Scheme of Teaching and Examination for
III Semester DIPLOMA in ELECTRICAL ENGINEERING BRANCH

THEORY

SL. No	SUBJECTS	SUBJECT CODE	Periods per Week	Periods in one Session	Hours of Exam.	Terminal Exam. (A) Marks	Final Exam. (B) Marks	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
1	Professional Mathematics	00301	6	60	3	20	80	100	26	36
2	Engineering Mechanics	00302	5	50	3	20	80	100	26	36
3	Computer Programming Through 'C '	00303	4	50	3	20	80	100	26	36
4	Electrical component and material	20304	6	50	3	20	80	100	26	36
5	Semi-conductor Devices and circuit	20305	5	60	3	20	80	100	26	36
	Total :-		26					500		

PRACTICAL

SL. No.	SUBJECTS	SUBJECT CODE	Periods per Week	Periods in one Session	Hours of Exam.	Marks Internal Exam. (A)	Marks External Exam. (B)	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
6	Engineering Mechanics Lab.	00306	4	50	3	10	40	50	16	21
7	Computer Programming Through 'C ' Lab.	00307	6	60	3	10	40	50	16	21
8	Electrical workshop practice	20308	6	40	6	10	40	50	16	21
	Total :-		16					150		

SESSIONAL

SL. No.	SUBJECTS	SUBJECT CODE	Periods per Week	Periods in One Session	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject
9	Electrical workshop practice	20309	_	50	40	60	100	50
	Total :-		_				100	

Total Periods per Week	42	Total Marks	750

PROFESSIONAL MATHEMATICS

Subject Code	Theory			No of Period in one session : 60		
00301	**No. of Periods Per Week**			**Full Marks**	**:**	**100**
	L	**T**	**P/S**	**Annual Exam.**	**:**	**80**
	06	**00**	**00**	**Internal Exam.**	**:**	**20**

Rationale:

   A technical diploma holder is engaged generally as first line supervisor. He forms a bridge between workers and management. He has to understand the language of the modern management and communicate with the workers in their language. This subject will help accomplishment of the task in stipulated time, develop attitude towards cost effectiveness, selection of most effective alternative methods. This course will also help the student to tackle different numerical methods and computational techniques for problem solving in research organization as a programmer.

Objective:

   The course enables students to.

- Managerial skill based on mathematical footing
- The ability to find approximate solutions and/or answers   to the problems where analytical methods become more complex.
- To choose correct numerical techniques for a given problem.

S.No.	Topics	Periods
01	GROUP –A (Numerical Methods)	**(20)**
02	GROUP-B (Statistical Techniques)	**(20)**
03	GROUP-C (Management Techniques)	**(20)**
	Total:	**(60)**

CONTENTS:

GROUP-A   (NUMERICAL METHODS)   (20)

01.01   Introduction to Numerical methods: Approximation and errors (Truncation & Round off).

01.02   Numerical solutions of non-linear and Transcendental equations: Iterative methods. Newton-Raphson's method. Bisection method and Regula-Falsi method.

01.03   Solution of Linear Simultaneous Equations: Gaussian Elimination method and Gauss-Jordan method.

01.04   Finite Difference: Backward and forward Differences. Finite Difference Interpolation Formula. Newton's Forward Difference formula and Newton's Backward Difference formula.

01.05   Numerical Differentiation & Integration: Newton's forward and backward differentiation formula. Trapezoidal Rule and Simpson's 1/3 rule for numerical integration.

01.06   Difference equations. simple problem Only

GROUP-B   (STATISTICAL TECHNIQUES)   [20]

02.01   Introduction to statistics: Measure of central tendencies: measures of dispersions: standard deviation and variance for discrete and grouped data: assumed mean and step deviation methods.

02.02   Theory of Probability: Random events and their types. Probability of Events. Definitions. Laws of Probability (Addition and Multiplication Laws)

02.03   Probability Distribution: Introduction to Arithmetic Mean and Standard Deviation of a probability distribution. Important probability distribution – Binomial distribution. Poisson's distribution & Their means and variance.

GROUP-C   (MANAGEMENT TECHNIQUES)   [20]

03.01   Linear Models

03.01.01   Introduction to Operations Research (O.R) Steps of O.R.

03.01.02   Linear Programming Problems: Formulation of a LPP. Mathematical Modelling and Solution by graphical method.

03.01.03   Solution by Simplex Method: Basic Feasible Solution (Degenerator and Non-degenerator)

03.01.04   Transportation problem: Introduction and Solution Procedure-

    (i)   Finding the initial basic feasible solution by N-W Corner Rule, Least cost method and Vogel's Approximation Method.

    (ii)   Test of optimality by **u-v** method only.

03.01.05   Assignment Problem: Introduction and Solution Procedure–Fundamental theory underlying Hungarian Method.

03.02   Network Analysis. CPM & PERT: Introduction.

03.02.01   Basic concepts – Activities. Nodes. Edges. Networking of a project. Various times calculations. CPM to determine the optimal project schedule.

03.02.02   PERT- Definition, difference between CPM & PERT. Pessimistic times, optimistic times. Most likely times of various activities.

Books Recommended: <u>Text Books</u>

1.	Operations Research. Sultan Chand & Sons, New Delhi, 1990	-	Kanti Swaroop. P.K Gupta and Man Mohan
2.	Operations Research. Sultan Chand & Sons, New Delhi, 1990	-	Heera & Gupta
3.	Operations Research. Macmillan Publishing Co. New York, 1982	-	H.A.Taha
4.	Computer based numerical algorithm, East West Press, 1975	-	E.V Krishna Murthy & S.V. Sen
5.	Computer oriented numerical method, Prentice Hall India, 1980	-	V. Rajaraman

ENGINEERING MECHANICS

Subject Code	Theory			No of Period in one session : 50		
00302	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	04	00	00	Internal Exam.	:	20

Rationale:

The subject forms an important part of Engineering curricula for developing the concepts required in the design of various structures. The subject deals with the basic concept of mechanic of body and the behaviour of material used in practice and in structures under varying load conditions. The first part of the subject deals with the applied mechanics science. Which describe the condition of body in rest or motion under the action of forces. In its preview come variety of general and specialized engineering disciplines concerned with analysis of structures and machines and the mechanism of their parts.

In the Second part, the principles of strength of materials is introduced in which the student will learn to distinguish between different types of stress and strain and also the qualitative assessment of stress and strains in material element under the action of internal forces.

Objective:

Knowledge Workers will be able to:

- Analyze and understand the physical behaviour of members of engineering structures.
- Acquire knowledge of various elements of structures.
- Utilise the basic principles.
- Develop skill to tackle field problem.
- Solve the problems by the application of basic principles.
- Judge the suitability of materials in design process.

S.No.	Topics	Periods
	PART-A	
01	Introduction	(02)
02	Vector Methods	(02)
03	Introduction to system of forces and equilibrium	(06)
04	Friction	(04)
05	Kinematics and kinetics of a particle	(03)
06	Kinematics and kinetics of rigid body	(02)
07	Impulse and Momentum	(02)
08	Work, Energy and Power	(04)
	Total :	**(25)**
	PART-B	
01	Simple stress and strains	(07)
02	Elastic constants	(03)
03	Center of Gravity (Centroid)	(02)
04	Moment of Inertia	(05)
05	Shearing force and bending moments	(08)
		(25)
	Total :	**(50)**

CONTENTS:
PART-A
TOPIC: 01 – INTRODUCTION: [02]
Idealisation of mechanics; Concept of rigid body; External forces (Body forces & surface forces) Law of Mechanics.
TOPIC: 02 VECTOR METHODS: [02]
Equality and equivalence of vectors; Free and Bound vector; Moment of a force about a point and a line; Couple and moment of a couple.

TOPIC: 03 – INDTRODUCTION TO SYSTEM OF FORCES AND EQUILIBRIUM: [06]

Statically equivalent force system; simplest equivalent of a system of forces; force analysis, free body diagram, equation of equilibrium.

TOPIC: 04 – FRICTION: [04]
Basic Concept of different Friction (Static, Dynamic, Sliding, Rolling, Fluid).

TOPIC: 05 – KINEMATICS AND KINETICS OF A PARTICLE: [03]
Rectilinear and curvilinear translations; normal and tangential component of acceleration.

TOPIC:06 – KINEMATICS AND KINETICS OF RIGID BODY: [02]
Simple concept of Angular Velocity and angular acceleration. Effective forces on a rigid body. D' Alembert's principle.

TOPIC:07 – IMPULSE AND MOMENTUM: [02]
Linear impulse and linear momentum, angular impulse and angular momentum, definitions only;

TOPIC: 08 – WORK, ENERGY AND POWER: [04]
Work done by forces and couples, potential and kinetic energy, work-energy; conservation of energy; concept of power and efficiency.

PART-B

TOPIC: 01 – SIMPLE STREES & STRAIN: [07]

01.01	Definition of various terms and their units (S.I. Units)
01.02	Stress and strain due to axial load and transverse load relation between stress and strain. Hook's law. Studies of stress strain curve. Factor of safety & working stress. Concepts of isotropic materials.
01.03	Stress & strain in simple section & composite bar. Stress & strain due to temperature variation.
01.04	Shrinking on hoop's stresses.

TOPIC: 02 – ELASTIC STRESS & STRAIN: [03]
02.01	Linear strain and lateral strain, poisson's ratio, volumetric strain
02.02	Change in volume due to axial, biaxial & triaxial loading. Bulk modulus.
02.03	Shear stress and strain, modulus of rigidity.
02.04	Simple shear. Complementary shear stress.
02.05	Various Relations among modulus of elasticity, modulus of rigidity & bulk modulus.

TOPIC: 03 – CENTER OF GRAVITY (CENTROID): [02]
03.01	Definition of center of gravity & centroid.
03.02	Determination of C.G of various sections symmetrical and unsymmetrical sections.
03.03	Determination of C.G. of perforated sections.

TOPIC: 04 – MOMENT OF INERTIA: [05]
04.01	Definition of M.I.; radius of gyration, second moment of area.
04.02	Parallel axis theorem & perpendicular axis theorem.
04.03	Derivation of M.I. of regular area-rectangular, triangular circular about centroidal axis.
04.04	M.I. of built up section, symmetrical and unsymmetrical about centroidal axis, modulus of sections.

TOPIC: 05 – SHEARING FORCE & BENDING MOMENT: [08]
05.01	Types of beams and types of supports, types of loading.
05.02	Concept and definitions of shear force and bending moment, sign convention.
05.03	Shear force and bending moment diagrams for cantilever, simply supported beam, over hanging beam for various types of loading & couples, point of contraflexure.
05.04	Relation between B.M, S.F. and rate of loading.

Books Recommended:
Text Books

1.	Strength of Materials	-	R.S. Khurmi
2.	Mechanics of Structure	-	S.B. Junarkar
3.	Strength of Materials	-	Ramamrutham
4.	Theory of Structure	-	Vazirini & Ratwani
5.	Strength of Materials & Mechanics of Structure.	-	Punamia
6.	Teaching plans of Strength of Material	-	T.T.T.I. Madras
7.	द्रव्य सामर्थ्य	-	गुरूचरण सिंह
8.	Engineering Mechanics	-	I.H. Shames
9.	Engineering Mechanics	-	Beer & Johnson
10.	Strength of material	-	S.K. Singh

COMPUTER PROGRAMMING THROUGH C

Subject Code	Theory			No of Period in one session : 50		
00303	**No. of Periods Per Week**			**Full Marks**	**:**	**100**
	L	T	P/S	Annual Exam.	:	80
	04	00	00	Internal Exam.	:	20

Rationale:

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

Objective:

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

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

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

CONTENTS:

TOPIC: 01 – INTRODUCTION TO PROGRAMMING: **[03]**

The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.

TOPIC: 02 – ALGORITHM FOR PROBLEM SOLVING: **[08]**

Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,

TOPIC: 03 – INTRODUCTION TO 'C' LANGUAGE: **[08]**

03.01   Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.

03.02   Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.

03.03   Simple assignment statement. Basic input/output statement.

03.04   Simple 'C' programs of the given algorithms

TOPIC: 04 – CONDITIONAL STATEMENTS AND LOOPS: **[07]**

04.01   Decision making within a program

04.02   Conditions, Relational Operators, Logical Perator.

04.03   If statement, it-else statement.

04.04   Loop statements

04.05   Break, Continue, Switch

TOPIC: 05 – ARRAYS: **[07]**

What is an Array?, Declaring an Array, Initializing an Array.

One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.

TOPIC: 06 – FUNCTIONS: [07]
Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.

TOPIC: 07 – STRUCTURES AND UNIONS: [04]
Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,

TOPIC: 08 – POINTERS: [06]
Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.

Book Recommended:

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

ELECTRICAL COMPONENT & MATERIAL

Subject Code	Theory			No of Period in one session : 60		
20304	**No. of Periods Per Week**			**Full Marks**	**:**	**100**
	L	**T**	**P/S**	**Annual Exam.**	**:**	**80**
	00	**00**	**03**	**Internal Exam.**	**:**	**20**

Rationale

For the course of Diploma in Engineering it is a common feature that the students of all branches are taught the common subjects, and the basic thrust is to improve their knowledge of science, and skills in tackling mathematical problems and some common practical practices which help them later on to become a good supervisor. For the Diploma in Electrical Engineering it is desirable to expose them to such items, also which they are to face in subsequent classes as well as in fields. So for designing a curriculum for the 1st year students, it is kept in mind that they should be given sufficient knowledge which they will be able to comprehend and apply in their concerned subjects in the higher classes as well as in their world of work.

The functions of diploma holder technicians are to select materials, identify the materials, distinguish between good and bad ones.

The skill is to be developed by selecting such types of theories and practicals which are need based.

The teachings should be with the help of models, charts, projected photographs, videos and possibly with physical demonstration. The students should be given opportunity to observe the things themselves in institutions, laboratories, workshop as well as in open market.

Since no practical classes are being recommended in Electrical Engineering for 1st year students, eight classes have been allotted for physical exposure to different materials to acquaint the students with practical problems or projects, which they will encounter in higher classes and industries. This skill will also help them in entrepreneurship.

Tutorial classes have been introduced to make the students know the actual rates and criteria of selection by persuading them to contact local markets at their own. Through the tutorial the students should be made to develop skill so that they can be able to acquire practical knowledge of different types of products and materials available in the market with quality and non quality making. This will help them develop sufficient knowledge of different types of manufactured items. Thus the students will be able to select the right materials at reasonable price.

CURRICULUM

SL	Topics	Periods
1.	Introduction to Conductors	..
2.	Insulating Materials	..
3.	Magnetic Materials	..
4.	Semi Conducting Materials	..
5.	Physical Exposure	..
	Total	**60**

CONTENTS

Topics	Content	Periods
01	Introduction to Conductors	..
01.01	General properties and specification of conducting materials: By showing charts and providing tables. Use of S.W.G. and its equivalent.	
01.02	Resistivity and factors affecting resistivity. Effect of temperature - by showing some practicals and illustrating it.	
01.03	Properties of Copper, Aluminium, Steel materials used in the construction of electric cables, standard conductors - Each item explained clearly and their individual use in practical purposes. Naming the material or equipment inside and outside and illustrating them with physical presence.	
01.04	Low resistivity copper alloys, high resistivity alloys, practical uses in electrical resistance in lamps and electric furnaces - After explaining the properties, the practical use should be shown to students by demonstration, List of equipments should be provided.	
01.05	Properties and application of Nichrome, Manganin, Tungsten, Solder, Fuse elements. With practical use and method of selection of materials for a particular work.	
02	Insulating Materials	..
_	The objective of this topic is to let the students know the importance of insulating materials and their uses in day-to-day life as well as in transmission of electrical power.	

02.01   Introduction, electrical properties of dielectrics, volume resistance, surface resistance. By imparting theoretical resistance with numerical methods of calculations.

02.02   Factors affecting insulating resistance, factors affecting dielectric strength - By imparting theoretical resistance with numerical methods of calculations.

02.03   Main insulating materials, temporating rating of insulating materials - The topic to be discussed in detail with the help of charts and tables. Commonly used insulating materials should be shown.

02.04   Insulating varnishes. Natural and Synthetic rubber, insulating liquid materials - By providing classified knowledge and their practical uses with the help of charts.

02.05   Transformer oil, properties of ideal insulation oil. Causes of deterioration of insulating oil, effect of moisture and temperature, dielectric strength test: This is an important and practically used topic. Efforts should be made to show an oil immersed transformer and its proper use should be discussed in detail.

02.06   Porcelain insulators: This is most commonly used insulating material. While imparting knowledge stress should be on physical representation of various types of insulators and their construction.

03   Magnetic Materials   ..
_   By imparting knowledge through this topic, the students will be able to understand the importance of core and yoke in a transformer.

03.01   Introduction and Classification - With the help of proper drawing and photographs students should be made to understand the importance of the subject and its practical uses in machines.

03.02   Magnetization curve, Hysteresis, B-H Curve, magnetic saturation.

03.03   Hysteresis loop, hysteresis loss, simple problems on hysteresis loss. - The teachings should be with the help of figures and drawings and its effect on efficiency of a machine should be clearly mentioned.

03.04   Magnetic materials for electric devices and their properties - Properties of ferromagnetic materials should be explained in detail. Its use in transformer to be explained with the help of chart.

04   Semi Conducting Materials   ..
_   The main aim of this topic is to familiarize the students with basic ideas of semi conductors, use of different materials in the semi conductors, their importance and uses. It will help them understand the topics of transistor circuit that they will encounter in higher classes. At this juncture the students will be able to know how a semi conductor is used to manufacture a transistor.

04.01   Introduction and uses of semi conducting materials. Basic idea of semi conductors, semi conductors compound, intrinsic and extrinsic semi conductor - The teaching of basic idea should be associated with periodic tables and charts.

04.02   N and P type semi conductor, P-N junction, PNP and NPN type of materials, importance and uses of majority carriers and minority carriers, biasing of a transformer - This topic includes the principle of working of a P-N diode and transistor. The flow diagram of electrons should be explained clearly with the help of a neat chart.

05   Physical Exposure   ..
_   This will enable the students to develop the skill of distinguishing and differentiating between good quality and bad quality materials. This will also give an idea of the price of the materials available in various qualities in the market. This will help students select suitable materials at reasonable price in their world of work. Tutorials - Tutorial classes should consist of two parts. Students should be divided into groups of five or six. Each group should be given simple problems relating to inside and outside of the institution. It should relate to the subject. The students should be encouraged for self observation. In the subsequent class they should be put to objective questions. The achievements should be given proper priority in evaluation at terminal examinations. In the tutorial classes the students should be guided to know the actual rates and modes of selection of the materials by persuading them to contact the local market at their own. They should be given practical exposure of different types of products with quality and non quality markings. They should be made able to select the right materials at reasonable prices, with developing a clear-cut knowledge of different types and quality of manufactured items.

Recommended Books

SL	Title/Publisher	Author
1.	Electrical Engineering Materials, Mir Publication	Y. Koritskey
2.	Electrical Engineering Materials, Prentice Hall of India Pvt. Ltd.	A.J. Dekkar
3.	A Text Book on Electrical Engineering	Y.P.S. Bector
4.	विद्युत इंजीनियरिंग पदार्थ	यष
5.	विद्युत अभियांत्रिक सामग्री	डी. सी. मित्तसेन

SEMI CONDUCTOR DEVICES & CIRCUITS

Subject Code	Theory			No of Period in one session : 60		
20305	**No. of Periods Per Week**			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06			Internal Exam.	:	20

Rationale

The continuous use and development of Electronics in each field of engineering has necessitated an electrical engineer to have a thorough knowledge of electronic instruments. Almost all electrical control equipments are now electronically controlled. Thus electronics has become a part and parcel of electrical engineers. Therefore each student of electrical engineering should be well conversant of the use of electronics instruments for measurement circuiting control processes machine operations etc.

Objectives

With the background of the knowledge of the topics of the subject will enable an electrical supervisor to locate the troubles properly and when arising in the electrical system. They will be able to guide the necessity of control required in industries. Students will be able to select an equivalent components in absence of exact substitute of component for non stop working.

CURRICULUM

SL	Topics	Periods
1.	Semiconductors	..
2.	Digital Electronics	..
3.	Power Electronics	..
	Total	**60**

CONTENTS

Topics	Content	Periods
01	Semiconductors	..
01.01	Overview of Semiconductor diode and Transistors.	
01.02	Formation of transistors and biasing CB, CE and CC configuration. Input-Output characteristics of transistors, Current and Voltage gains, stability, transistor as an amplifier,	
01.03	Field Effect Transistors (FET), JEET, MOSFET, Characteristic of FET, Biasing of FET,	
02	Digital Electronics	..
02.01	Logic gates - AND, OR, EXOR, NAND , NOR gates, flip-flop using gates, J-K flip-flop, D-flip flop, full adder, resistors, shift resistor,	
03	Power Electronics	..
03.01	Operational amplifiers - ideal characteristics, use of amplifiers as integrator, differentiation and as comparator, (a) A/D and D/A convertors - different techniques and their applications.	

Reference Books

SL	Title/Publisher	Author
1.	Solid State Electronics Devices, Tata McGraw Hill	-
2.	Integrated Electronics, McGraw Hill	Miliman
3.	Semi Conductor Device, McGraw Hill	S. M. Sze
4.	Physics of Semi Device, Willy Eastern	S. M. Sze
5.	Electronics Device and Circuits, Khanna Publishers	G.K. Mithal
6.	Electronic Principles, Tata McGraw Hill	A.P. Malvino
7.	Transistor Approximation, Tata McGraw Hill	A.P. Malvino
8.	Introduction to Solid State Physics, 6th Ed., McGraw Hill	Kittel
9.	Introduction to Micro Electronic Devices	Pulfrey
10.	Micro Electronic Devices, McGraw Hill	Yang
11.	Special Issue on Lasers, Physics Today	41 No.-10, Oct. 88

ENGINEERING MECHANICS Lab.

Subject Code 00306	Practical			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	04	00		Internal Exam.	:	10

Rationale & Objectives:

The Engineering Mechanics Laboratory is a subject which will help technician to understand the application of theory that he has studied in practice by performing experiments and verifying results.

Besides the above the objective of the curriculum with effective skill will be developed in them to observe experimental data, and to analyses the results.

These topics of this curriculum will certainly build their confidence in performing the utilization of principle of mechanics in Civil Engineering works.

CONTENTS:

Eight experiments to be performed in the laboratory:

1. Determination of elongation of wire under external load.
2. Tensile Test on mild steel specimen.
3. Tensile Test on high tensile specimen.
4. Compression Test on metal.
5. Compression Test on bricks.
6. Determination of Young's Modulus of Elasticity of wire.
7. Determination of reaction at the support of beam.
8. Determination of bending moment of a simply supported beam.
9. Determination of reaction at the support of roof truss.
10. Determination of deflection of beams.
11. Determination of moment of inertia of fly wheel.
12. Determination of bending moment of a over hanging beam.
13. Verification of Polygon Law of forces.
14. Verification of Triangle Law of forces.
15. To find moment of inertia of fly wheel.
16. Compression Test on metal.
17. Tensile Test on M.S.specimen.
18. Determination of co-efficient of friction on inclined plane.

Books Recommended:

Text Books

1. अभियांत्रिक यांत्रिकी   . जे०के० कपूर
2. Strength of Materials   - Bininder Singh
3. Mechanics of Structure, Vol. 1   - S.B. Junarkar
4. Strength of Materials   - R.S. Khurmi
5. Engineering Mechanics and Strength of Materials   - I.B. Prasad
6. Teaching plans of Strength of Material   - T.T.T.I. Madras

COMPUTER PROGRAMMING THROUGH 'C'

Subject Code	Practical			No of Period in one session : 60		
00307	**No. of Periods Per Week**			**Full Marks**	**:**	**50**
	L	**T**	**P/S**	**Annual Exam.**	**:**	**40**
	06	**00**	**03**	**Internal Exam.**	**:**	**10**

CONTENTS:

List of Practicals:

1.   Programming exercise on executing a C program.

2.   Programming exercise on editing C program.

3.   Programming exercise on defining variables and assigning values to variable.

4.   Programming exercise on arithmetic and relational operations.

5.   Programming exercise on arithmetic expressions and their evaluation

6.   Programming on infix, postfix, transformation using stack.

7.   Programs on array implementation.

Books Recommended:

1.   How to solve it by Computer, Prentice Hall of India, 1992.   - R.G. Dromey.

2.   The C Programming Language, Prentice Hall of India, 1989.   -B.W. Kernighan & D.M.
                                                                                                                       Ritchie.

3.   The Spirit of C Programming, Jaico Publishing House, New Delhi, 1987.   - Cooper, Mullish

4.   Application Programming in C. Macmillain International editions, 1990.   - Richa'd Johnson-
                                                                                                                       Baugh & Martin Kalin

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

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

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

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

9.   Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi   - R. Subburaj

10.   Programming with C language, Tata McGraw Hill, New Delhi.   - C. Balaguruswami

11.   Elements of C, Khanna Publishers. Delhi   - M. H. Lewin

12.   Programming in C   - Stephan G. Kochan.

13.   Programming in C, Khanna Publishers. New Delhi   - B.P. Mahapatra

14.   Let us C, BPB Publication. New Delhi   - Yashwant Kanetkar

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

ELECTRICAL WORKSHOP PRACTICE

Subject Code	Practical			No of Period in one session : 120		
20308	**No. of Periods Per Week**			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	00	00	60	Internal Exam.	:	10

Rationale

As a supervisor, electrical diploma holder has to inspect test and modify the work done by skilled workers or artisans under hire. Sometimes he has to demonstrate the correct method and procedure of doing certain operations. So an electrical diploma holder must have conceptual understanding of the method of procedure and possess manual skills in addition to supervisory capability.

Objectives

To develop special skills required for repairing small electrical domestic appliances, making joints and carrying out work and detecting faults etc. in electrical equipments and circuits.

LIST OF PRACTICALS
SL   Topics
* Miscellaneous Electrical Workshop Processes
1. Acquaintance with the average tools and equipments used for electrical workshop.
2. Soldering wire jointing of different types.
3. Making of extension board containing two 5A and one one 15A plug-points.
4. Soldering electrical elements with the necessary switches micro-switches and extension terminals.
* House Wiring Processes
1. Wiring of different lamp control, stair casing circuits, batton wiring, cleat wiring and conduit wiring.
2. Assembly and interchange wiring of fluorescent tube light.
3. Connection of table and ceiling fans with regulators.
4. Earth resistance measurement and earthing processes.
* Distribution Boards Processes
1. To make a distribution board containing at least two switches, one fan regulator and one 5A plug point energy meter with main switch.
2. Fault detection and repair of domestic electric installation.
3. Fault detection and its repair in institution's workshop installations.
4. To make a single phase main distribution board with five outgoing circuits for light and fan load including main switch and fuses (only internal connections).
5. Wiring and testing of alarm and indicating relays, indicating lights etc.
6. Dismantling, repairing, assembling and testing of domestic appliance like electric iron, room heater, electric toaster, water heater, electric kettle, electric oven, ceiling fan, Table Fan, regulators, alarm bell.
7. Coil winding for small transformers or alarm bell.
8. Assembling small transformer cores from the given lamination plates.
9. Assembling small battery charger.
* Armature Winding
1. Armature winding of car dynamo.
2. Armature winding of table fan.
3. Armature winding of ceiling fan.
4. Armature winding of 3 phase induction motor.

ELECTRICAL WORKSHOP PRACTIC

Subject Code	Sessional			No of Period in one session :		
20309	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	00	00	00	Internal Exam.	:	20

<u>**Rationale**</u>

As a supervisor, electrical diploma holder has to inspect test and modify the work done by skilled workers or artisans under hire. Sometimes he has to demonstrate the correct method and procedure of doing certain operations. So an electrical diploma holder must have conceptual understanding of the method of procedure and possess manual skills in addition to supervisory capability.

Objectives

To develop special skills required for repairing small electrical domestic appliances, making joints and carrying out work and detecting faults etc. in electrical equipments and circuits.

LIST OF PRACTICALS

SL   Topics

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1. Acquaintance with the average tools and equipments used for electrical workshop.
2. Soldering wire jointing of different types.
3. Making of extension board containing two 5A and one one 15A plug-points.
4. Soldering electrical elements with the necessary switches micro-switches and extension terminals.
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1. Wiring of different lamp control, stair casing circuits, batton wiring, cleat wiring and conduit wiring.
2. Assembly and interchange wiring of fluorescent tube light.
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1. To make a distribution board containing at least two switches, one fan regulator and one 5A plug point energy meter with main switch.
2. Fault detection and repair of domestic electric installation.
3. Fault detection and its repair in institution's workshop installations.
4. To make a single phase main distribution board with five outgoing circuits for light and fan load including main switch and fuses (only internal connections).
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