kanetka

BASICS OF PRINTING TECHNOLOGY

Subject Code 2027303	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 Subtracts	(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	Marks
Unit -1	**Introduction to Printing Technology** 1.1 : Definition of Printing 1.2 : Scope of Printing Technology in modern day world.	(08)	
Unit -2	Introduction to Printing Inks 2.1 : Its role in Printing 2.2 : Types of Printing Inks 2.3 : Drying Processes of Printing inks.	(07)	
Unit -3	**Introduction to Printing Substracts** 3.1 : Printing Paper 3.2 : Plastics 3.3 : Aluminium foil	(07)	
Unit -4	**Introduction to Printing Plates** 4.1 : Suitability of Nature of plate as per Printing Process. 4.2 : Different Printing plates used today	(07)	
Unit -5	**Introduction to Printing Design** 5.1 : Role of Design on Printing Products 5.2 : Originals used in Printing	(07)	
Unit -6	**Education in Printing Technology** 6.1 : Certificate Level courses in Printing Technology imparted in I.T.I's 6.2 : Diploma level courses available in polytechnic's 6.3 : Degree level courses in Colleges & Universities	(07)	
Unit -7	**Careers in Printing Technology** 7.1 : Careers in operating of Printing Machines & equipment's. 7.2 : Supervisory level career. In Printing houses, Publishing houses, advertising agencies & a lot more 7.3 : Management & top-level management careers in Printing & allied Trades.	(07)	
	Total	**50**	

PRINTER'S SCIENCE

Subject Code 2027304	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	Marks
Unit -1	**MATERIAL USED FOR IMAGE CARRIERS** 1.1 Relief process, Type metal alloys, original plates; Zinc & Copper for Blocks, Photopolymer plates, Duplicate plates; Stereo and Electro. 1.2 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:** 2.1 Basic Ingredients of emulsion and their functions. 2.2 Emulsion process, control of sensitometric qualities and sensitometric properties, emulsion structure. 2.3 Developer`s constituents and their functions. 2.4 Chemicals for after –treatment. 2.5 Introduction to non-silver material.	10	
Unit -3	**POLYMERS:** 3.1 Monomers and Polymers. 3.2 Homopolymers and Copolymers. 3.3 Types of polymerization reactions: Addition polymerization and condensation polymerization. 3.4 Types of polymers: Plastics, Rubber and Fibres. 3.5 Composition and characteristic properties of the polymers printing Ink resin and vehicles, adhesives, film base, cellulose and gelatin.	10	
Unit -4	**COLLOIDS** 4.1 Characteristics. 4.2 Methods of preparation and properties. Application in printing industry.	10	
Unit -5	**SUBSTRATES:** 5.1 Fibrous and non-fibrous raw materials used in paper and board manufacture. 5.2 Surface treatment related to ultimate use. 5.3 Varieties of papers and boards: Characteristics, Classifications, identification selection of choice for different classes of print jobs and printing processes. 5.4 Other substrates: Metal foil, plastic, cellophane, etc.	10	

Unit -6	**pH** 6.1 PH Scale, range of acidity and alkalinity 6.2 PH of fountain Solutions, optimum range required, problems encountered when PH is higher or lower than the optimum range. 6.3 Optimum PH of printing inks, problem encountered when pH is higher or lower than the optimum range. 6.4 PH of paper, problems encountered when pH is higher or lower than the optimum range. 6.5 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 2027305	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 & 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	Marks
Unit -1	**RELIEF PRINTING:** 1.1 Letter press planten machine, kinds-purpose sizes of machine, Different kinds of inking systems- Makeready systems. 1.2 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:** 2.1 Offset machine (sheet-fed), kinds of presses-sizes-speeds suitability, single, two and multi-colour and perfecting machine. 2.2 Different Kinds of feeding system and its control (ramp controls) 2.3 Plate cylinder, Blanket cylinder, impression cylinder. Packing of these cylinder-their purposes. 2.4 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** 5.1 Flexography-sheet fed machine, web fed, kinds-sizes and suitability. 5.2 Features, classification of various presses. 5.3 Various unwinding and rewinding units, printing units.	[10]	
	Total	**50**	

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code 2000306	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	

Course Learning Objectives:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

Course outcomes:

Student should be able to write code snippets, and then compile, debug and execute them.

Content: Practical		Hrs	Marks
Unit – 1	Familiarization with programming environment (Editor, Compiler, etc.)		
Unit – 2	Programs using, I/O statements and various operators		
Unit – 3	Programs using expression evaluation and precedence		
Unit – 4	Programs using decision making statements and branching statements		
Unit – 5	Programs using loop statements		
Unit – 6	Programs to demonstrate applications of n dimensional arrays		
Unit – 7	Programs to demonstrate use of string manipulation functions		
Unit – 8	Programs to demonstrate parameter passing mechanism		
Unit – 9	Programs to demonstrate recursion		
Unit – 10	Programs to demonstrate use of pointers		
Unit – 11	Programs to demonstrate command line arguments		
Unit – 12	Programs to demonstrate dynamic memory allocation		
Unit – 13	Programs to demonstrate file operations		

The language of choice will be C. This is a skill course. More you practice, better it will be.

Reference Books:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

BASICS OF PRINTING TECHNOLOGY LAB

Subject Code	Practical			No. of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	50	
2027307	L	T	P/S	ESE	:	50	02
	—	—	04	Internal	:	15	
				External	:	35	

Contents: Practical		Hrs	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 2027308	Practical			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

	Contents: Practical	Hrs	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	:	75	
2027309	L	T	P/S	Internal	:	23	02
	—	—	03	External	:	52	

Sl.No. Topics

1 Letter Press.
2 Offset

	Contents: Term Work	Hrs	Marks
Unit -1	**LETTER PRESS:** 1.1 Automatic platens and cylinder machine makeready operations for text, line and halftone, setting of feeding, inking and delivery units, levelling the impression. 1.2 Simple imposition schemes. 01.03 .Printing problem and their remedies for sheet-fed presses. 01.04 Mounting and locking of Blocks.		
Unit -2	**OFFSET:** 2.1 Adjustment of automatic feaders. 2.2 Mounting of plate on cylinder, fitting of offset blanket, preparing it for printing. 2.3 Preparation of fountain solution, dampening rollers setting. 2.4 Adjustment of inking and dampening rollers, ink fountain zero setting. 2.5 Colour mixing and matching. 2.6 Make-ready and printing of line and halftone, one-and-two colour work. 2.7 Ink roller wash up, cleaning & storing plates.		

PYTHON / Others –TW

Subject Code 2000310	Term Work			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	25	
	L	T	P/S	Internal	:	07	01
	—	—	02	External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

STATE BOARD OF TECHNICAL EDUCATION, BIHAR
Scheme of Teaching and Examinations for
IIIRD SEMESTER DIPLOMA IN TEXTILE ENGINEERING

(Effective from Session 2020-21 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	2000301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	2000302	03	03	10	20	70	100	28	40	03
3.	Textile Fibres	2028303	02	03	10	20	70	100	28	40	03
4.	Yarn Manufacture-I	2028304	03	03	10	20	70	100	28	40	03
5.	Fabric Manufacture-I	2028305	03	03	10	20	70	100	28	40	03
		Total:	**15**				**350**	**500**			15

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGSCHEME	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.	2000306	06 50% Physical 50% Virtual	03	15	35	50	20	03
7.	Yarn Manufacture Lab. – I	2028307	04 50% Physical 50% Virtual	03	15	35	50	20	02
8.	Fabric Manufacture Lab. – I	2028308	02 50% Physical 50% Virtual	03	15	35	50	20	01
Total: - 12							**150**		06

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.	Yarn Manufacture –I (TW)	2028309	02	15	35	50	20	01
10.	**Python / Others** (TW)	2000310	02	07	18	25	10	01
11.	Fabric Manufacture – I (TW)	2028311	02	07	18	25	10	01
Total: - 06						**100**		03
Total Periods per week Each of duration one Hours = **33**						Total Marks = **750**		**24**

APPLIED MATHEMATICS

Subject Code 2000301	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	Marks
Unit -1	Integration: 1.1 Definition of integration as anti-derivative. Integration o f 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 seidel 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 2000302	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	

Course Learning Objective:

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 array, stacks and linked list solving problems.
- Handling File in "C".

Contents: Theory		Hrs	Marks
Unit -1	**Introduction to computer software:** ➢Classification of computer software. •System software. •Application software. ➢Programming languages. •Machine languages. •Assembly languages. •High level programming languages. ➢Algorithms and flowchart.	[03]	
Unit -2	**Fundamental of C languages.** ➢Introduction. •Background. •Characteristics of C. •Uses of C. ➢Structure of a C program. ➢Writing the first C program. ➢Files used in a C program. •Source code files. •Header files. •Object files. •Binary executable files. ➢Compiling and Executing C programs.	[08]	

	➢Using comments. ➢Characters used in C. ➢Identifier. ➢Keyword or Reserved words. ➢Tokens. ➢Constants. •Numeric constant. •String Character constant. ➢Variables. ➢Variable Declaration. ➢Basic Data Types. ➢Additional Data types. ➢Operators and Expressions. ➢Operator Precedence and Associativity. ➢Type conversion and Type casting. ➢Input/ Output statements in C.		
Unit -3	**Decision Control and Looping Statements:** ➢Introduction to Decision control statements. ➢Conditional Branching statements. •If statement. •If-else statement. •If-else-if statement. •Switch case. ➢Iterative statements. •While loop. •Do-while loop. •For loop. ➢Nested loops. ➢Break and continue statements. •Break statement. •Continue statement. ➢Goto statement.		

Unit -4	**Functions in 'C'.** ➢Uses of functions. ➢User defined functions. ➢Function Declaration. ➢Calling a function. ➢Actual and formal Arguments. ➢Rules to call a function. ➢Function propotype. ➢Recursion. •Use of Recursive function. ➢Local or Internal variables. ➢Global or External variables. ➢Void function. ➢Storage classes in C. •Auto or Automatic Storage class. •Static Storage class. •Extern Storage class. •Register Storage class.	[07]	
Unit -5	**Arrays.** ➢Introduction. ➢Declaration of Arrays. ➢Accessing the Elements of an Array. •Calculating the address of Array elements. •Calculating the length of an Array. ➢Storing values in Arrays. •Initializing Arrays during Declaration. •Inputting values from the keyboard. •Assigning values to Individual Elements. ➢Operations on Arrays. •Traversing an Array. •Inserting an Element in an Array. •Deleting an Element from an Array. •Merging Two Arrays. •Searching for a value in an Array. ➢Passing Arrays to functions. ➢Two dimensional Arrays. •Declaring Two-dimensional Arrays. •Initializing Two-dimensional Arrays. •Accessing the Elements of two-dimensional Arrays. ➢Operations on Two-dimensional Arrays.	[07]	

Unit -6	**Pointers.** ➢Understanding the Computer's Memory. ➢Introduction to pointers. ➢Declaring pointer variables. ➢Pointer Expressions and pointer Arithmetic. ➢Null pointers. ➢Passing Arguments to function using pointer. ➢Pointers and Arrays. ➢Passing an Array to a Function. ➢Dynamic Memory Allocation. •Malloc ( ) function. •Calloc ( ) function. •Realloc ( ) function. •Free ( ) function.	[07]	
Unit -7	**Structures and Unions.** ➢Structures. ➢Structure variables and Arrays. •Initialization of structure variable and Array. •Dot (•) Operator. •Assigning value of a structure to Another structure. ➢Structure within structures. ➢Site of ( ) of a structure. ➢Unions. ➢Site of ( ) unions. ➢Difference between a structure and an union. ➢Enum Data Type. ➢Typedef Declaration.	[04]	

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.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa
10.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
11.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth
12.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
13.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
14.	Pointers in C, BPB publication, New Delhi.	-	Yashwant Kanetkar

TEXTILE FIBRES

Subject Code 2028303	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	Marks
Unit -1	**INTRODUCTION TO TEXTILES** 1.1 Textile, Textile Technology, Textile Engineering, Texture and importance of Textile 1.2 Textile fibres and filament (definition with examples). 1.3 Classification of textile fibres according to source of occurrence.	02	
Unit -2	**PROPERTIES OF TEXTILE FIBRES** 2.1 Fiber morphology, the macro and micro structure of a textile fibre and filament, microscopic appearance. 2.2 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:** **3.1 Cotton Fibres** 3.1.1 Introduction 3.1.2 Growth, cultivation and production of cotton fibres, grading and growing countries, commercial classification or varieties of cotton. 3.1.3 Microscopic Appearance and chemical composition of cotton. 3.1.4 Physical Properties, Chemical Properties, Thermal Properties and Biological Properties. 3.1.5 Uses of Cotton fibres. **3.2 Wool Fibres** 3.2.1 Introduction 3.2.2 Growing of wool, grading of wool (fine, medium, long, crossbreed. mixed). 3.2.3 Types of wool (Merino, British, Cross- breed, and carpet). 3.2.4 Microscopic structure and appearance, chemical composition. 3.2.5 Physical Properties, Chemical Properties, Thermal properties and Electrical properties. 3.2.6 Felting of wool. 3.2.7 Brief idea of conversion of wool fibres into woolens and worsted yarns. 3.2.8 Uses. **3.3 Silk** 3.3.1 Introduction 3.3.2 Types of silk (Mulberry, Tassar, Eri and Muga silk). 3.3.3 Production of silk: - Sericulture, reeling of silk and throwing of silk. 3.3.4 Wild silk, spun silk, Degumming of silk, chemical composition of silk. 3.3.5 Physical Properties, Chemical Properties and Electrical properties of Silk. 3.3.6 Microscopic appearance, uses of silk. **3.4 Jute Fiber** 3.4.1 Introduction. 3.4.2 Growth and cultivation: Harvesting, Retting and stripping of jute fibres. 3.4.3 Properties and Uses of jute fibres.	20	

Unit -4	**MAN – MADE FIBERS** 4.1 Viscose Rayon: Introduction, properties and uses of viscose rayon. 4.2 Polynosic Rayon: Introduction, properties and uses of polynosic rayon. 4.3 Cuprammonium Rayon: Introduction, chemical constitution, manufacture with flow sheet, properties and uses of cuprammonium rayon. 4.4 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:** 5.1 Identification of textile fibers. 5.1.1 Non-Technical Test: Feeling test, burning test, staining test. 5.1.2 Technical Test: Microscope test, Density measurement, Chemical test. 5.2 Application of Fibers and Textiles: Apparel textiles, bedding and home textiles, interior textile and technical textiles. 5.2.1 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 2028304	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	Marks
Unit-1	**Ginning and Bailing** 1.1 Objects of Ginning. 1.2 Description and working of different types of gins- Macarthy Roller gin, Saw gin, Knife Roller gin 1.3 Defects in ginning. 1.4 Objects of bailing 1.5 Bailing process 1.6 Standard bale sizes and weights of bales from important cotton growing countries. 1.7 Bale densities, Different impurities or trash present in the cotton bales. 1.8 Grading of cotton.	**05**	

Unit-2	**Mixing, opening and cleaning** 2.1 Objects and methods of mixing, opening and cleaning. 2.2 Difference between mixing and blending 2.3 Detailed Study of blow room machineries for different varieties of cotton. 2.3.1 Hopper Bale Breaker and Hopper feeder. 2.3.2 Types of conventional openers- Porcupine openers, vertical openers, Two and Three bladed beater, Krischner beater 2.3.3 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. 2.4 Detailed Study of conventional scutcher 2.5 Lap forming, Delivery cages, filters and dust trunk, grid bars, leaf bars, major and minor cleaning points.	**15**	
	2.6 Cotton conveying – Lattice and pneumatic conveying 2.7 Advantages of single process blow room line. 2.8 Cleaning efficiency of blow room and idea of lap regularity and lap rejection. 2.9 Speeds, and production calculations 2.10 Modern developments in blow room machinery 2.11 Evaluation of blow room performance 2.12 Opening lines required for processing of various blends with appropriate speeds and settings.		
Unit-3	**Carding** 3.1 Objects of carding; Basic concepts of Carding Process. 3.2 Construction of revolving flat carding machineries 3.3 Detailed study and its working, speeds and productions for various types of cotton. 3.4 Setting of different parts and effects of changing the setting on sliver quality. 3.5 Methods of Stripping and Grinding. 3.6 Card clothing – flexible Clothing, Metallic clothing. 3.7 Comparison of flexible wire and metallic wire card clothing. 3.8 Cleaning efficiency, Nep count. 3.9 Features and requirements of high-speed Cards. 3.10 Auto-Levelling at Card. 3.11 Modern developments in high-speed cards. 3.12 Speeds, settings and production calculations of various types of cotton.	**12**	
Unit-4	**Draw frame** 4.1 Objects of Draw frames 4.2 Principles of roller drafting 4.3 Detailed study of draw frame mechanism 4.4 Drafting system and their calculations. 4.5 Roller slip and its remedies 4.6 Roller weighting, Roller settings 4.7 Modern drafting on high-speed draw frames 4.8 Features of high-speed draw frames. 4.9 Condensation and its effect on sliver quality. 4.10 Speeds, setting and production Calculations pertaining to draw frames.	**07**	

Unit-5	**Combing** 5.1 Objects of combing process 5.2 Need for preparatory process for comber. 5.3 Construction and working of preparatory machines to combing – sliver lap machine, Ribbon lap machine, super lap machine. 5.4 Effect of hook formation at carding on comber lap performance at combing. 5.5 Amount of pre-comber draft. 5.6 Recent development in preparatory machines to combing 5.7 Salient features of modern lap preparatory system. 05.08 Basic Principle of cotton combing. 5.9 Construction and working of Nesmith Comber. 5.10 Setting and timings of different parts of the comber. Adjustment for changing waste percentage on comber. Faults and their remedies. 5.11 Recent developments in comber. 5.12 Performance evaluation of combers. 5.13 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 , welkin, 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 2028305	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	Marks
Unit -1	**MOTIONS OF WEAVING:** 1.1 Principle and definition of fabric manufacture. 1.2 Motions in weaving: Primary motions, Secondary motions and Tertiary motions.	02	
Unit -2	**LOOM:** 2.1 Introduction 2.2 Types of Loom 2.3 Handloom – Brief idea of handloom. 2.4 Power loom - Details study of plain tappet looms. 2.5 Various parts of loom and its functions.	06	
Unit -3	**SHEDDING MECHANISM:** 3.1 Definition, Types of shed. 3.2 Shedding mechanisms and its kinds. 3.3 The scope of tappet, dobby and jacquard shedding.	05	
Unit -4	**Tappet Shedding** 4.1 Tappets, cam and Difference between cam and tappets. 4.2 Types of tappet shedding: Negative and positive tappet shedding. 4.3 Various types of tappet shedding: Inside Outside tappet shedding. 4.4 Condition of good shedding 4.5 Early shedding and late shedding.	08	
Unit -5	**PICKING MECHANISM:** 5.1 Introduction, Methods of picking mechanism. 5.2 Types of picking mechanism: cone – over pick mechanism, cone – under pick mechanism and other conventional picking mechanism, Comparison between under pick and over pick. 5.3 Shuttle and its types, defects in shuttle and shuttle cop. 5.4 Defects in negative picking. 5.5 Essential feature to a good pick. 5.6 Early and late picking. 5.7 Study of the following: picker, picking band, buffer, check strap, swell spring, shuttle guard, shuttle flying, shuttle trapping.	10	
Unit -6	**BEAT-UP MECHANISM:** 6.1 Introduction, Construction and Mechanism 6.2 Eccentricity of sley motion and its effect on loom working. 6.3 Factors affecting the sley, motion.	03	

Unit -7	**TAKE-UP MOTION:** 7.1 Introduction, Classification of take up motion: Negative and positive take up motion. 7.2 Five wheel and seven-wheel take - up motion. 7.3 Dividend of loom, calculated dividend and practical dividend, Calculated regarding dividend. 7.4 Changing the number of picks inch.	06	
Unit -8	**LET- OFF MOTION:** 8.1 Objects 8.2 Types of let- off motion: Negative and positive let- off motion. 8.3 Types of negatives 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. 8.4 Conditions to good let – off motion	04	
Unit -9	**WEFT FORK MOTION:** 9.1 Objects and principles 9.2 Types of Weft fork motion: Side Weft fork motion and centre weft fork motion. 9.3 Relative advantages and disadvantages between a side weft fork and centre weft fork motion	03	
Unit -10	**WARP PROTECTING MOTION:** 10.1 Introduction 10.2 Types of Warp Protecting motion: Loose Reed, Fast reed and Electromagnetic Warp Protecting motion. 10.3 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 2000306	Practical			No of Period in one session: 60			Credits
	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
				External	:	35	

Course Learning Objectives:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

Course outcomes:

Student should be able to write code snippets, and then compile, debug and execute them.

Content: Practical		Hrs	Marks
Unit – 1	Familiarization with programming environment (Editor, Compiler, etc.)		
Unit – 2	Programs using, I/O statements and various operators		
Unit – 3	Programs using expression evaluation and precedence		
Unit – 4	Programs using decision making statements and branching statements		
Unit – 5	Programs using loop statements		
Unit – 6	Programs to demonstrate applications of n dimensional arrays		
Unit – 7	Programs to demonstrate use of string manipulation functions		
Unit – 8	Programs to demonstrate parameter passing mechanism		
Unit – 9	Programs to demonstrate recursion		
Unit – 10	Programs to demonstrate use of pointers		
Unit – 11	Programs to demonstrate command line arguments		
Unit – 12	Programs to demonstrate dynamic memory allocation		
Unit – 13	Programs to demonstrate file operations		

The language of choice will be C. This is a skill course. More you practice, better it will be.

Reference Books:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

YARN MANUFACTURE LAB - I

Subject Code 2028307	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	Marks
Unit -1	**Blow room** 1.1 Detailed Study of the working of opening and cleaning machinery in relation to setting and speeds. 1.2 Sketching the line and gearing diagrams of blow room machinery 1.3 Major and minor cleaning points. 1.4 Piano feed regulating motion, Knock- off motion 1.5 Show passage of material through each machine of blow room 1.6 Calculation of speed, Production, Hank of lap.	**30**	
Unit -2	**Carding** 2.1 Detailed study of the card and show passage of the material through carding machine 2.2 Functions of the Card in relation to various parts of the machine 2.3 Practicing, stripping , Grinding, setting, oiling, cleaning, 2.4 Sketching the line and gearing diagrams of carding machine 2.5 Practicing card clothing and mounting of fillet on cylinder, doffer and flats 2.6 Calculation of speeds and production of the machines.	**12**	
Unit -3	**Draw frame** 3.1 Sketching the line and gearing diagrams of draw frame 3.2 Demonstration of the working of draw frames. 3.3 Dismantling refitting and resetting of the draw frames for different cottons and hanks. 3.4 Calculations of speeds , drafts and production pertaining to the above machines	**09**	
Unit -4	**Combing** 4.1 Sketching the line and gearing diagrams of preparatory machines to the comber 4.2 Demonstration of the working of the preparatory machines to the comber 4.3 Dismantling, refitting and resetting of the machines for different cottons and counts. 4.4 Sketching the line and gearing diagrams of combing machines. 4.5 Calculations of speeds, drafts and production pertaining to the above machines.	**09**	
	Total-	**60**	

FABRIC MANUFACTURE LAB-I

Subject Code 2028308	Practical			No of Period in one session: 30			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

Contents: Practical

List of Experiments :-		Hrs	Marks
Unit -1	**PRIMARY MOTIONS:** 5.1 Detailed study of primary motions 5.1.1 Shedding 5.1.2 Picking 5.1.3 Beat Up 5.2 Dismantling and resetting of the parts of the above motions. 5.3 Sketching the above motion parts.	10	
Unit -2	**SECONDARY MOTIONS:** 6.1 Detailed study of secondary motions 6.1.1 Take Up Motion (5 wheels and 7 wheels) 6.1.2 Let Off Motion 6.2 Dismantling and resetting of the parts of the motions. 6.3 Sketching the above motion parts.	07	
Unit -3	**TERTIARY MOTIONS:** 7.1 Detailed study of the tertiary motions 7.1.1 Weft Fork Motion 7.1.2 Warp Protecting Motion (Loose reed & fast reed) 7.2 Dismantling and resetting of the above motions. 7.3 Sketching the above motion parts.	08	
Unit -4	**LOOMS:** 8.1 Study the handloom and practice of weaving on them. 8.2 Study the Power loom and practice of weaving on them.	05	
	Total	**30**	

YARN MANUFACTURE I - TW

Subject Code 2028309	Term Work			No of Period in one session: 30			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	Marks
Unit -1	**Blow room** 1.7 Detailed Study of the working of opening and cleaning machinery in relation to setting and speeds. 1.8 Sketching the line and gearing diagrams of blow room machinery 1.9 Major and minor cleaning points. 1.10 Piano feed regulating motion, Knock- off motion 1.11 Show passage of material through each machine of blow room 1.12 Calculation of speed, Production, Hank of lap.	15	
Unit -2	**Carding** 2.7 Detailed study of the card and show passage of the material through carding machine 2.8 Functions of the Card in relation to various parts of the machine 2.9 Practicing, stripping , Grinding, setting, oiling, cleaning, 2.10 Sketching the line and gearing diagrams of carding machine 2.11 Practicing card clothing and mounting of fillet on cylinder, doffer and flats 2.12 Calculation of speeds and production of the machines.	06	
Unit -3	**Draw frame** 3.5 Sketching the line and gearing diagrams of draw frame 3.6 Demonstration of the working of draw frames. 3.7 Dismantling refitting and resetting of the draw frames for different cottons and hanks. 3.8 Calculations of speeds, drafts and production pertaining to the above machines	05	
Unit -4	**Combing** 4.6 Sketching the line and gearing diagrams of preparatory machines to the comber 4.7 Demonstration of the working of the preparatory machines to the comber 4.8 Dismantling, refitting and resetting of the machines for different cottons and counts. 4.9 Sketching the line and gearing diagrams of combing machines. 4.10 Calculations of speeds, drafts and production pertaining to the above machines.	04	
	Total-	30	

PYTHON / OTHERS - TW

Subject Code 2000310	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	02	External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

FABRIC MANUFACTURE - I - TW

Subject Code 2028311	Term Work			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	02	External	:	18	

Contents:Term Work

List of Term Work: -		Hrs.	Marks
Unit -1	**PRIMARY MOTIONS:** 5.1 Detailed study of primary motions 5.1.1 Shedding 5.1.2 Picking 5.1.3 Beat Up 5.2 Dismantling and resetting of the parts of the above motions. 5.3 Sketching the above motion parts.		
Unit -2	**SECONDARY MOTIONS:** 6.1 Detailed study of secondary motions 6.1.1 Take Up Motion (5 wheels and 7 wheels) 6.1.2 Let Off Motion 6.2 Dismantling and resetting of the parts of the motions. 6.3 Sketching the above motion parts.		
Unit -3	**TERTIARY MOTIONS:** 7.1 Detailed study of the tertiary motions 7.1.1 Weft Fork Motion 7.1.2 Warp Protecting Motion (Loose reed & fast reed) 7.2 Dismantling and resetting of the above motions. 7.3 Sketching the above motion parts.		
Unit -4	**LOOMS:** 8.1 Study the handloom and practice of weaving on them. 8.2 Study the Power loom and practice of weaving on them.		
	Total		

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

IIIRD SEMESTER DIPLOMA IN ARCHITECTURAL ASSISTANTSHIP

(Effective from Session 2020-21 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	2037301	03	03	10	20	70	100	28	40	03
2.	Building Materials	2037302	03	03	10	20	70	100	28	40	03
3.	Architectural Design & Drawing-I	2037303	03	04	10	20	70	100	28	40	03
4.	Computer Application in Architecture	2037304	03	03	10	20	70	100	28	40	03
5.	Climatology	2037305	03	03	10	20	70	100	28	40	03
		Total: -	**15**				**350**	**500**			15

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGS CHEME	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 Lab.	2037306	06 50% Physical 50% Virtual	03	30	70	100	40	03
7.	Computer Application in Architecture Lab.	2037307	06 50% Physical 50% Virtual	03	15	35	50	20	03
Total:- 12							**150**		**06**

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)	2037308	04	23	52	75	30	02
9.	Python / Others	2000310	02	07	18	25	10	01
Total- 06						**100**		**03**
Total Periods per week Each of duration one Hours **= 33**						**Total Marks = 750**		**24**

PERSPECTIVE, SCIOGRAPHY & FREE HAND SKETCH

Subject Code 2037301	Theory			No of Periods 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 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	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	[13]	[20]

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 vertical shine in the center vi) Grades washes with diagonal 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	[13]	[20]
UNIT – 3	**Mural Design :-** 3.1 Mural design and collage	[06]	[10]
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, 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.	[10]	[15]
UNIT – 5	**Human anthropometry :-** 5.1 Sketching of different posture of humans with standard Dimensions. 5.2 Sketch different furniture's	[08]	[05]
	Total -	[50]	[70]

Books :-

1.	Philip J Lawson, Practical Perspective Drawing, Mc Graw Hill Book Corporation, 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 2037302	Theory			No of Periods 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: -

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-colored drawings of buildings and monuments
3) Make models
4) Sketch free hand colored perspective.

CONTENTS : (THEORY)

Name of the Topic		Hrs	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 bu9ilding stones used in India. Characteristics and use of stones.	[04]	[05]
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	[06]	[06]
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, fibreboard, etc. - SUSTAINABLE BUILDING MATERIALS- Bamboo / Local available materials.	[08]	[10]
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]	[06]
UNIT – 6	SAND :- Sources of Sand, Classification, Test of Sand. Grades of sand and their uses	[08]	[10]

	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.		
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]	[10]
UNIT – 8	Polymer's Plastic properties of plastic, Types and use of Plastics in building construction. Miscellaneous materials–Glass, Fibre glass, cork, linoleum, Gypsum, ceramic products.	[08]	[10]
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.	[04]	[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 2037303	Theory			No of Periods 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: -

Freehand 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 instruction / 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	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]	[07]
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	[12]	[15]

	2.4 Composition of 3D surfaces 2.5 Problems based on principles & elements of Architecture		
UNIT – 3	**Proportion of Components of Human Body** :- The proportions of the different components of the human body; Examples from Le Corbusier Modular Man, Vaastu Pursha Mandala	[06]	[07]
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]	[07]
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]	[07]
UNIT – 6	**Vehicles** :- Vehicles in motion, parking along with turning radii for two-wheelers, cars, buses, vans etc. Standard road width.	[04]	[04]
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]	[07]
UNIT – 8	Graphic Representation of plant material (ground cover, foliage, shrubs, trees) human figures and vehicles.	[04]	[04]
UNIT – 9	Development of architectural drawing from given sketch design of building involving two or more floors and split levels.	[04]	[04]
	Total-	[60]	[70]

RECOMMENDED BOOKS :-

1.	Time Saver Standards for Building Types by Josaeph De Chiara and John Callendera
2.	Architects Data by Neufert
3.	Space, Time and Order by DK Ching
4.	Time Sever 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 2037304	Theory			No of Periods 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: -

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 & 3-D architectural drawings for presentation and construction purposes. The student should get familiar with the latest Auto CAD software

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

CONTENTS : (THEORY)

	Name of the Topic	Hrs	Marks
UNIT – 1	**Introduction to 2-D CAD / 3-D Basic** :- • Input Devices • **Auto CAD basic introduction & Starting Auto CAD** • **Sketch UP Basic introduction 3D** • **Graphics** & Inside the drawing editor • Commands in the menus (Tool bars) • Accessing Commands • Entity Selection • Entering Coordinates • Folders for organizing drawings and files	[08]	[09]
UNIT – 2	**Introduction to 3-D basic software Sketch UP** :- • **Toolbars & Camera controls – Pan, Zoom & orbit** • **Basic tools – Rectangle, Circle, Select pencil, push / pull, groups, Components, Move, Rotate, Copy, Paint bucket, Offset, Array & Polar array** • **Modelling practice – Walls + floor, Windows & Doors etc.** • **Warehouse** • **Structures phase** • **Section Basic Render and print settings** • **Shadows, views, V-ray plugin**	[14]	[17]

UNIT – 3	**Drawing Commands in Auto CAD** :- • Line • Poly line / Double line. • Circle & Arc • Ellipse • Polygon & SP line • Rectangle • **Dimension style & Option** • **Drafting settings** • **Group & Ungroup** • Hatch • Donuts	[08]	[09]
UNIT – 4	Viewing an Existing Drawing :- • Zoom • Pan • Redraw and Regen all • Regen Auto • View, Lwdisplay, & Insert block	[08]	[09]
UNIT – 5	Modifying an Existing Drawing :- • Undo Redo / Oops • Trim & Extend • Move & Table • Offset & Point • Rotate & Ortho mode • Array & Centre mark • Stretch • Divide • Champher • Erase	[14]	[17]

	• Dimension & Mtext • Copy, Multiple Copy • Mirror (Mirror test) • Change (Change properties) • Plot, Save & Save as, • Explode • Block • Scale & Multileader • Fillet		
UNIT – 6	Making and Inserting Blocks :- • Blocks • Insert block • Tool palettes • Using library for blocks • W-block • X-ref • Explode	[08]	[09]
	Total-	[60]	[70]

CLIMATOLOGY

Subject Code 2037305	Theory			No of Periods 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: -

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	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 &Wind scaping of building. • 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, According to Sun & Wind direction consideration. • 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 LAB

Subject Code 2037306	Practical			No of Periods 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	Marks
UNIT – 1	Introduction of Free hand Sketching of Monuments and buildings in different techniques and medium	[10]	[ ]
UNIT – 2	India Gate, Red Fort, Taj Mahal & Kailash Temple Any one historical monument.	[10]	[ ]
UNIT – 3	Scribble	[10]	[ ]
UNIT – 4	Doodle	[05]	[ ]
UNIT – 5	Toran (Gateway)	[05]	[ ]
UNIT – 6	Architectural Elements & Conceptual Views	[10]	[ ]
	Total-	[50]	[ ]

COMPUTER APPLICATION IN ARCHITECTURE LAB.

Subject Code 2037307	Practical			No of Period in one session: 50			Credits
	No. of Periods Per Week			Full Marks	:	50	03
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
	-	-	-	External	:	35	

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**	**8**
Unit -2	Creating and saving a new Drawing Exercise: Setting up a new drawing with units, limits etc	**7**	**7**
Unit -3	Drawing Commands Exercise: Making a composition of different geometrical shapes using various drawing commands	**10**	**10**
Unit -4	Viewing an Existing Drawing Exercise: Viewing, zooming of existing drawing made in section3.	**10**	**10**
Unit -5	Modifying an Existing Drawing Exercise: a) Modifying composition made in Section 3 b) Making plan, elevation and section of simple building	**8**	**8**
Unit -6	Making and Inserting Blocks Exercise Inserting furniture, fixtures, trees etc. in the plans, sections and elevations made in section 5.	**7**	**7**
	Total	**50**	**50**

ARCHITECTURAL DESIGN & DRAWING-I - TW

Subject Code	Term Work			No of Period in one session: 60			Credits
	No. of Periods Per Week			Full Marks	:	75	
2037308	L	T	P/S	Internal	:	23	02
	—	—	04	External	:	52	

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 Color – tones – texture	**08**	**09**
Unit -2	**Composition of 2D & 3D** 2.1 Composition of 2D surfaces in tone, colors 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

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

PYTHON/Others - TW

Subject Code	Term Work			No of Period in one session: 30			Credits
	No. of Periods Per Week			Full Marks	:	25	
2000310	L	T	P/S	Internal	:	07	01
	—	—	02	External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

III[RD] SEMESTER DIPLOMA IN ELECTRONICAND COMMUNICATION ENGINEERING.

(Effective from Session 2020-21 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	2000301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	2000302	03	03	10	20	70	100	28	40	03
3.	Analog Electronics	2038303	03	03	10	20	70	100	28	40	03
4.	Basic Electronics Engineering	2038304	03	03	10	20	70	100	28	40	02
5.	Electric Circuits and Network	2021305	04	03	10	20	70	100	28	40	03
		Total: -	**17**				**350**	**500**			14

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGS CHEME	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.	2000306	06 50% Physical 50% Virtual	03	15	35	50	20	03
7.	Analog Electronics Circuit Lab.	2038307	02 50% Physical 50% Virtual	03	15	35	50	20	01
8.	Web Technology Lab	2018308	02 50% Physical 50% Virtual	03	07	18	25	10	01
9.	Electrical Measurements and Instrumentation Lab	2021309	04 50% Physical 50% Virtual	03	15	35	50	20	02
		Total: -	14				**175**		**07**

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.	Summer Internship-I (4 weeks) after II semester	2021310	-	15	35	50	20	02
11.	**PYTHON**	2018311	02	07	18	25	10	01
		Total: -	02			**75**		**02**
Total Periods per week Each of duration One Hours = **33**						**Total Marks = 750**		**24**

APPLIED MATHEMATICS

Subject Code 2000301	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.	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. Regula-Falsi method. Newton – Raphson method. 5.2 Solution of simultaneous equations containing 2 and 3 unknowns Gauss elimination method. Iterative methods- Gauss seidel 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 Delhi
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Delhi
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code 2000302	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	

Course Learning Objective:

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 array, stacks and linked list solving problems.
- Handling File in "C".

Contents: Theory		Hrs.	Marks
Unit -1	**Introduction to computer software:** Classification of computer software. System software. Application software. Programming languages. Machine languages. Assembly languages. High level programming languages. Algorithms and flowchart.	[03]	
Unit -2	**Fundamental of C languages.** Introduction. Background. Characteristics of C. Uses of C. Structure of a C program. Writing the first C program. Files used in a C program. Source code files. Header files. Object files. Binary executable files. Compiling and Executing C programs. Using comments. Characters used in C. Identifier.	[08]	

	Keyword or Reserved words. Tokens. Constants. Numeric constant. String Character constant. Variables. Variable Declaration. Basic Data Types. Additional Data types. Operators and Expressions. Operator Precedence and Associativity. Type conversion and Type casting. Input/ Output statements in C.		
Unit -3	**Decision Control and Looping Statements:** Introduction to Decision control statements. Conditional Branching statements. If statement. If-else statement. If-else-if statement. Switch case. Iterative statements. While loop. Do-while loop. For loop. Nested loops. Break and continue statements. Break statement. Continue statement. Goto statement.		

Unit -4	**Functions in 'C'.** Uses of functions. User defined functions. Function Declaration. Calling a function. Actual and formal Arguments. Rules to call a function. Function propotype. Recursion. Use of Recursive function. Local or Internal variables. Global or External variables. Void function. Storage classes in C. Auto or Automatic Storage class. Static Storage class. Extern Storage class. Register Storage class.	[07]	
Unit -5	**Arrays.** Introduction. Declaration of Arrays. Accessing the Elements of an Array. Calculating the address of Array elements. Calculating the length of an Array. Storing values in Arrays. Initializing Arrays during Declaration. Inputting values from the keyboard. Assigning values to Individual Elements. Operations on Arrays. Traversing an Array. Inserting an Element in an Array. Deleting an Element from an Array. Merging Two Arrays. Searching for a value in an Array. Passing Arrays to functions. Two dimensional Arrays. Declaring Two-dimensional Arrays. Initializing Two-dimensional Arrays. Accessing the Elements of two-dimensional Arrays. Operations on Two-dimensional Arrays.	[07]	

Unit -6	**Pointers.** Understanding the Computer's Memory. Introduction to pointers. Declaring pointer variables. Pointer Expressions and pointer Arithmetic. Null pointers. Passing Arguments to function using pointer. Pointers and Arrays. Passing an Array to a Function. Dynamic Memory Allocation. Malloc ( ) function. Calloc ( ) function. Realloc ( ) function. Free ( ) function.	[07]	
Unit -7	**Structures and Unions.** Structures. Structure variables and Arrays. Initialization of structure variable and Array. Dot (•) Operator. Assigning value of a structure to Another structure. Structure within structures. Site of ( ) of a structure. Unions. Site of ( ) unions. Difference between a structure and an union. Enum Data Type. Typedef Declaration.	[04]	

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.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa
10.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
11.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth
12.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
13.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
14.	Pointers in C, BPB publication, New Delhi.	-	Yashwant Kanetkar

ANALOG ELECTRONIC CIRCUIT

Subject Code 2038303	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.	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 trans resistance 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 width of a multistage amplifier. 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 Barkhuizen 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	-	Milliman's and Halkias
Principle of electronics	-	V.KMehta & S Chand. (MCGRAW HILL)

BASIC ELECTRONICS ENGINEERING

Subject Code 2038304	Theory			No of Period in one session: 50			Credits
	No. of Periods Per Week			Full Marks	:	100	02
	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.	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 Stabilization 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	Feedback, -ve feedback, +ve feedback, oscillations, multistage amplifier (Fundamental idea only).	[04]	
	Total	**50**	

ELECTRIC CIRCUITS AND NETWORK

(Electronics Engineering Group)

Subject Code 2021305	Theory			No of Periods in One Session :50			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	04	1	-	TA	:	10	
	-	-	-	CT	:	20	

Course Content:

	Contents (Theory)	Hrs.
UNIT 1	***Basics of Network and Network Theorem*** Node and Mesh Analysis Superposition Theorem Thevenin Theorem Norton Theorem Maximum Power transfer theorem Reciprocity Theorem	12
UNIT 2	***Graph Theory*** Graph of network, tree, incidence matrix F Tie-Set Analysis F Cut-Set Analysis Analysis of resistive network using tie-set and cut-set Duality	06
UNIT 3	***Time Domain and Frequency Domain Analysis*** Solution of first and second order differential equations for Series and parallel R-L, R-C, R-L-C circuits Initial and Final conditions in network elements Forced and Free response, time constants Steady State and Transient State Response Analysis of electrical circuits using Laplace Transform for standard inputs (unit, Ramp, Step)	12
UNIT 4	***Trigonometric and exponential Fourier series*** Discrete spectra and symmetry of waveform Steady state response of a network to non-sinusoidal periodic inputs, power factor, effective values Fourier transform and continuous spectra	10
UNIT 5	***Two Port Network*** Two Port Network Open Circuit Impedance Parameters Short Circuit Admittance Parameters Transmission Parameters Hybrid Parameters Interrelationship of Two Port Network Inter Connection of Two Port Network	10
	Total	**50**

LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1.	Networks and Systems	Ashfaq Husain	Khanna Publishing House
2.	Network Analysis	M. E. Van Valkenburg	Prentice Hall of India
3.	Engineering Circuit Analysis	W. H. Hayt, J. E. Kemmerly and S. M. Durbin	McGraw Hill

4.	Electrical Circuits	Joseph Edminister	Schaum's Outline, Tata McGraw Hill
5.	Basic Circuit Theory	Lawrence P. Huelsma	Prentice Hall of India
6.	Network & Systems	D. Roy Choudhury	Wiley Eastern Ltd
7.	Linear Circuit Analysis	De Carlo and Lin	Oxford Press

Course Outcomes: After the completion of the course, student will be able to

1. Use network theorems to determine the various parameters in circuits.
2. Obtain circuit matrices of linear graphs and analyze networks using graph theory.
3. Analyze circuits in time and frequency domain.
4. Write given functions in terms of Fourier series.
5. Use two port networks to determine the circuit parameters.

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code	Practical			No. of Period in one session: 84			Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	03
2000306	—	—	06	Internal	:	15	
				External	:	35	

- **Course Learning Objectives:**
- This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.
- **Course outcomes:**
- Student should be able to write code snippets, and then compile, debug and execute them.

Content: Practical		Hrs.	Marks
Unit – 1	Familiarization with programming environment (Editor, Compiler, etc.)		
Unit – 2	Programs using, I/O statements and various operators		
Unit – 3	Programs using expression evaluation and precedence		
Unit – 4	Programs using decision making statements and branching statements		
Unit – 5	Programs using loop statements		
Unit – 6	Programs to demonstrate applications of n dimensional arrays		
Unit – 7	Programs to demonstrate use of string manipulation functions		
Unit – 8	Programs to demonstrate parameter passing mechanism		
Unit – 9	Programs to demonstrate recursion		
Unit – 10	Programs to demonstrate use of pointers		
Unit – 11	Programs to demonstrate command line arguments		
Unit – 12	Programs to demonstrate dynamic memory allocation		
Unit – 13	Programs to demonstrate file operations		

- The language of choice will be C. This is a skill course. More you practice, better it will be.
- **Reference Books:**

- 1. Let Us C, Yashavant Kanetkar
- 2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
- 3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
- 4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
- 5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
- 6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

ANALOG ELECTRONICS CIRCUIT LAB.

Subject Code 2038307	Practical			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

Contents: Practical			
Unit -1	Wiring of RC coupled single stage FET amplifier and determination of the gain-frequency response, input and output impedances.	Hrs.	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 Thevenin's Theorem and maximum power transfer theorem 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.		

WEB TECHNOLOGY LAB

SUBJECT CODE: 2018308	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks:	:	25	01
	L	T	P/S	ESE	:	25	
		-	02	Internal	:	07	
				External	:	18	

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies'. Some of the things that should necessary be covered in lab.

Course outcomes:

Student will be able to program web applications using and will be able to do the following:

- Use LAMP Stack for web applications
- Write simple applications with Technologies like HTML, Java script, AJAX, PHP
- Connect to Database and get results
- Parse XML files Student will be able to develop/build a functional website with full features.

Content: Practical		Hrs.	Marks
Unit – 1	Home page Development static pages (using Only HTML) of an online Book store.	04	
Unit – 2	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.	06	
Unit – 3	Write a PHP program to display a digital clock which displays the current time of the server.	06	
Unit – 4	Write an HTML code to display your CV on a web page.	04	
Unit – 5	Write an XML program to display products.	05	
Unit – 6	Create a web page with all types of Cascading style sheets.	06	
Unit – 7	Write a PHP program to display a digital clock which displays the current time of the server.	05	
Unit – 8	Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.	04	

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson
2. "Internet & World Wide Web How to Program", Deitel, Deitel, Goldberg, Pearson Education
3. "Web programming- Building Internet Application", Chris Bales
4. Web Applications: Concepts and Real-World Design, Knuckles

ELECTRONIC MEASUREMENT AND INSTRUMENTATION LAB

Subject Code 2021309	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.	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		

SUMMER INTERNSHIP-I (4 WEEKS) AFTER II SEMESTER - TW

Subject Code	Term Work			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	50	
2021310	L	T	P/S	Internal	:	15	02
	—	—	-	External	:	35	

PYTHON (Term Work)

Subject Code 2018311	Term Work			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	02	External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

References Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

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

(Effective from Session 2020-21 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	2000301	04	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C'	2000302	03	03	10	20	70	100	28	40	03
3.	Instrumentation and Process Control	2040303	03	03	10	20	70	100	28	40	03
4.	Basic Electronics Engineering	2040304	03	03	10	20	70	100	28	40	03
5.	Digital Circuits	2040305	03	03	10	20	70	100	28	40	03
		Total: - 16					**350**	**500**			15

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGS CHEME	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.	2000306	06 50% Physical 50% Virtual	03	15	35	50	20	03
7.	Electrical Measurements Lab.	2040307	02 50% Physical 50% Virtual	03	15	35	50	20	01
8.	Web Technology Lab	2018308	02 50% Physical 50% Virtual	03	07	18	25	10	01
9.	Electrical & Electronics Workshop Practice	2040309	04 50% Physical 50% Virtual	03	15	35	50	20	02
Total: - 14							**175**		**07**

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.	Electrical & Electronics Workshop Practice (TW)	2040310	01	15	35	50	20	01
11.	**PYTHON**	2018311	02	07	18	25	10	01
Total: - 03						**75**		**02**
Total Periods per week Each of duration One Hours = **33**						**Total Marks = 750**		**24**

APPLIED MATHEMATICS

Subject Code 2000301	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.	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. Regula-falsi method. Newton – Raphson method. 5.2 Solution of simultaneous equations containing 2 and 3 unknowns Gauss elimination method. Iterative methods- Gauss seidel 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 2000302	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	

Course Learning Objective:

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 array, stacks and linked list solving problems.
- Handling File in "C".

Contents: Theory		Hrs.	Marks
Unit -1	**Introduction to computer software:** ➢ Classification of computer software. • System software. • Application software. ➢ Programming languages. • Machine languages. • Assembly languages. • High level programming languages. ➢ Algorithms and flowchart.	[03]	
Unit -2	**Fundamental of C languages.** ➢ Introduction. • Background. • Characteristics of C. • Uses of C. ➢ Structure of a C program. ➢ Writing the first C program. ➢ Files used in a C program. • Source code files. • Header files. • Object files. • Binary executable files. ➢ Compiling and Executing C programs. ➢ Using comments. ➢ Characters used in C.	[08]	

	➢ Identifier. ➢ Keyword or Reserved words. ➢ Tokens. ➢ Constants. • Numeric constant. • String Character constant. ➢ Variables. ➢ Variable Declaration. ➢ Basic Data Types. ➢ Additional Data types. ➢ Operators and Expressions. ➢ Operator Precedence and Associativity. ➢ Type conversion and Type casting. ➢ Input/ Output statements in C.		
Unit -3	**Decision Control and Looping Statements:** ➢ Introduction to Decision control statements. ➢ Conditional Branching statements. • If statement. • If-else statement. • If-else-if statement. • Switch case. ➢ Iterative statements. • While loop. • Do-while loop. • For loop. ➢ Nested loops. ➢ Break and continue statements. • Break statement. • Continue statement. ➢ Goto statement.	[12]	

Unit -4	**Functions in 'C'.** ➢ Uses of functions. ➢ User defined functions. ➢ Function Declaration. ➢ Calling a function. ➢ Actual and formal Arguments. ➢ Rules to call a function. ➢ Function propotype. ➢ Recursion. • Use of Recursive function. ➢ Local or Internal variables. ➢ Global or External variables. ➢ Void function. ➢ Storage classes in C. • Auto or Automatic Storage class. • Static Storage class. • Extern Storage class. • Register Storage class.	[07]	
Unit -5	**Arrays.** ➢ Introduction. ➢ Declaration of Arrays. ➢ Accessing the Elements of an Array. • Calculating the address of Array elements. • Calculating the length of an Array. ➢ Storing values in Arrays. • Initializing Arrays during Declaration. • Inputting values from the keyboard. • Assigning values to Individual Elements. ➢ Operations on Arrays. • Traversing an Array. • Inserting an Element in an Array. • Deleting an Element from an Array. • Merging Two Arrays. • Searching for a value in an Array. ➢ Passing Arrays to functions. ➢ Two dimensional Arrays. • Declaring Two-dimensional Arrays. • Initializing Two-dimensional Arrays. • Accessing the Elements of two-dimensional Arrays. ➢ Operations on Two-dimensional Arrays.	[07]	

Unit -6	**Pointers.** ➢ Understanding the Computer's Memory. ➢ Introduction to pointers. ➢ Declaring pointer variables. ➢ Pointer Expressions and pointer Arithmetic. ➢ Null pointers. ➢ Passing Arguments to function using pointer. ➢ Pointers and Arrays. ➢ Passing an Array to a Function. ➢ Dynamic Memory Allocation. • Malloc ( ) function. • Calloc ( ) function. • Realloc ( ) function. • Free ( ) function.	[07]	
Unit -7	**Structures and Unions.** ➢ Structures. ➢ Structure variables and Arrays. • Initialization of structure variable and Array. • Dot (•) Operator. • Assigning value of a structure to Another structure. ➢ Structure within structures. ➢ Site of ( ) of a structure. ➢ Unions. ➢ Site of ( ) unions. ➢ Difference between a structure and an union. ➢ Enum Data Type. ➢ Typedef Declaration.	[04]	

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.	Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi.	-	Kris A. Jamsa
10.	The Art of C Programming, Narosa Publishing House, New Delhi.	-	Jones, Robin & Stewart
11.	Problem Solving and Programming. Prentice Hall International.	-	A.C. Kenneth
12.	C made easy, McGraw Hill Book Company, 1987.	-	H. Schildt
13.	Software Engineering, McGraw Hill, 1992.	-	R.S. Pressman
14.	Pointers in C, BPB publication, New Delhi.	-	Yashwant Kanetkar

INSTRUMENTATION AND PROCESS CONTROL

Subject Code 2040303	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.	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 Schering 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, Proportional, Integral and derivatic control.	**[05]**	
Unit-9	**Pneumatic Control elements:-** 9.1 Pneumatic pressure supply 9.2 Pneumatic actuators, relays, pressure switches contractors, etc.	**[04]**	
Unit-10	**Hydraulic control element:-** 10.1 Introduction 10.2 Hydraulic actuators 10.3 Hydraulic valves	**[04]**	
	Total	**48**	

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 2040304	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.	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 Thevenin's and Norton's theorem. 1.7 Star delta connection. 1.8 Simple Problem.	**[04]**	
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 Simplified 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.	**[08]**	
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.	**[06]**	

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 Stabilization 4.8 Satiability 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	**[06]**	
Unit -6	**JUNCTION FIELD EFFECT TRANSISTOR**	**[04]**	
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 (in brief) 7.4 Barkhamsen's criteria 7.5 Oscillators (RC phase oscillator) Multivibrators	**[08]**	
	Total	**48**	

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 2040305	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.	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.	**[03]**	
Unit -2	**LOGIC GATES:-** AND, OR, NOT, NAND, EX-OR and EX-NOR gates. Truth table, symbol, logical expression and realization Universal gates.	**[03]**	
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 Algebra 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.	**[6]**	

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	**[6]**	
Unit -8	**REGISTERS: -** The shift Register, clocking. Serial-Parallel Data Transfer. Shift-Right-Shift. Left Registers.	**[6]**	
Unit -9	**COUNTERS :-** Introduction. Asynchronous counters. Synchronous counters.	**[4]**	
Unit -10	**OP-AMP AND COMPARATOR :-** The operational Amplifier. Characteristics of an OP-AMP. CMRR The comparator. The Schmitt Trigger circuit.	**[6]**	
	Total	**48**	

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 eastern 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:			Credits
	No. of Periods Per Week			Full Marks	:	50	
2000306	L	T	P/S	ESE	:	50	03
	—	—	06	Internal	:	15	
				External	:	35	

Course Learning Objectives:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

Course outcomes:

Student should be able to write code snippets, and then compile, debug and execute them.

Content: Practical		Hrs.	Marks
Unit – 1	Familiarization with programming environment (Editor, Compiler, etc.)		
Unit – 2	Programs using, I/O statements and various operators		
Unit – 3	Programs using expression evaluation and precedence		
Unit – 4	Programs using decision making statements and branching statements		
Unit – 5	Programs using loop statements		
Unit – 6	Programs to demonstrate applications of n dimensional arrays		
Unit – 7	Programs to demonstrate use of string manipulation functions		
Unit – 8	Programs to demonstrate parameter passing mechanism		
Unit – 9	Programs to demonstrate recursion		
Unit – 10	Programs to demonstrate use of pointers		
Unit – 11	Programs to demonstrate command line arguments		
Unit – 12	Programs to demonstrate dynamic memory allocation		
Unit – 13	Programs to demonstrate file operations		

The language of choice will be C. This is a skill course. More you practice, better it will be.

Reference Books:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

ELECTRICAL MEASUREMENTS LAB

Subject Code 2040307	Practical						Credits
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	01
	—	—	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 Practical's:

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.

WEB TECHNOLOGY LAB

SUBJECT CODE: 2018308	Practical			No. of period in one session:			Credits
	No. of Periods per Week			Full Marks :	:	25	01
	L	T	P/S	ESE	:	25	
		-	02	Internal	:	07	
				External	:	18	

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies'. Some of the things that should necessary be covered in lab.

Course outcomes:

Student will be able to program web applications using and will be able to do the following:

- Use LAMP Stack for web applications
- Write simple applications with Technologies like HTML, Java script, AJAX, PHP
- Connect to Database and get results
- Parse XML files Student will be able to develop/build a functional website with full features.

Content : Practical		Hrs.	Marks
Unit – 1	Home page Development static pages (using Only HTML) of an online Book store.	04	
Unit – 2	Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.	06	
Unit – 3	Write a PHP program to display a digital clock which displays the current time of the server.	06	
Unit – 4	Write an HTML code to display your CV on a web page.	04	
Unit – 5	Write an XML program to display products.	05	
Unit – 6	Create a web page with all types of Cascading style sheets.	06	
Unit – 7	Write a PHP program to display a digital clock which displays the current time of the server.	05	
Unit – 8	Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.	04	

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson
2. "Internet & World Wide Web How To Program", Deitel, Deitel, Goldberg, Pearson Education
3. "Web programming- Building Internet Application", Chris Bales
4. Web Applications: Concepts and Real World Design, Knuckles

ELECTRICAL & ELECTRONICS WORKSHOP PRACTICE

Subject Code 2040309	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 :- 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	Marks
Unit -1	1.	Acquaintance with required tools and equipment 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 defects 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 data's 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 2040310	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	Internal	:	15	
	—	—	01	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 :Term Work			Hrs/week	Marks
Unit -1	22.	Acquaintance with required tools and equipment's 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 defects 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 data's 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.		

PYTHON - TW

Subject Code 2018311	Term Work			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	02	External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3…..1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

References Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

IIIRD SEMESTER DIPLOMA IN LIBRARY & INFORMATION SCIENCE

(Effective from Session 2020-21 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	2041301	03	03	10	20	70	100	28	40	03
2.	Computer Programming Through 'C '	2000302	03	03	10	20	70	100	28	40	03
3.	Knowledge Organization Library Classification & Cataloguing	2041303	03	03	10	20	70	100	28	40	03
4.	Management Information System in Libraries	2041304	03	03	10	20	70	100	28	40	03
5.	Library House Keeping Operation	2041305	03	03	10	20	70	100	28	40	03
		Total: -	**15**				**350**	**500**			**15**

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGSCHEME	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.	2000306	06 50% Physical 50% Virtual	03	15	35	50	20	03
7.	Knowledge Organization Classification Lab.	2041307	04 50% Physical 50% Virtual	03	15	35	50	20	02
8.	Knowledge Organization Cataloguing Lab.	2041308	02 50% Physical 50% Virtual	03	07	18	25	10	01
Total: - 12							**125**		**06**

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)	2041309	02	15	35	50	20	01
10.	**Python / Others** (TW)	2000310	02	07	18	25	10	01
11.	Knowledge Organization Cataloguing (TW)	2041311	02	15	35	50	20	01
Total: - 06						**125**		**03**
Total Periods per week Each of duration one Hours = **33**						**Total Marks = 750**		**24**

FOUNDATION OF LIBRARY AND INFORMATION SCIENCE

Subject Code 2041301	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.	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 educing		
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 Organization:** • 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 Equipment's.		
Units-6	**Resource sharing:** • Concept, Need, Purpose, Area of Resource sharing. • Resource sharing Programmers: 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 2000302	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	

Course Learning Objective:

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 array, stacks and linked list solving problems.
- Handling File in "C".

Contents: Theory		Hrs	Marks
Unit -1	**Introduction to computer software:** ➢ Classification of computer software. • System software. • Application software. ➢ Programming languages. • Machine languages. • Assembly languages. • High level programming languages. ➢ Algorithms and flowchart.	[03]	
Unit -2	**Fundamental of C languages.** ➢ Introduction. • Background. • Characteristics of C. • Uses of C. ➢ Structure of a C program. ➢ Writing the first C program. ➢ Files used in a C program. • Source code files. • Header files. • Object files. • Binary executable files.	[08]	

	➢ Compiling and Executing C programs. ➢ Using comments. ➢ Characters used in C. ➢ Identifier. ➢ Keyword or Reserved words. ➢ Tokens. ➢ Constants. • Numeric constant. • String Character constant. ➢ Variables. ➢ Variable Declaration. ➢ Basic Data Types. ➢ Additional Data types. ➢ Operators and Expressions. ➢ Operator Precedence and Associativity. ➢ Type conversion and Type casting. ➢ Input/ Output statements in C.		
Unit -3	**Decision Control and Looping Statements:** ➢ Introduction to Decision control statements. ➢ Conditional Branching statements. • If statement. • If-else statement. • If-else-if statement. • Switch case. ➢ Iterative statements. • While loop. • Do-while loop. • For loop. ➢ Nested loops. ➢ Break and continue statements. • Break statement. • Continue statement. ➢ Goto statement.		
Unit -4	**Functions in 'C'.** ➢ Uses of functions. ➢ User defined functions. ➢ Function Declaration.	[07]	

	➢ Calling a function. ➢ Actual and formal Arguments. ➢ Rules to call a function. ➢ Function props type. ➢ Recursion. • Use of Recursive function. ➢ Local or Internal variables. ➢ Global or External variables. ➢ Void function. ➢ Storage classes in C. • Auto or Automatic Storage class. • Static Storage class. • Extern Storage class. • Register Storage class.		
Unit -5	**Arrays.** ➢ Introduction. ➢ Declaration of Arrays. ➢ Accessing the Elements of an Array. • Calculating the address of Array elements. • Calculating the length of an Array. ➢ Storing values in Arrays. • Initializing Arrays during Declaration. • Inputting values from the keyboard. • Assigning values to Individual Elements. ➢ Operations on Arrays. • Traversing an Array. • Inserting an Element in an Array. • Deleting an Element from an Array. • Merging Two Arrays. • Searching for a value in an Array. ➢ Passing Arrays to functions. ➢ Two dimensional Arrays. • Declaring Two-dimensional Arrays. • Initializing Two-dimensional Arrays. • Accessing the Elements of two dimensional Arrays. ➢ Operations on Two-dimensional Arrays.	[07]	

Unit -6	**Pointers.** ➢ Understanding the Computer's Memory. ➢ Introduction to pointers. ➢ Declaring pointer variables. ➢ Pointer Expressions and pointer Arithmetic. ➢ Null pointers. ➢ Passing Arguments to function using pointer. ➢ Pointers and Arrays. ➢ Passing an Array to a Function. ➢ Dynamic Memory Allocation. • Malloc ( ) function. • Calloc ( ) function. • Realloc ( ) function. • Free ( ) function.	[07]	
Unit -7	**Structures and Unions.** ➢ Structures. ➢ Structure variables and Arrays. • Initialization of structure variable and Array. • Dot (•) Operator. • Assigning value of a structure to Another structure. ➢ Structure within structures. ➢ Site of ( ) of a structure. ➢ Unions. ➢ Site of ( ) unions. ➢ Difference between a structure and an union. ➢ Enum Data Type. ➢ Typedef Declaration.	[04]	

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. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa

10. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart

11. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth

12. C made easy, McGraw Hill Book Company, 1987. - H. Schildt

13. Software Engineering, McGraw Hill, 1992. - R.S. Pressman

14. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

KNOWLEDGE ORGANISATION OF LIBRARY CLASSIFICATION & CATALOGUING

Subject Code 2041303	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 / 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	Marks
Unit -1	**Basic of Classification**			
	1.1	Definition, Need and purpose of classification.		
	1.2	Concept of call Number, class Number and Basic number.		
	1.3	Species of classification scheme.		
	1.4	Salient features of DDC, CC and UDC.		
	1.5	Notation: Definition, Kinds, Function.		
Unit -2	2	**Theoretical Foundation of Classification**		
	2.1	Canons of classification		
	2.2	Phase relation, Common isolates and other Auxiliary Table of DDC, CC and UDC.		
	2.3	Postulational Approach to classification and five fundamental categories and Facet sequence.		
	2.4	Devices, Indicator digits.		
	2.5	Recent developments in classification.		
Unit -3	3	**Basic of Cataloguing**		
	3.1	Library Catalogue: Definition, Function, type and Physical Forms.		
	3.2	Kinds of entries and their function.		
	3.3	History of Catalogue Cod.		
	3.4	Salient Feature of AACR-II and CCC		

Unit -4	4	**Normative Principle and subject cataloguing**		
	4.1	Normative principle and canons of Cataloguing		
	4.2	Subject cataloguing: Chain Procedure, Subject Heading lists.		
	4.3	Filling of Catalogue entire and Alphabetization.		
Unit -5	5	**Bibliographical Formals and other aspects**		
	5.1	Standards of bibliographic description and Record Formats: ISBD, MARC, CCF, ISO-2709/Z39.2, Dublin core.		
	5.2	Centralized and Co-operative cataloguing, Simplified Cataloguing.		
	5.3	Cataloguing of Non-Book Material: Cartographic Materials, Electrons Documents, Audio-Visual Materials and Continuing documents.		
		Total		

Recommended Books **Author**

1. पुस्तकालय वर्गीकरण के सिद्धांत S. S. Agarwal
2. सूचीकरण के सिद्धांत

6.
7.
8.

MANAGEMENT INFORMATION SYSTEM IN LIBRARIES

Subject Code	Theory			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	100	
2041304	L	T	P/S	ESE	:	70	03
	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 center in our Country. It gives a basic knowledge about information officers function is the most useful and organized 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 Libraries.

Contents: Theory		
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.	
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 विज्ञान एवं सूचना प्रावैधिकी	डॉ० बी० के० शर्मा
4.	Library Automation	

LIBRARY HOUSE KEEPING OPERATION

Subject Code	Theory			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	100	
2041305	L	T	P/S	ESE	:	70	03
	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**			
	1	Library House-Keeping (Information)		
	1.1	Definition		
	1.2	Scope and Utility		
	1.3	Purpose and Need		
	1.4	Characteristics of Library House Keeping		
Unit -2	2	**Different Departments of Library**		
	2.1	Reception		
	2.2	Reading Room		
	2.3	Lending Section		
	2.4	Reference Section		

Unit -3	3	**Acquisition: Book Selection, Ordering and Allotment**		
	3.1	Technical Section (Classification & Cataloguing)		
	3.2	Maintenance of Binding/Material-Print & Non-Print Work		
	3.3	Reprography (Xeroxing/Photostat)		
	3.4	Microform Unit		
Unit -4	4	**Manuscript**		
	4.1	Kinds of Manuscript		
	4.2	Maintenance of Manuscript		
	4.3	Duplication of Manuscript		
	4.4	Preservation and Conversion of Manuscript		
Unit -5	5	**Rules of Library**		
	5.1	Membership		
	5.2	Lending		
	5.3	Circulation		
	5.4	Serial		
Unit -6	6	**Library Planning**		
	6.1	Building Plan		
	6.2	Furniture		
	6.3	Fixtures		
	6.4	Equipments		
		Total		

Recommended Books

SL	Title/Publisher	Author
1.	Basic of Library & Information Series, Vikas Publishing House, New Delhi.	K.T.Dilli
2.	सूचना प्रा द्यौगिकी के नये आयाम, साम्बर पब्लिकेश न, नई दिल्ली	शंक र सिंह
3-	ग्रन्थालय विज्ञान	श्री दिनेश। सिंह

COMPUTER PROGRAMMING THROUGH 'C' LAB

Subject Code	Practical			No. of Period in one session: 50			Credits
	No. of Periods Per Week			Full Marks	:	50	
2000306	L	T	P/S	ESE	:	50	03
	—	—	06	Internal	:	15	
				External	:	35	

Course Learning Objectives:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

Course outcomes:

Student should be able to write code snippets, and then compile, debug and execute them. The language of choice will be C. This is a skill course. More you practice, better it will be.

Content: Practical		Hrs	Marks
Unit – 1	Familiarization with programming environment (Editor, Compiler, etc.)		
Unit – 2	Programs using, I/O statements and various operators		
Unit – 3	Programs using expression evaluation and precedence		
Unit – 4	Programs using decision making statements and branching statements		
Unit – 5	Programs using loop statements		
Unit – 6	Programs to demonstrate applications of n dimensional arrays		
Unit – 7	Programs to demonstrate use of string manipulation functions		
Unit – 8	Programs to demonstrate parameter passing mechanism		
Unit – 9	Programs to demonstrate recursion		
Unit – 10	Programs to demonstrate use of pointers		
Unit – 11	Programs to demonstrate command line arguments		
Unit – 12	Programs to demonstrate dynamic memory allocation		
Unit – 13	Programs to demonstrate file operations		

Reference Books:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

KNOWLEDGE ORGANIZATION CLASSIFICATION LAB

Subject Code 2041307	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	Pero
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	Marks
Unit -1	**Content** **1 Introduction to D.D.C., 19th Edition** 1.1 Terminologies 1.2 Summaries	[10]	
Unit -2	**2 Construction of Members for Simple Titles** 2.1 Construction of Members - Methods - Means. 2.2 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 2041308	Practical			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	ESE	:	25	
	—	—	02	Internal	:	07	
				External	:	18	

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:			Hrs	Marks
Unit -1	**04**	**Cataloguing with AACR-II (Revised)**	[10]	
	04.01	Introduction to		
	04.02	AACR-II Salient Features of AACR-II		
Unit -2	**05**	**Different Types of Entries**	[10]	
	05.01	Entries in		
	05.02	AACR-II Main		
	05.03	Entry		
	05.04	Added Entry		
		Reference		
		Entry		

Unit -3	**06**	**Choice of Headings**	[10]	
	06.01	Choice and Rendering of		
	06.02	Heading Personal names,		
	06.03	Western/Indian names		
	06.04	Corporate Authors		
		Pseudonymous, Anonymous Works and Uniform Titles		
Unit -4	**07**	**Cataloguing of at least 100 Titles with AACR-II**	[10]	
	07.01	Personal authors, Single and Joint		
	07.02	Authors - 20 each Pseudonymous		
	07.03	Authors - 20 each		
		Anonymous Author - 20 each		
		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	
2041309	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	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		

PYTHON / OTHERS (TW)

Subject Code	Term Work			No of Period in one session:			Credits
2000310	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal	:	07	
	—	—	02	External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3…..1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		

KNOWLEDGE ORGANIZATION CATALOGUING -TW

Subject Code	Term Work			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	50	
2041311	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		Hrs	Marks
Unit -1	Arranging institutional library according to the subject.		
Unit -2	Preparation of temporary collection of given subject i.e., local history/Primary		
Unit -3	Cataloguing with 25 titles according to AACR.		
	Total		

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

IIIRD SEMESTER DIPLOMA IN COSTUME DESIGN & GARMENT TECHNOLOGY

(Effective from Session 2020-21 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	2042301	03	03	10	20	70	100	28	40	03
2.	Software skills	2042302	03	03	10	20	70	100	28	40	03
3.	Textile Science	2042303	03	03	10	20	70	100	28	40	03
4.	Visualization and Representation	2042304	03	03	10	20	70	100	28	40	03
5.	Clothing Construction	2042305	03	03	10	20	70	100	28	40	03
		Total:-	**15**				**350**	**500**			**15**

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGS CHEME	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	2042306	06 50% Physical 50% Virtual	03	15	35	50	20	03
7.	Visualization and Representation Lab	2042307	04 50% Physical 50% Virtual	03	15	35	50	20	02
8.	Clothing Construction Lab.-I	2042308	02 50% Physical 50% Virtual	03	15	35	50	20	01
Total: - 12							**150**		**06**

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)	2042309	04	23	52	75	30	02
10.	**Python / Others** (TW)	2000310	02	07	18	25	10	01
Total: - 06						**100**		**03**
Total Periods per week Each of duration one Hours = **33**						**Total Marks = 750**		**24**

BASICS OF COSTUME DESIGN & GARMENT MAKING

Subject Code 2042301	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 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	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 2042302	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 software's, 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	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 2042303	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	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 2042304	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	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 2042305	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: 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	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 2042306	Practical						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 software's, 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 color changing techniques.
- Photo editing skills

Eight experiments to be performed in the laboratory:

Contents : Practical

List of Experiment: -		Hrs	Marks
Unit -1	Photoshop		
Unit-2	Corel draw.		
Unit-3	Adobe Illustrator.		
	Total		

VISUALIZATION & REPRESENTATION LAB

Subject Code 2042307	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	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.	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**.	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 2042308	Practical			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
				External	:	35	

CONTENTS : PRACTICAL

	List of Experiment	Hrs	Marks
Unit-1	Prepare a labeled outline diagram of sewing machine.		
Unit-2	Take body measurement of another person and note it in the file.		
Unit–3	Prepare sample of hand stitches (covered in theory) on given fabric.		
	Prepare samples of machine stitches (covered in theory) on given fabric.		
Unit-4	Prepare samples of neck line finishing using piping and shape facing (any three)		
	To make samples of pockets (Patch, side and cut)		
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)		
Unit-6	Fix components such as zip, button and button hole, hook and eye and Velcro as directed on given garment		
	Total		

DESIGN CONCEPTS & DETAILS -TW

Subject Code	Term Work			No of Period in one session: 60			Credits
2042309	No. of Periods Per Week			Full Marks	:	75	02
	L	T	P/S	Internal	:	23	
	—	—	04	External	:	52	

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	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, Placket's 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 different types of motifs. (5 Motifs each)	15	
	4.2 Natural Floral motifs Animal motifs Geometric Design Abstract Design Man-made motifs Decorative motifs Design Polka dot Design		
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**	

PYTHON / OTHERS -TW

Subject Code	Term Work			No of Period in one session:			Credits
	No. of Periods Per Week			Full Marks	:	25	
2000310	L	T	P/S	Internal	:	07	01
	—	—	02	External	:	18	

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		