STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 3rd Semester Electrical Engg.(wef 2019-20)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional:	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Engineering Mathematics-III	4		-	20	80	3	100
Th.2		Circuit and Network Theory	4	1	-	20	80	3	100
Th.3		Element of Mechanical Engineering	4		-	20	80	3	100
Th.4		Electrical Engineering Material	4			20	80	3	100
Th.5		Environmental studies	4			20	80	3	100
		Total	20	01		100	400	-	500
		Practical							
Pr.1		Mechanical Engineering Lab	-	-	3	25	50	3	75
Pr.2		Circuit and Simulation Lab	-	-	6	50	50	3	100
Pr.3		Mechanical Workshop	-	-	6	25	50	3	75
		Student Centred Activities(SCA)		-	3	-	-	-	-
		Total	-	-	*18*	*100*	*150*	-	*250*
		Grand Total	**20**	**01**	**18**	**200**	**550**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc., Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional: Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

CURRICULLUM OF 3RD SEMESTER

For

DIPLOMA IN ENGINEERING

(Effective FROM 2019-20 Sessions)

STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th1. ENGINEERING MATHEMATICS – III

(COMMON TO ELECT,ETC, AE & I and other Allied branches of Electrical and ETC)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. RATIONALE:

The subject engineering mathematics-III is a common paper for engineering branches. This subject includes complex numbers, Matrices, Laplace Transforms, Fourier series, Differential equations and Numerical Methods etc for solution of engineering problems.

B. OBJECTIVE:

On completion of study of Engineering Mathematics-III, the students will be able to:

1. Apply complex number concept in electricity , Quadratic equation , Imaginary numbers in signal processing, Radar & even biology (Brain Waves)
2. Apply Matrices in Engineering fields such as Electrical Circuits and Linear programming.
3. Transform Engineering problems to mathematical models with the help of differential equations and familiarize with the methods of solving by Analytical methods, Transform method and operator method and Numerical methods.
4. Solve algebraic equations by iterative Methods easily programmable in computers.
5. Analysis data and develop interpolating polynomials through method of differences

C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	Complex Numbers	06
2	Matrices	04
3	Differential Equations	10
4	Laplace transforms	12
5	Fourier Series	12
6	Numerical Methods	04
7	Finite difference & interpolation	12
	Total:	**60**

D. COURSE CONTENTS

1. Complex Numbers

1.1 Real and Imaginary numbers.
1.2 Complex numbers, conjugate complex numbers, Modulus and Amplitude of a complex number.
1.3 Geometrical Representation of Complex Numbers.
1.4 Properties of Complex Numbers.
1.5 Determination of three cube roots of unity and their properties.

1.6 De Moivre's theorem
1.7 Solve problems on 1·1 - 1·6

2. Matrices

2.1. Define rank of a matrix.
2.2. Perform elementary row transformations to determine the rank of a matrix.
2.3. State Rouche's theorem for consistency of a system of linear equations in n unknowns.
2.4. Solve equations in three unknowns testing consistency.
2.5. Solve problems on 2.1 – 2.4

3. Linear Differential Equations

3.1. Define Homogeneous and Non – Homogeneous Linear Differential Equations with constant coefficients with examples.
3.2. Find general solution of linear Differential Equations in terms of C.F. and P.I.
3.3. Derive rules for finding C.F. And P.I. in terms of operator D, excluding $\frac{1}{f(D)}x^n$.
3.4. Define partial differential equation (P.D.E) .
3.5. Form partial differential equations by eliminating arbitrary constants and arbitrary functions.
3.6. Solve partial differential equations of the form Pp + Qq = R
3.7. Solve problems on 3.1- 3.6

4. Laplace Transforms

4.1. Define Gamma function and $\Gamma(n+1) = n!$ and find $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$.
4.2. Define Laplace Transform of a function $f(t)$ and Inverse Laplace Transform .
4.3. Derive L.T. of standard functions and explain existence conditions of L.T.
4.4. Explain linear, shifting property of L.T.
4.5. Formulate L.T. of derivatives, integrals, multiplication by t^n and division by t.
4.6. Derive formulae of inverse L.T. and explain method of partial fractions .
4.7. solve problem on 4.1- 4.6

5. Fourier Series

5.1. Define periodic functions.
5.2. State Dirichlet's condition for the Fourier expansion of a function and it's convergence
5.3. Express periodic function $f(x)$ satisfying Dirichlet's conditions as a Fourier series.
5.4. State Euler's formulae.
5.5. Define Even and Odd functions and find Fourier Series in ($0 \le x \le 2\pi$ *and* $-\pi \le x \le \pi$).
5.6. Obtain F.S of continuous functions and functions having points of discontinuity in ($0 \le x \le 2\pi$ *and* $-\pi \le x \le \pi$)
5.7. Solve problems on 5.1 – 5.6

6. Numerical Methods

6.1. Appraise limitation of analytical methods of solution of Algebraic Equations.
6.2. Derive Iterative formula for finding the solutions of Algebraic Equations by :

6.2.1. Bisection method
6.2.2. Newton- Raphson method

6.3. solve problems on 6.2

7. Finite difference and interpolation

7.1. Explain finite difference and form table of forward and backward difference.
7.2. Define shift Operator (E) and establish relation between E & difference operator(Δ).
7.3. Derive Newton's forward and backward interpolation formula for equal intervals.
7.4. State Lagrange's interpretation formula for unequal intervals.
7.5. Explain numerical integration and state:
7.5.1. Newton's Cote's formula.
7.5.2. Trapezoidal rule.
7.5.3. Simpson's 1/3rd rule
7.6. Solve problems on 7.1- 7.5

Syllabus to be covered up to I.A.
Chapter: 1,2,3 and 4

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1.	Higher engineering mathematics	Dr B.S. Grewal	khanna publishers
2.	Elements of mathematics Vol-1	Odisha state bureau of text book preparation and production	
3.	Text Book of Engineering Mathematics-I	C.R Mallick	Kalayani publication
4.	Text Book of engineering mathematics-III	C.R Mallick	Kalayani publication

Th2. Circuit and Network Theory

(Common to Electrical /EEE/E&M/EIC)

Name of the Course: Diploma in Electrical Engineering			
Course code:			
Total Period:	75(60L+15T)	Semester	3rd
Theory periods:	4P/week	Examination :	3 hrs
Tutorial:	1P/week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. Rationale:

Study of Magnetic and Electric Circuits are essential in study of Electrical Engineering. Study of Circuits, Network and Filters constitutes the basic and fundamental aspect of deriving insight into the functioning and analysis of Electrical network, instruments and machineries.

B. Objectives:

After completion of this subject the student will be able to:

1. To develop the concept on Electrical circuit parameters
2. To develop problem solving ability on magnetic Circuit.
3. To develop knowledge on network analysis
4. Use of theorems in problem solving.
5. To develop knowledge on R-L, R-C and R-L-C circuit analysis in A.C
6. To understand the behavior of circuit in transient condition.
7. To develop knowledge of filters and their circuit characteristics

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the Topic	Period
1	Magnetic Circuits	07
2	Coupled Circuits	05
3	Circuit Elements And Analysis	06
4	Network Theorems	08
5	Ac Circuit And Resonance	08
6	Poly-phase Circuit	06
7	Transients	06
8	Two-Port Network	08
9	Filters	06
	TOTAL	**60**

D. COURSE CONTENT:

1. MAGNETIC CIRCUITS

1 . 1 Introduction
1 . 2 Magnetizing force, Intensity, MMF, flux and their relations
1 . 3 Permeability, reluctance and permeance
1 . 4 Analogy between electric and Magnetic Circuits
1 . 5 B-H Curve
1 . 6 Series & parallel magnetic circuit.
1 . 7 Hysteresis loop

2. COUPLED CIRCUITS:

2 . 1 Self Inductance and Mutual Inductance
2 . 2 Conductively coupled circuit and mutual impedance
2 . 3 Dot convention
2 . 4 Coefficient of coupling
2 . 5 Series and parallel connection of coupled inductors.
2 . 6 Solve numerical problems

3. CIRCUIT ELEMENTS AND ANALYSIS:

3 . 1 Active, Passive, Unilateral & bilateral, Linear & Non linear elements
3 . 2 Mesh Analysis, Mesh Equations by inspection
3 . 3 Super mesh Analysis
3 . 4 Nodal Analysis, Nodal Equations by inspection
3 . 5 Super node Analysis.
3 . 6 Source Transformation Technique
3 . 7 Solve numerical problems (With Independent Sources Only)

4. NETWORK THEOREMS:

4.1 Star to delta and delta to star transformation
4.2 Super position Theorem
4.3 Thevenin's Theorem
4.4 Norton's Theorem
4.5 Maximum power Transfer Theorem.
4.6 Solve numerical problems (With Independent Sources Only)

5. AC CIRCUIT AND RESONANCE:

5.1 A.C. through R-L, R-C & R-L-C Circuit
5.2 Solution of problems of A.C. through R-L, R-C & R-L-C series Circuit by complex algebra method.
5.3 Solution of problems of A.C. through R-L, R-C & R-L-C parallel & Composite Circuits

5.4 Power factor & power triangle.
5.5 Deduce expression for active, reactive, apparent power.
5.6 Derive the resonant frequency of series resonance and parallel resonance circuit
5.7 Define Bandwidth, Selectivity & Q-factor in series circuit.
5.8 Solve numerical problems

6. **POLYPHASE CIRCUIT**
6.1 Concept of poly-phase system and phase sequence
6.2 Relation between phase and line quantities in star & delta connection
6.3 Power equation in 3-phase balanced circuit.
6.4 Solve numerical problems
6.5 Measurement of 3-phase power by two wattmeter method.
6.6 Solve numerical problems.

7. **TRANSIENTS:**
7.1 Steady state & transient state response.
7.2 Response to R-L, R-C & RLC circuit under DC condition.
7.3 Solve numerical problems

8. **TWO-PORT NETWORK:**
8.1 Open circuit impedance (z) parameters
8.2 Short circuit admittance (y) parameters
8.3 Transmission (ABCD) parameters
8.4 Hybrid (h) parameters.
8.5 Inter relationships of different parameters.
8.6 T and π representation.
8.7 Solve numerical problems

9. **FILTERS:**
9.1 Define filter
9.2 Classification of pass Band, stop Band and cut-off frequency.
9.3 Classification of filters.
9.4 Constant – K low pass filter.
9.5 Constant – K high pass filter.
9.6 Constant – K Band pass filter.
9.7 Constant – K Band elimination filter.
9.8 Solve Numerical problems

Syllabus coverage up to Internal assessment
Chapters: 1, 2, 3, 4 and 5.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of the publisher**
1	Electrical Technology Volume – I [for module: 2 only]	B. L. Thereja	S. Chand
2	Introduction to CIRCUIT ANDNETWORK	Gargi Basu	Platinum

3	Network Analysis and Synthesis	B.R.Gupta	S.CHAND
4	Circuit and Networks	Sakhija & Nagsarkar	OXFORD
5	CIRCUIT & NETWORKS for modules:- 1,3,4,5,6,7,8,9	A. Sudhakar & Shyam Mohan S Palli	Tata McGraw Hill
6	Introduction to Circuit and Network	Gargi Basu	Platinum Publishers

Th3. Elements of Mechanical Engineering

(Common to Electrical and EEE)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P/week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. Rationale:

This subject has been introduced with a view to provide adequate understanding of properties of steam, thermodynamic laws, Boilers, Turbines, Condensers to the students of electrical engineering since these form the basic and fundamental aspect for drive mechanisms used in generation of electricity

B. Objectives:

On completion of the course content the students will be able to:

1. Explain the principle of working of Boilers, Turbines and condensers.
2. State the different types of boilers and Turbines and their uses.
3. Explain the properties of steam.
4. State and explain thermodynamic laws.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl No.	Topic	Periods
1.	THERMODYNAICS	06
2.	PROPERTIES OF STEAM	05
3.	BOILERS	10
4.	STEAM ENGINES	10
5.	STEAM TURBINES	06
6.	CONDENSER	04
7.	I.C. ENGINE	04
8.	HYDROSTATICS	05
9.	HYDROKINETICS	05
10.	HYDRAULIC DEVICES AND PNEUMATICS	05
	TOTAL	**60**

D. **Course Content :**

1. THERMODYNAICS:
   - 1 . 1 State Unit of Heat and work, 1st law of thermodynamics.
   - 1 . 2 State Laws of perfect gases
   - 1 . 3 Determine relationship of specific heat of gases at constant volume and constant pressure.
2. PROPERTIES OF STEAM:
   - 2.1 Use steam table for solution of simple problem
   - 2.2 Explain total heat of wet, dry and super heated steam
3. BOILERS:
   - 3 . 1 State types of Boilers

3 . 2 Describe Cochran, Babcock Wilcox boiler
3 . 3 Describe Mountings and accessories

4. STEAM ENGINES:
   4.1 Explain the principle of Simple steam engine
   4.2 Draw Indicator diagram
   4.3 Calculate Mean effective pressure, IHP and BHP and mechanical efficiency.
   4.4 Solve Simple problem.
5. STEAM TURBINES:
   5.1 State Types
   5.2 Differentiate between impulse and reaction Turbine
6. CONDENSER:
   6.1 Explain the function of condenser
   6.2 State their types
7. I.C. ENGINE:
   7.1 Explain working of two stroke and 4 stroke petrol and Diesel engines.
   7.2 Differentiate between them
8. HYDROSTATICS:
   8.1 Describe properties of fluid
   8.2 Determine pressure at a point, pressure measuring Instruments
9. HYDROKINETICS:
   9.1 Deduce equation of continuity of flow
   9.2 Explain energy of flowing liquid
   9.3 State and explain Bernoulli's theorem
10. HYDRAULIC DEVICES AND PNEUMATICS:
   10.1 Intensifier
   10.2 Hydraulic lift
   10.3 Accumulator
   10.4 Hydraulic ram

Syllabus coverage up to Internal assessment

Chapters: 1, 2, 3, and 4.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of the publisher**
1	Thermal Engineering	R. S. Khurmi	S Chand
2	Hydraulics & Hydraulic M/Cs	A. R. Basu	Dhanpat Rai & Co.
3	Thermal Engineering	A. S. Sarad	Satyaprakashan
4	Hydraulics & Hydraulic M/Cs	R. K. Bansal	Laxmi Publishers

Th4. ELECTRICAL ENGINEERING MATERIAL

(Common to Electrical /E&M)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P/week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. Rationale:

Electrical Engg. Materials hold prime importance for Electrical Engineers in design, installation & maintenance of electrical equipments. With the advent of latest metallurgical processes the materials used in the design processes brings safer and hazard free electrical installations. Hence basic knowledge on electrical Engineering materials is essential.

B. Objectives:

1. To clarify the students on insulating, conducting & magnetic materials.
2. To impart knowledge on the Physical, Electrical & Mechanical properties
3. To impart knowledge on practical uses of various materials in different areas.

C.TOPIC WISE DISTRIBUTION OF PERIODS

Sl No.	Topic	Periods
1.	Conducting materials	16
2.	Semiconducting materials	10
3.	Insulating materials	09
4.	Dielectric materials	08
5.	Magnetic materials	08
6.	Material for special purposes	09
	Total:	**60**

D. COURSE CONTENT:

1. **Conducting Materials:**
   - 1 . 1 Introduction
   - 1 . 2 Resistivity, factors affecting resistivity
   - 1 . 3 Classification of conducting materials into low-resistivity and high resistivity materials
   - 1 . 4 Low Resistivity Materials and their Applications. (Copper, Silver, Gold, Aluminum, Steel)

1.5 Stranded conductors
1.6 Bundled conductors
1.7 Low resistivity copper alloys
1.8 High Resistivity Materials and their Applications(Tungsten, Carbon, Platinum, Mercury)
1.9 Superconductivity
1.10 Superconducting materials
1.11 Application of superconductor materials

2. **Semiconducting Materials:**

2.1 Introduction
2.2 Semiconductors
2.3 Electron Energy and Energy Band Theory
2.4 Excitation of Atoms
2.5 Insulators, Semiconductors and Conductors
2.6 Semiconductor Materials
2.7 Covalent Bonds
2.8 Intrinsic Semiconductors
2.9 Extrinsic Semiconductors
2.10 N-Type Materials
2.11 P-Type Materials
2.12 Minority and Majority Carriers
2.13 Semi-Conductor Materials
2.14 Applications of Semiconductor materials
2.14.1 Rectifiers
2.14.2 Temperature-sensitive resisters or thermistors
2.14.3 Photoconductive cells
2.14.4 Photovoltaic cells
2.14.5 Varisters
2.14.6 Transistors
2.14.7 Hall effect generators
2.14.8 Solar power

3. **Insulating Materials:**

3.1 Introduction
3.2 General properties of Insulating Materials
3.2.1 Electrical properties
3.2.2 Visual properties
3.2.3 Mechanical properties
3.2.4 Thermal properties
3.2.5 Chemical properties
3.2.6 Ageing
3.3 Insulating Materials – Classification, properties, applications
3.3.1 Introduction
3.3.2 Classification of insulating materials on the basis physical and

chemical structure

3.4 Insulating Gases

3.4.1 Introduction.

3.4.2 Commonly used insulating gases

4. **Dielectric Materials:**

4.1 Introduction

4.2 Dielectric Constant of Permittivity

4.3 Polarization

4.4 Dielectric Loss

4.5 Electric Conductivity of Dielectrics and their Break Down

4.6 Properties of Dielectrics.

4.7 Applications of Dielectrics.

5. **Magnetic Materials:**

5.1 Introduction

5.2 Classification

5.2.1 Diamagnetism

5.2.2 Para magnetism

5.2.3 Ferromagnetism

5.3 Magnetization Curve

5.4 Hysteresis

5.5 Eddy Currents

5.6 Curie Point

5.7 Magneto-striction

5.8 Soft and Hard magnetic Materials

5.8.1 Soft magnetic materials

5.8.2 Hard magnetic materials

6. **Materials for Special Purposes**

6.1 Introduction

6.2 Structural Materials

6.3 Protective Materials

6.3.1 Lead

6.3.2 Steel tapes, wires and strips

6.4 Other Materials

6.4.1 Thermocouple materials

6.4.2 Bimetals

6.4.3 Soldering Materials

6.4.4 Fuse and Fuse materials.

6.4.5 Dehydrating material.

Syllabus coverage up to Internal assessment

Chapters: 1, 2 and 3.

Learning Resources:			
Sl.No	Title of the Book	Name of Authors	Name of Publisher
1	Electrical Engineering Material & Electronic components	K.B.Raina, S.K. Bhattacharya, T. Joneja	S. K. Kataria & Sons
2	An Introduction to Electrical Engineering Materials	C.S.Indulkar, S.Thiruvengadam	S. Chand
3	Electrical Engineering Materials	R.K.Shukla, Archana Singh	Mc Graw Hill

Th5. ENVIRONMENTAL STUDIES

(Common to all Branches)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. RATIONALE:

Due to various aspects of human developments including the demand of different kinds of technological innovations, most people have been forgetting that, the Environment in which they are living is to be maintained under various living standards for the preservation of better health. The degradation of environment due to industrial growth is very much alarming due to environmental pollution beyond permissible limits in respect of air, water industrial waste, noise etc. Therefore, the subject of Environmental Studies to be learnt by every student in order to take care of the environmental aspect in each and every activity in the best possible manner.

B. OBJECTIVE:

After completion of study of environmental studies, the student will be able to:

1. Gather adequate knowledge of different pollutants, their sources and shall be aware of solid waste management systems and hazardous waste and their effects.
2. Develop awareness towards preservation of environment.

C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	The Multidisciplinary nature of environmental studies	04
2	Natural Resources	10
3	Systems	08
4	Biodiversity and it's Conservation	08
5	Environmental Pollution	12
6	Social issues and the Environment	10
7	Human population and the environment	08
	Total:	**60**

D. COURSE CONTENTS

1. The Multidisciplinary nature of environmental studies:

1.1 Definition, scope and importance.

1.2 Need for public awareness.

2. Natural Resources:

Renewable and non renewable resources:

2.1 Natural resources and associated problems.

2.1.1. Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.

2.1.2. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.

2.1.3. Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.

2.1.4. Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, .

2.1.5. Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

2.1.6. Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification.

2.2 Role of individual in conservation of natural resources.

2.3 Equitable use of resources for sustainable life styles.

3. **Systems:**

3.1. Concept of an eco system.

3.2. Structure and function of an eco system.

3.3. Producers, consumers, decomposers.

3.4. Energy flow in the eco systems.

3.5. Ecological succession.

3.6. Food chains, food webs and ecological pyramids.

3.7. Introduction, types, characteristic features, structure and function of the following eco system:

3.8. Forest ecosystem:

3.9. Aquatic eco systems (ponds, streams, lakes, rivers, oceans,

estuaries).

4. **Biodiversity and it's Conservation:**

4.1. Introduction-Definition: genetics, species and ecosystem diversity.
4.2. Biogeographically classification of India.
4.3. Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.
4.4. Biodiversity at global, national and local level.
4.5. Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.

5. **Environmental Pollution:**

5.1. Definition Causes, effects and control measures of:

5.1.1 Air pollution.
5.1.2 Water pollution.
5.1.3 Soil pollution
5.1.4 Marine pollution
5.1.5 Noise pollution.
5.1.6 Thermal pollution
5.1.7 Nuclear hazards.

5.2. Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
5.3. Role of an individual in prevention of pollution.
5.4. Disaster management: Floods, earth quake, cyclone and landslides.

6. **Social issues and the Environment:**

6.1. Form unsustainable to sustainable development.
6.2. Urban problems related to energy.
6.3. Water conservation, rain water harvesting, water shed management.
6.4. Resettlement and rehabilitation of people; its problems and concern.
6.5. Environmental ethics: issue and possible solutions.
6.6. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
6.7. Air (prevention and control of pollution) Act.
6.8. Water (prevention and control of pollution) Act.
6.9. Public awareness.

7. **Human population and the environment:**

7.1. Population growth and variation among nations.
7.2. Population explosion- family welfare program.
7.3. Environment and humanhealth.
7.4. Human rights.
7.5. Value education

7.6. Role of information technology in environment and human health.

Syllabus coverage up to Internal assessment

Chapters: 1, 2 and 3.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1.	Textbook of Environmental studies	Erach Bharucha	#UGC
2.	Fundamental concepts in Environmental Studies	D.D. Mishra	S.Chand & Co-Ltd
3.	Text book of Environmental Studies	K.Raghavan Nambiar	SCITECH Publication Pvt. Ltd.
4.	Environmental Engineering	V.M.Domkundwar	Dhanpat Rai & Co

Pr1. MECHANICAL ENGINEERING LABORATORY

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	45	Examination :	3 hrs
Lab. periods:	3 P / week	Sessional:	25
Maximum marks:	75	End Semester Examination ::	50

1. APPLIED MECHANICS & MATERIAL TESTING

1.1 Determination of M.A.,V.R. and efficiency of Screw Jack

1.2 Determination of friction co-efficient of bearing

1.3 Determination of Young's modulus by Searle's Apparatus

1.4 Determination of M.A.,V.R. and efficiency of wheel train

1.5 Determination of Bending stress in beam using strain gauge

1.6 Study of Universal Testing Machine and determination of tensile stress and Young's module of M.S specification.

2. HYDRAULICS & HYDRAULIC MACHINE LAB

2.1 Study of pressure measuring devices such as (a) Piezo-meter (b) Simple manometer

2.2 Study of venturi-meter

2.3 Verification of Bernouli's Theorem

2.4 Model study of Centrifugal pumps, Francis, Turbine, Kaplan turbine and Pelton wheel.

3. HEAT ENGINE LAB

3.1 Study of Cochran Boiler

3.2 Study and demonstration of Stream Engine

3.3 Study and demonstration of Diesel Engine

3.4 Study and demonstration of Petrol Engine

Pr2. CIRCUIT AND SIMULATION LAB

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	90	Examination :	3hrs
Lab. periods:	6 P / week	Sessional:	50
Maximum marks:	100	End Semester Examination ::	50

A. Rationale:

The response of Electrical Circuit can be verified practically by applying different theorems and fundamental techniques. The students will become sure that the theoretical tricks which they have learned from books are true. The students will become competent in the field of circuit analysis

B. Objective:

On completion of the lab course the student will be able to:

1. Verify the theorems using different components.
2. Know the various types of filters.
3. Simulate different circuits using P-Spice/MATLAB software.

C. Course content in terms of specific objectives:

1. Measurement of equivalent resistance in series and parallel circuit
2. Measurement of power and power factor using series R-L-C Load.
3. Verification of KCL and KVL.
4. Verification of Super position theorem
5. Verification of Thevenin's Theorem
6. Verification of Norton's Theorem
7. Verification of Maximum power transfer Theorem
8. Determine resonant frequency of series R-L-C circuit.
9. Study of Low pass filter & determination of cut-off frequency
10. Study of High pass filter & determination of cut-off frequency
11. Analyze the charging and discharging of an R-C & R-L circuit with oscilloscope and Compute the time constant from the tabulated data and determine the rise time graphically.
12. Construct the following circuits using P-Spice/MATLAB software and compare the measurements and waveforms.
    i. Superposition theorem
    ii. Series Resonant Circuit
    iii. Transient Response in R-L-C series circuit

Note: P-Spice/MATLAB software might be loaded in 10 systems.

Pr3. MECHANICAL WORKSHOP PRACTICE

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	90	Examination:	3 hrs
Lab. periods:	6 P / week	Sessional:	25
Maximum marks:	75	End Semester Examination ::	50

1. Carpentry:

1 . 1 Name of carpentry tools and uses

1 . 2 Different operations

a. Sawing
b. Planning
c. Chiseling

1 . 3 Measuring & Marking

1 . 4 Different types of timbers used by carpenters, substitutions of timbers.

1 . 5 Jobs :

a. Slot. Notch
b. Mortise and tenon joint
c. Single dovetail joint

2. Turning

Study of S. C. Lathes and their accessories, practice in lathe work involving various operations such as plane turning, step turning, tapper turning, knuckling and external V. Threading. (One job only.)

List of Equipments for a batch size thirty (Electrical Laboratory)

Sl. No.	Equipment	Quantity
1	DC SHUNT MOTOR coupled with a DC SHUNT GENERATOR (MG SET)	
2	DC SERIES MOTOR	
3	DC SHUNT MOTOR	
4	DC COMPOUND MOTOR	
5	1- PHASE TRANSFORMER	
6	MULTIMETER	
7	MEGGER	
8	VOLTMETER [MI type 0-30, 0-300, 0-150-300-600 V], [MC type 0-50, 0-100, 0-150, 0-300, 0-600, 0-75-150 V]	
9	AMMETER [MI type 0-100mA, 0-2.5, 0-5, 0-5-10A] [MC type 0-100ma, 0-500 ma,0-1, 0-2.5, 0-3, 0-5A]	
10	WATTMETER [LPF-150W, 300W, 600W], [UPF 700W, 1400W]	
11	TACHOMETER [ANALOG & DIGITAL 0-10,000 rpm]	
12	P.F METER [5A,250V,0.5P.F]	
13	VARIABLE RESISTANCE (50Ω,5Amp)	
14	VARIABLE RESISTANCE (100Ω,5Amp)	
15	VARIABLE RESISTANCE (150Ω,5Amp)	
17	VARIABLE RESISTANCE (600Ω,1.2 Amp)	
18	VARIABLE RESISTANCE (20Ω,5Amp)	
19	RESISTIVE LOAD BOX (1.2KW)	
20	LAMP LOAD BOX (1.2 KW)	
21	STARTER (3 point)	
22	STARTER (4 point)	
23	BALL PIN HAMMER	
24	MALLET HAMMER	
25	COMBINATION PLIER	
26	NOSE PLIER	
27	WIRE GAUGE	
28	WIRE STRIPPER	
29	NEON TESTER(240V)	
30	MEASURINGTAPE(30M)	
31	SCREW DRIVER(10 INCH)	
32	SCREW DRIVER(5 INCH)	
33	ELECTRICIAN KNIFE	
34	WIRE CUTTER	
35	PVC TAPE	
36	Fuse(240v,5 amp)	
37	Fuse(240v,15 amp)	
38	One way switch(240v,5Amp)	
39	One way switch(240v,15Amp)	
40	Combination plier	
41	Nose plier	

42	Wire gauge	
43	Wire stripper	
44	Incandsecent lamp(180w,230v)	
45	Flourescent tube(40w,230v)	
46	Choke(230v)	
47	Starter	
48	Tubelight stand	
49	Lamp holder	
50	Sodium vapour lamp set	
51	Mercury vapour lamp	
52	Icdp switch(230v,5 amp)	
53	Ictp switch(400v,15 amp)	
54	Pcv board(2×2)	
55	Pcv board(2×4)	
56	Pcv board(4×6)	
57	Pcv board(6×6)	
58	Pcv board(4×10)	
59	Pcv board(6×8)	
60	Junction box	
61	PVC CONDUIT PIPE(20m)	
62	BATTENT(1.5 inch,10 m)	
63	CASING CAPPING(20m)	
64	5Pin Socket(230v,5Amp)	
65	5Pin Socket(230v,15Amp)	
66	Extention Chord(30m)	
67	FAN REGULATOR	
68	BEARING PULLER	
69	CAPACITOR(2.5µf,230V)	
70	CAPACITOR(3µf,230V)	
71	CEILING FAN	
72	PEDESTAL FAN	
73	BATTERY CHARGER [0-12-24 V]	
74	BANDPASS FILTER	
75	LOW PASS FILTER	
76	HIGH PASS FILTER	
77	BAND ELIMINATION FILTER	
78	CONSTANT K TYPE BANDPASS FILTER	
79	CRO	
80	FUNCTION GENERATOR	
81	NETWORK THEOREM KIT	
82	PARALLEL RESONANCE TRAINER KIT	
83	RC CIRCUIT AND TIME CONSTANT KIT	
84	SERIES RESONANCE TRAINER KIT	